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Improving primary school children's motor skills: a physical education approach using circuit games with auditory sequencing

[abc]Hilmy Aliriad*, [bcd]Mohamad Da'i, [de]Benny Widya Priadana, [cd]Moch Rimba Wigantara, & [de]Muchammad Ridwan Arifianto

Department of Physical Education, Sport, Health and Recreation, Faculty of Teacher Training and Education, Universitas Nahdlatul Ulama Sunan Giri, Bojonegoro, Indonesia

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ABSTRACT

Background: Basic motor skills are an important foundation for physical activity and development in primary school children. However, many pupils have a delay in the development of these skills, so an innovative approach to motor learning is needed. One promising method is the integration of circuit play and auditory motor sequencing. Basic motor skills are an important foundation for physical activity and development in primary school children. However, many students struggle to develop these skills, necessitating an innovative approach to motor learning. One promising method is the integration of circuit play and auditory motor sequencing. **Research Objectives:** This study aims to investigate and test the effectiveness of integrating circuit games with auditory motor sequencing in improving basic motor skills in primary school children. **Methods:** In this research and development (RND) approach that involves several stages, namely game concept and design development, initial testing, and evaluation and revision based on test results. A total of 40 fourth-grade students from three elementary schools in Bojonegoro were selected through a purposive sampling technique. Data collection was done analysing the basic motor skills of the students before and after the application of the method. Data analysis using the Content Validation Index (CVI) and Content Validity Ratio (CVR) to assess the validity of the contents of the model and T-test to measure the results of large-scale tests. **Finding/Results:** The study showed that integrating circuit games with auditory motor significantly improved the basic motor skills of primary school children. In addition, this method also increases students' interest and active participation in physical activity. **Conclusion:** The integration of circuit games with auditory motors is effective in improving basic motor skills in primary school children. These findings support the importance of using innovative approaches to motor learning. This research contributes to the enrichment of motor learning models that can be adapted by physical education teachers. Recommendations for further research may include investigating auditory motor with other learning materials in the field of physical education.

Keywords: Integration; circuit games; auditory motor sequencing; basic motor skills; primary school children

***Corresponding Author**
hilmy@unugiri.ac.id

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INTRODUCTION

The development of basic motor skills in primary school children is an important aspect of physical education, as motor skills are the basis for a range of physical activities that will be carried out throughout life (Ali et al., 2021; Aliriad et al., 2024). Basic motor

skills include the ability to perform basic movements such as running, jumping, throwing and catching, which play a role in building the foundation of a pupil's physical fitness and health (Chen et al., 2023; Cheng et al., 2023). However, many primary school students still face challenges in effectively mastering basic motor skills. Several factors, such as the lack of a structured training programme, teaching methods and lack of innovative teaching aids, become an obstacle in the process of learning motor skills. Therefore, a new approach is needed that can improve students' basic motor skills in a more interesting and effective way.

Previous studies have looked at different methods of improving basic motor skills in students (Cheung et al., 2022; Costa et al., 2021). The use of traditional games and play methods has been shown to be effective in teaching basic motor skills (Aliriad, 2023; Astiati et al., 2021; Widiarti & Anggita, 2022; Williams & Pill, 2021). In addition, several studies have shown that the integration of technology, such as video tutorials and educational applications, can increase students' motivation and involvement in learning motor skills (Martínez et al., 2022; Zamorano-García et al., 2022; Zhu & Wu, 2023). However, there is a paucity of research combining circuit play with auditory motor sequences in the context of learning basic motor skills. Several existing studies have shown the potential of these two approaches separately, but not many have explored the integration of the two as a comprehensive learning method.

Motor learning theory in physical education suggests that motor skills can be improved through repetitive and structured practice accompanied by appropriate feedback (Capio & Eguia, 2021; Indriyani et al., 2021; Lawson et al., 2021). In addition, the learning process, which combines visual, auditory and kinesthetic stimuli, can speed up the learning process and improve skills (Khovivah & Putri, 2023; Maspika & Kurniawan, 2019). Previous studies have found that circuit games can improve basic motor skills by providing an interesting and challenging variety of movements for students (Ardanari et al., 2023; Ramadhanty et al., 2022; Satria et al., 2023). Meanwhile, auditory motor sequences involving the use of rhythm and music have been shown to help students coordinate their movements more effectively.

