

Enhancing Athletic Skill Acquisition Through a Holistic Approach: A Study on Senior High School Student-Athletes

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Abstract

This study investigates the level of skill acquisition among senior high school student-athletes in Region XI, Philippines, employing the Fitts and Posner Three-Stage Model to categorize their progress into cognitive, associative, and autonomous phases. Utilizing a descriptive-comparative research design and a structured questionnaire, data were collected from 53 respondents aged 16 to 18 years, enrolled in Grades 11 and 12. The findings reveal that, overall, student-athletes exhibit a high level of skill acquisition, with significant differences observed across gender and year level categories. The study highlights the critical influence of demographic factors on athletic development and underscores the importance of tailored interventions. This study is anchored on the theory of The Fitts and Posner Three-Stage Model by Paul Fitts and Michael Posner in 1967. Based on the results, a program titled “STEP-UP: Skill Training and Enhancement Program for Upgrading Performance” is proposed to address perceived gaps and foster effective skill progression among student-athletes. These insights aim to inform coaches, educators, and stakeholders in fostering an environment conducive to athletic and personal growth among youth.

Keywords: *student-athletes; skill acquisition; parental support; skill progression*

Introduction

Skill acquisition refers to voluntary control over movements of joints and body segments in an effort to solve a motor skill problem and achieve a task goal (Singh, 2025). The process of skill acquisition among senior high school student-athletes is particularly critical as it directly influences their performance, personal development, and future athletic potential. Fitts and Posner's Three-Stage Model (1967) remains a widely accepted framework for understanding how athletes progress from novice to expert stages through cognitive, associative, and autonomous phases.

International studies have consistently emphasized the importance of deliberate practice and feedback in promoting skill acquisition. In New York, skill acquisition is of major concern to individuals, educators, and trainers (Johnson & Proctor, 2016). Similarly, in Colombia, a study was conducted to emphasize the challenge of which practices are best in order to develop skills (Singh, 2025). In Singapore, a study shows how research findings about skill acquisition is not always easy to apply on the ground.

In the Philippine context, studies have highlighted the educational system's increasing recognition of sports as a critical domain of youth development. A study in Dipolog City emphasized the lack of instructional guidance as one factor of skill acquisition (Tegero, 2022). Further, a study in Sorsogon highlighted to design a

training program and to upskill coaches to better select skilled athletes (Eblio & Digo, 2024) . Similar study in Davao Del Norte revealed that educational leaders have challenges on with athletes setbacks in skills (Boquel & Junsay, 2023).

Therefore, this study aims to assess the level of athletic skill acquisition among senior high school student-athletes, focusing on their cognitive, associative, and autonomous development. It also seeks to explore how demographic factors such as age, gender, and year level influence skill progression. The findings of this research will serve as a basis for proposing strategic interventions aimed at enhancing the sports development experience for student-athletes in both local and national contexts.

Statement of the Problem

The purpose of this study is to describe the level of Skill Acquisition. Specifically, this study sought to answer the following:

1. Describe the profile of respondents in terms of:
 - 1.1 Age;
 - 1.2 Sex; and
 - 1.3 Year Level
2. Determine the level of Skill Acquisition in terms of:
 - 2.1: Cognitive Stage
 - 2.2: Associative Stage
 - 2.3: Autonomous Stage
3. To determine the significant difference on the level of Skill Acquisition when analyzed across the profile of the respondents.
4. To determine possible interventions based on the result of the study.

Theoretical/Conceptual Framework

This study is anchored on the theory of The Fitts and Posner Three-Stage Model by Paul Fitts and Michael Posner in 1967 which seeks to explain individuals who are still developing their athletic skills, balancing academics and sports, and are often in a phase where they are refining both fundamental and more complex skills in their chosen sport. The model helps explain how they progress from novice learners to more expert performers as they gain experience and practice.

For senior high school student-athletes, the Fitts and Posner Three-Stage Model of skill acquisition offers valuable insights into their progression. In the Cognitive Stage, athletes are often new to certain skills or techniques and experience significant challenges in executing them. As athletes move into the Associative Stage, they begin to refine their movements and make fewer mistakes, demonstrating more consistency in their performance. Finally, in the Autonomous Stage, athletes achieve a level of mastery where the skills become second nature. For high school student-athletes, this model underscores the importance of deliberate practice and the critical role of coaching in guiding athletes through these stages of skill development, ultimately helping them reach their peak potential.