The combination of these two approaches is expected to have a synergistic effect on the learning of basic motor skills. Although there are studies that support the use of circuit play and auditory motor sequences separately (Pranjić et al., 2024; Zhu et al., 2024), not many studies have explored the integration of the two in the context of learning basic motor skills in primary school. This study aims to fill this gap by developing a learning method that combines circuit play with auditory motor sequences. This approach is expected to make a new contribution to the field of physical education by providing a more comprehensive and effective method of improving students' basic motor skills. The aim of this study was to develop and test the effectiveness of integrating circuit games with auditory motor sequences in improving the basic motor skills of primary school children. To provide practical recommendations for physical education teachers in implementing this method in primary schools.

METHOD

Research Design

The study used research and development (R&D) methods to develop and test the effectiveness of integrating circuit games with auditory motor circuits. The research design includes needs analysis, product development, expert validation, limited trials, product revision, field trials, evaluation and finalisation (Anggraini et al., 2024; Asriansyah, 2018; Ranuharja et al., 2021; Utama et al., 2023). This methodology is

designed to produce a valid and effective learning model for improving the basic motor skills of primary school children.

Research Participants/Subjects

This study involved 40 fourth and fifth grade students from three primary schools in Bojonegoro Regency who were selected using a purposive sampling technique. This technique was used to ensure that the participants met the criteria for the study, i.e., children of primary school age with a variety of basic motor skills.

This study involved 40 fourth and fifth grade students from three elementary schools in Bojonegoro, selected using purposive sampling. The participants consisted of 24 male students (60%) and 16 female students (40%) with an age range of 9-11 years, with an average age of 10 years. Physically, the average weight of the participants was 35 kg with a range of 30-40 kg, while the average height was 140 cm with a range of 130-150 cm. All participants were reported to be physically fit and had no significant motor or hearing impairments, ensuring that they met the study criteria.

In addition, the pupils have different levels of basic motor skills, which can be categorised as basic, intermediate, and advanced based on the results of initial observations. The participants came from three different primary schools, providing diversity in terms of facilities, teaching methods, and social environment. This is complemented by a high level of enthusiasm for motor and auditory-based games, which was identified through initial observations. These data suggest that the study participants are a relevant representation for testing early auditory motor sequencing game models.

Research Procedure

The stages of the study began with a needs analysis to understand the requirements for the development of basic motor skills in pupils. This was followed by the development of circuit game model products with auditory motor circuits, which were validated by sports and motor experts using CVR and CVI. Initial trials were carried out with small groups of students to obtain feedback, after which the product was revised. The revised product was then implemented with a larger group in an 8-week field trial.

The validator criteria involved four experts with relevant skills to assess the feasibility and validity of the game model. The validators are exercise material experts, motor experts, learning planning experts, and exercise teachers. Physical education experts are needed because these studies focus on developing motor skills through a physical education approach. Educators or primary school teachers are also involved because their experience of teaching children can provide input into the implementation of games in the classroom.

Intervention/Treatment

The products developed in this research are 10 models of circuit games with auditory motor sequencing. This model is designed to improve pupils' basic motor skills through a combination of physical movement and auditory stimulation. The game model was used in physical education classes in schools during the 8-week intervention period.

Data Measurement and Data Analysis

Data were collected through questionnaires, observations, and tests of basic motor skills. Measurements were taken before and after the intervention to see the development of the students' motor skills. Data analysis used descriptive analysis and a one-sample t-test to compare basic motor skills scores at the pre-test and posttest stages to assess the effectiveness of the game model developed.

This study used several instruments to collect data, namely questionnaires, observation sheets, and tests of basic motor skills. Questionnaires were used to measure students' perception, motivation, and response to the game model. The validity of the questionnaire was tested through content validation by experts in physical education and child psychology, while its reliability was tested with Cronbach's alpha, which showed a value of > 0.7, indicating good consistency. Observation sheets are used to observe the students' behaviour during the game, such as motor coordination, auditory focus, and activity engagement, organised under the rubric of motor skills observation. The validity of the content of the observation sheet was tested by experts, while reliability was tested by inter-rater reliability with coefficients > 0.8. Tests of basic motor skills such as running, jumping, and throwing were measured using the Test of Gross Motor Development-2 (TGMD-2) (Han et al., 2022), an instrument that has been tested for construct and content validity. This test is highly reliable, with a test-retest reliability of > 0.9. The validity and reliability of all instruments are tested prior to use to ensure that the data collected are accurate and consistent, thus allowing a thorough evaluation of the effectiveness of the game model developed.

Research Ethics

This study followed ethical procedures, including obtaining school approval and parental permission to involve children as research subjects. Participants and parents were also given an explanation of the purpose of the study and the personal data protection policy that was maintained throughout the research process. Here is a table showing the game models developed in this study:

Table 1. Early Auditory Motor Sequencing Game Models

No.	Game Name	Description
1	Run and pat	Participants run around the area. At the sound signal they stop and clap twice.
2	Jump and listen to the sound	The participants jump over lines or obstacles. After each jump, call out the colour or number the instructor has called out.
3	Step and follow the pattern	Participants run on the track. At the instructor's signal, they stop and make movements such as turning or squatting.
4	Recording and repeating movements	The instructor throws the ball. Participants catch the ball and repeat the instructor's sound or beat pattern.
5	Walking and running to the beat	Participants run in response to the instructor's voice commands (for example, "run fast" or "run slow").
6	Walking to the beat	Participants run on the spot. When they hear a knock, they make a movement such as jumping or shaking hands.
7	Zigzag with voice instruction	Participants run in a zigzag path. At a certain sound, make a movement or change direction as instructed.
8	Walking while following a pattern	Participants walk according to a pattern indicated by a sound or tapping, e.g. "tap-tap, pause, tap".
9	Throw and catch the ball while following the instructions	Participants throw the ball while listening to a sound pattern to follow, such as a beat or melody.
10	Stop and start the game	Participants run around the area. At a certain sound, they stop and perform the movements indicated by the instructor, e.g. high jump or squat.

The results of the observations show the success of this game model, with most students achieving a success rate of over 70% for each game. The Run and Pat game showed an average response time of 1.5 seconds with a success rate of 85%, while the Walking and Running to the Beat game achieved a speed suitability rate of up to 90%.

Games involving complex patterns, such as recording and repeating movements or throwing and catching the ball while following instructions, also showed positive results, with more than 75% of students able to complete the tasks according to instructions.

The researchers asked four experts, consisting of a sports material's expert, a motor expert, a learning planning expert, and a sports teacher, to evaluate the series of games with auditory motor sequencing. After obtaining the assessment of the four experts, the next step is to analyse the data to evaluate the validity of the model "circuit game with auditory motor sequencing". Analysis using the Content Validation Index (CVI) and the Content Validity Ratio (CVR) to assess the validity of the content of the model. Field trials consisting of two phases, namely small group trials and large group trials. CVI measures the suitability of model content based on an expert assessment of the relevance, clarity, and usefulness of each item. High CVI values indicate that the majority of experts agree the items in the model correspond to the goals of developing motor skills. Meanwhile, the CVR assesses whether items in the model are considered "essential" by experts. A positive CVR indicates that experts agree on the importance of the item in the model. Good CVI and CVR values confirm that this model has strong content validity and deserves to be applied in the context of physical education for elementary school children.

Table 2. Content Validation Index (CVI) Results for the Game Model

No.	Aspect Evaluated	Expert 1	Expert 2	Expert 3	Expert 4	CVI
1	Content Relevance	1	1	1	1	1
2	Instruction Clarity	1	1	1	1	1
3	Usefulness in Learning	1	1	1	1	1
4	Alignment with Learning Objectives	1	1	1	1	1
5	Logical Game Structure	1	1	0.75	1	0.94
6	Alignment with Auditory Motor Skills	1	1	1	1	1
7	Game Variations	0.75	1	1	1	0.94
8	Safety in Implementation	1	1	1	1	1

The results of the Content Validation Index (CVI) assessment, which reached a value of 1 in most aspects and 0.94 in several others, indicate that the majority of experts agree that this model is very relevant, clear, and useful for the development of auditory motor skills in primary school children.