Method

Quantitative research involves collecting and analyzing numerical data to identify patterns, make predictions, test causal relationships, and generalize results to broader populations (Bhandari, 2020). A descriptive-comparative study is a non-experimental research design that aims to determine the relationship among variables by comparing two or more groups or conditions without manipulating the independent variable. This study will be conducted among high school student-athletes in Region XI. It is a region of the Philippines located in Mindanao. The researcher will specifically select these high school student-athletes within Region XI due to their active engagement in various regional sports competitions. Region XI will be chosen as the study's focus, with its reputation as an inclusive and supportive environment for student-athletes.

The 20 respondents of the study were student-athletes enrolled in the secondary schools in Davao City, school year 2024- 2025. They were volunteers to participate in the study. The researcher can select respondents and the research locale associated with the research problem being studied. The respondents are below the legal age; therefore, ascent and informed consent will be used. In this study, the quantitative phase will entail the involvement of the selection of respondents through a purposive random sampling technique. This technique allows the researcher to focus on characteristics of a population that are of interest, which will best enable them to answer the research questions (Rai and Thapa, 2015). The researcher adopted a questionnaire to collect data for the independent variable. The frequency will be used to describe the profile of the respondents in terms of their age, year level, and sex. The mean will also be used to measure the level of skill acquisition of high school student athletes. In addition, a T-test will also be used to compare two groups based on the profile of the respondents.

Results and Discussion

This chapter outlines the discussion of the results and the analysis of the data. By employing suitable statistical methods, the gathered information was examined to address the issues outlined in the introduction of this study. The discussion is organized according to the order of the research objectives. Related literature is integrated to support and provide context to the findings.

Tables 1 provide a detailed demographic profile of the high school student athletes involved in the study. Outlined in the table are age distribution, sex, and year level of the students.

Table 1. Demographic Profile of Dance Sports Athletes

Category	Frequency	Percent (%)
Age		
14	1	1.8
15	2	3.7
16	6	11.3
17	26	49.0
18	14	26.4
19	2	3.7
20	1	1.8
23	1	1.8
Total	53	100
Sex		
Female	25	47.1
Male	28	52.8
Total	53	100
Year Level		
Junio High School	5	9.4
Grade 11	18	33.9
Grade 12	29	54.7
Other Level	1	1.8
Total	53	100

The table highlights the demographic characteristics of the student athletes, categorized by age, sex, and year level. The majority of respondents belong to the 17-year-old age group, representing forty-nine point six percent, followed by eighteen years old at twenty six point forty two percent and sixteen years old at eleven point thirty two percent, with smaller proportions for other age groups. The sex distribution shows higher percent for female respondents, with fifty two point eighty three and male with forty seven point seventeen percent female. Regarding year level, the majority of respondents are Grade 12 students, comprising fifty-four point seventy two percent, followed by Grade 11 students with thirty three point ninety six percent indicating that most of the respondents came from the senior high school.

Table 2. Level of Skill Acquisition of Student Athletes

Skill Aquisition	SD	Mean	Description
Cognitive	0.85	4.43	High
Associative	0.75	4.42	High
Autonomous	0.88	4.31	High
Overall Mean	0.83	4.39	High

Presented in table 2 are the descriptive statistics for the skill acquisition of student athletes, measured across three dimensions: Cognitive, associative, and autonomous, as well as the overall mean.

In this variable, the indicator cognitive achieved the highest mean score of 4.43, categorized as High, which means that the cognitive stage of student athletes is good. This indicates that student athletes are highly motivated to learn skills in sports. According to the Stam et al. (2020) study, young athletes' cognitive abilities are favorably correlated with their athletic performance and may aid in their improvement. Talented athletes can efficiently learn and train skills and raise their levels by improving their cognitive abilities. As a result, it has a favorable correlation with the degree of sports acquisition both now and in the future.

Additionally, student athletes have good associative skills, as indicated by the indicator associative stage, which has a mean score of 4.42 and is evaluated as high. This indicates that they start to hone their motions and commit fewer errors, exhibiting greater performance consistency. The associative stage is likewise characterized by a transition from cognitive understanding to more instinctive and fluid movements, according to an article by Stasulli (2018). Greater consistency results from athletes' actions becoming more refined and their performance becoming less variable as they continue to practice. All of these observations provide credence to the idea that student-athletes in the associative stage are improving their performance through efficient skill development, moving them closer to more dependable and consistent performance.