Table 3. Scale for Rating the Teaching

Scale	Rating Description
1	very unsuitable / very inappropriate / very unsafe / very inconvenient / very impractical / very unsafe
2	inappropriate / inadequate / unsafe / inconvenient / impractical / not optimisable
3	accurate / precise / safe / easy / practical / can be optimised
4	very suitable / very accurate / very safe / very easy / very practical / very optimal

Table 4. Validation Expert Assessment Instruments

No.	Assessment Aspects	Rating Scale			
		1	2	3	4
1.	Conformity of the developed game model with the standards of competence and basic competence and their indicators.				
2.	Conformity between indicators and content and assessment.				
3.	Accuracy of the contents of the auditory motor sequencing circuit game developed for primary school children.				
4.	The accuracy of the contents of the circuit game with auditory motor sequencing was developed with the characteristics of the pupils of the primary school.				
5.	Safety learning model circuit game with auditory motor sequencing developed.				
6.	Ease of learning circuit game model with auditory motor sequencing developed.				
7.	Practicality of learning model circuit game with auditory motor sequencing developed.				

No.	Assessment Aspects	Rating Scale			
		1	2	3	4
8.	Circuit game learning models with auditory motor sequencing developed can increase children's activity.				
9.	Circuit game learning model with auditory motor sequencing developed to optimise knowledge (cognitive) elementary school students.				
10	Circuit game learning model with auditory motor sequencing developed to optimise the FMS of primary school students.				

RESULTS AND DISCUSSION

The research tool used an expert rating scale instrument to assess the feasibility of designing a learning model for developing auditory motor sequencing circuit games for primary school children to improve motor skills. The rating scale was tested on four experts and practitioners to test the feasibility of the model to be developed. The results of the validation tests conducted by four experts were used to determine the level of validity of the auditory motor sequencing circuit games model. CVR was used to analyse the results of the expert ratings, and the results showed a good level of validity.

Table 5. CVR Test Results for Learning Model Circuit Game with Auditory Motor Sequencing

No.	E1	E2	E3	E4	ne	N	N/2	ne(N/2)	CVR	Criteria
1	4	4	4	4	4	4	2	2	1	valid
2	4	4	4	4	4	4	2	2	1	valid
3	4	4	4	4	4	4	2	2	1	valid
4	4	4	4	3	3	4	2	1	0.5	valid
5	4	3	3	3	1	4	2	1	0.5	valid
6	4	4	4	4	4	4	2	2	1	valid
7	3	4	4	4	3	4	2	1	0.5	valid
8	3	4	4	4	3	4	2	1	0.5	valid
9	3	4	4	4	3	4	2	1	0.5	valid
10	3	4	4	4	3	4	2	1	0.5	valid
Total		36	39		39	38	Total		6	
Average		3.6	3.9		3.9	3.8	Average		0.6	valid
	Average				3.8					

The results of the CVR analysis of the auditory-motor sequencing game circuit model (Table 4) showed a value of 0.6, which means that the content of the development of the auditory-motor sequencing game circuit learning model is appropriate or relevant or good and has a high content validity, so it can be further tested for empirical validation. The results of the analysis of the test validity of the activities in the instrument learning model can be seen in Table 5 below:

Table 6. Validity Test Results of Instruments for the Development of Learning Models

Aspect	Score Rater	correlation coefficient	P	Status
Movement Skill	Rater 1 - score total rater	0.718	0.05	Valid
	Rater 2 - score total rater	0.803	0.05	Valid
	Rater 3 - score total rater	0.748	0.05	Valid
Cognitive Skill	Rater 1 - score total rater	0.790	0.05	Valid
	Rater 2 - score total rater	0.563	0.05	Valid
	Rater 3 - score total rater	0.718	0.05	Valid
Fun	Rater 1 - score total rater	0.803	0.05	Valid
	Rater 2 - score total rater	0.748	0.05	Valid
	Rater 3 - score total rater	0.790	0.05	Valid
Focuss Attention	Rater 1 - score total rater	0.629	0.05	Valid
	Rater 2 - score total rater	0.709	0.05	Valid
	Rater 3 - score total rater	0.602	0.05	Valid