Last but not least, the Autonomous Stage had the lowest mean score, 4.31, which is also considered high. This indicates that student athletes' Autonomous qualities are also strong. This suggests that pupils are supported in all school-related activities and encouraged to acquire various skills for their own objectives. The findings point to the importance of fostering a sense of purpose, perhaps through participating sports activities and being physically active that align with students' personal goals and aspirations. Achieving a high mean score of 4.31 in the autonomous stage of skill acquisition indicates that student-athletes are progressing toward performing skills with greater automaticity and minimal conscious effort. It means that their progression allows them to focus on their performance, aligning their skill acquisition with personal goals.

The overall level of the skill acquisition of student athletes has a mean of 4.39, which is interpreted as High, means that the skill acquisition of the student athletes is monitored. This means that the perceived sports competence of student athletes is always observed enhancing their skill acquisition in sports. This study's findings are consistent with those of Drost and Todorovich (2017) who found that continuous feedback on students skill levels is essential for teaching and improving skill form. This emphasizes how crucial monitoring is for helping student athletes develop their skills. Additionally, the study by Zhou et al. (2021) state that there is compelling evidence of the impact of feedback interventions on students skill development when compared to students who were not observed and did not receive verbal feedback from their teachers.

Table 3. Difference in the Level of Fighting Spirit by Demographic Profile

Demographic Profile	F-value	P-value	Decision @ 0.05 Alpha	Interpretation
Age	0.21	7.542	Accept null hypothesis	No significant difference
Sex	0.62	4.097	Accept null hypothesis	No significant difference
Year Level	0.08	4.024	Accept null hypothesis	No significant difference

Presented in Table 3 are the results of the skill acquisition of student athletes. The ANOVA was used to assess differences in skill acquisition based on age, while the T-test was applied to examine differences between sexes and year levels.

The analysis of the age indicator shows a statistically significant relationship with the dependent variable. The F-value is 0.2128, which by itself suggests a relatively small effect or variance between age groups. However, the P-value is 7.542, an extremely small number that is far below the standard 0.05 alpha level. This indicates that the likelihood of observing such a result due to chance is virtually zero. As a result, the null hypothesis is rejected, confirming that age has a significant influence on the outcome being measured.

This study supports the findings of Thieschafer and Busch (2022) that performance is influenced by age thus skill naturally improves throughout adolescence. On the other hand, a study by Pelletier and Lemoyne (2022) the perceived competence of the players revealed age had no significant effect on it.

The analysis of the gender indicator also reveals a statistically significant effect on the dependent variable. The computed F-value is 0.625, which, similar to the other variables, appears relatively low and may suggest a modest difference between groups. However, the corresponding P-value is 4.097, an exceptionally small number that is far below the 0.05 alpha level. This extremely low P-value provides strong evidence against the null hypothesis, leading to its rejection. Therefore, it can be concluded that gender has a significant impact on the outcome being studied.

This study supports the findings of Gromeier et.al. (2017), that male yielded higher scores than female athletes leading to gender-specific differences in performance. On the other hand, a study by Wu et.al. (2024) revealed that there were no gender effects found in the skills of adolescent players and skills were consistent regardless of gender.

The analysis of the year level indicator shows that it has a statistically significant effect on the dependent variable. The F-value is 0.0873, which suggests minimal variance between groups based on year level. However, the P-value is 4.024, which is extremely small and far below the 0.05 alpha level. This indicates a very low probability that the result occurred by chance, leading to the rejection of the null hypothesis.

This supports the study of Purcell (2005) that year level is a significant factor in skill acquisition, highlighting that activities must be developmentally appropriate and should be at their level of developmental ability. Another study by Neto et.al (2021) revealed that athletes likely developed their fitness and skills in adolescent years with players moving to higher levels of their sport.

Based on the results of the study, an intervention plan titled “STEP-UP: Skill Training and Enhancement Program for Upgrading Performance” is proposed to address the significant differences in skill acquisition among student-athletes when analyzed according to age, gender, and year level. The program aims to enhance the cognitive, associative, and autonomous stages of skill acquisition by implementing age-appropriate, gender-responsive, and year-level-specific training modules. For age differences, younger athletes will focus on building fundamental motor skills and understanding of rules, while older students will be guided toward leadership roles and advanced skill application. Gender-sensitive coaching will be promoted through inclusive training sessions, gender-responsible workshops, and safe spaces for expression to ensure equitable development. Year-level interventions will target junior high school students with fun, engaging activities, while senior high school students will receive more technical and performance-based training aligned with their maturity and academic standing. A strong monitoring and feedback mechanism will be established through regular assessments, performance tracking, and personalized coaching to ensure continuous progress. Additionally, parent and community involvement will be encouraged through orientations and sports showcases to foster external support. This holistic approach not only aims to improve physical skills but also to develop confidence, autonomy, and sports leadership among student-athletes.

Conclusion

This study demonstrates that the progression of skill acquisition among senior high school student-athletes aligns with the Fitts and Posner Three-Stage Model, highlighting the sequential development from cognitive understanding to autonomous performance. The high scores across all stages suggest that athletes are effectively advancing through deliberate practice and coaching interventions tailored to their developmental needs. The significant influence of demographic variables further emphasizes the importance of stage-specific strategies to optimize performance at each level of skill mastery. These findings reinforce the validity of the Fitts and Posner model as a useful framework for understanding athletic skill development and underscore the necessity of structured training and feedback mechanisms in guiding athletes through these stages toward athletic excellence.

Recommendation

This study presents valuable findings that highlight the importance of creating tailored training programs aligned with each stage of athletes' skill development. Regular monitoring and constructive feedback are essential components for effectively tracking progress, reinforcing skills, and identifying areas for improvement. Interventions should consider demographic factors such as age and gender to ensure equitable and personalized support for all athletes. Additionally, ongoing coach education on age-appropriate and effective instructional strategies will enhance training quality. Engaging parents and the community through orientations, sports showcases, and support activities can foster an encouraging environment that motivates continued participation. Further research into long-term effects of targeted training and psychological aspects influencing skill acquisition can provide deeper insights, ultimately improving coaching practices and athlete development.

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Appendix: Survey Questionnaire

Research Title: Enhancing Athletic Skill Acquisition Through a Holistic Approach: A Study on Senior High School Student-Athletes

(Adapted from Fernandez, Y. J. R. T., Busalanan, C. N. C.,
 Busalanan, R. M. A., Orapa, L. C., Dapar, J. R. J., & Bulilawa, R. Y. (2023).

General Instruction: Please indicate how much you agree with each of the following statements based on your personal experiences as a dance sports athlete. Be truthful with your answers. Use the scale below to assess objectively.

The Likert scale below was used to analyze the results:

Range of Means	Description	Interpretation
4.6-5.0	Very High	This means that the fighting spirit of dance sports athletes is always evident.
3.7-4.5	High	This means that the fighting spirit of dance sports athletes is often evident.
2.8-3.6	Moderate	This means that the fighting spirit of dance sports athletes is sometimes evident.
1.9-2.7	Low	This means that the fighting spirit of dance sports athletes is rarely evident.
1.0-1.8	Very Low	This means that the fighting spirit of dance sports athletes is never evident at all.

Demographic Profile

Name: (Optional) _____

Age: _____

Sex: _____

Year Level: _____

A. COGNITIVE LEARNING	5	4	3	2	1
1. I am willing to learn sports skills.					
2. I find sports, as an interesting course.					
3. I am highly motivated to learn skills in sports.					
4. I actively participate in every practicum in Volleyball.					
5. I feel good whenever I play sports.					
B. ASSOCIATIVE LEARNING	5	4	3	2	1
6. In our PE class, the teacher gives constructive feedback on the students' performance.					
7. In our PE class, the teacher uses a group activity in the practice of sports skills to correct					

each other's mistake.					
8. In our PE class, the teacher uploads videos as points of reference to improve sports skills.					
9. In our PE class, the teacher puts the welfare of the learners above other considerations					
10. In our PE class, the teacher utilizes the time to identify my strengths and weaknesses when playing sports.					
11. During trainings, the coach demonstrates the different sports skills in a simple and understandable manner.					
12. During trainings, the coach is willing to give extra time to teach students further on the skills that I don't understand well.					
13. During trainings, the coach strives to assist slow learners when it comes to Sports.					
C. AUTOMOUS LEARNING	5	4	3	2	1
14. I am encouraged to learn the different skills for my personal gain.					
15. I am supported in every Sports activity in school.					
16. I am provided me with the necessary equipment to be used in sports.					
17. I am taught with the importance of joining sports activities and being physically active.					
18. I am rewarded if I have an excellent performance in Sports.					