The results of the correlation calculation showed a positive and significant relationship between scores 1, 2, and 3 with the total score for the motor skills, cognitive, enjoyment, and attentional aspects. The researchers then tested the reliability of the auditory motor sequencing game circuit using the ICC test with three raters. The results of this reliability test are shown in Table 5. The implementation of the first stage of the game module was tested with a small group of 20 students from Elementary School Pilang Kanor District. The purpose of this stage is to evaluate the initial effectiveness of the designed game. Preparation includes preparing instructions, providing tools, and arranging the game area according to the notes of the expert learning physical education and basic movement experts. Data collection was done through direct observation and basic motor skills tests before and after the implementation of the module (Ardanari et al., 2023; Barca et al., 2022). Observations recorded how the students interacted with the game, their level of difficulty, satisfaction, and engagement. Basic motor skills tests are used to measure changes in students' skills because of the trial. Once the data has been collected, an analysis is carried out to evaluate the effectiveness of the game (Devereux et al., 2023). This evaluation involves a review of observation records and a comparison of test results before and after the trial.

Table 7. Expert Validation in Circuit Game with Auditory Motor Sequencing of Interview Results

No.	Game name	Notes from a sports learning expert	Basic movement expert notes
1	Run and pat	Effective games for motor response to cues. Ensure the safety of the running area.	Focus on running coordination and applause. Keep a steady rhythm.
2	Jump and listen to the sound	Very the height of the obstacles and the difficulty of the sound to suit the ability of the participants.	Take care of your jumping and landing technique to avoid injury. Build strength and endurance.
3	Step and follow the pattern	Use a clear and consistent voice. Make sure the track is clear.	Pay attention to the transition between walking and moving. Improves body awareness and coordination.
4	Recording and repeating movements	Great game for tracking skills and auditory memory. Use a safe ball.	Watch your catching technique and reaction speed. Improves fine motor skills and response to stimuli.
5	Walking and running to the beat	Very the voice prompts to maintain engagement. Use different types of sounds.	Focuses on speed of movement change and adaptation to instruction. Increase flexibility and reaction time.
6	Walking to the beat	Beats should be varied and easy to hear. Good for coordination of hearing and body movements.	Attention should be paid to the correspondence between strokes and movements. Develops rhythm and motor coordination.
7	Zigzag with voice instruction	Make zigzags safe. Tones should be clear and distinct.	Improves zigzag running technique and change of direction. Improves balance and motor control.
8	Walking while following a pattern	The sound pattern should be consistent and simple. Very the patterns to increase the challenge.	Improves motor memory and ability to follow instructions. Adapt the pattern to the ability of the participants.
9	Throw and catch the ball while following the instructions	Adapt the difficulty of the sound pattern to the skill level of the participant. Improves hand-eye coordination and auditory memory.	Emphasises technique of picking up and responding to sound patterns. Develops fine motor and cognitive skills.
10	Stop and start the game	Vary the types of sounds to increase motivation. Make sure the playing area is large enough to allow for quick changes of movement.	Focuses on movement techniques and responses to sounds. Increases reaction speed and coordination of the body.

Table 8. Game Revision of the Product Range with Auditory Motor Testing

No.	Game Name	Description
1	Running and clapping	Participants run around safe areas. At a sound signal (whistle or clap) they stop and clap twice.
2	Jumps and sounds	The participants jump over lines or obstacles. After jumping, call out the colour or number mentioned by the instructor.
3	Walk and listen	Participants run on a safe path. At a specific sound from the instructor, they stop and perform movements such as turning or squatting.
4	Catch and repeat	The instructor throws the ball to the participants. Participants catch the ball and repeat the sound or beat pattern given by the instructor.
5	Walking with clues	Participants run in response to the instructor's voice commands (for example, "run fast" or "run slow").
6	Walking and tapping	Participants run on the spot. When they hear a beat (for example, a drumbeat), they make certain movements such as jumping or shaking hands.
7	Zigzag with sound	Participants run in a zigzag path. At a certain sound, make a movement or change direction as instructed.
8	Walking and following a pattern	Participants walk to a pattern of sounds or taps, e.g. "tap-tap, pause, tap".
9	Catch and follow pattern	Participants throw the ball while listening to a sound pattern to follow, such as a beat or melody.
10	Stopping and starting the game	Participants run around a large area. At a certain sound, they stop and perform the movements the instructor mentions, e.g. high jump or squat.

Large group trials using experimental methods with one group pretest posttest with a population of 40 samples. The instrument used in this study is the Test of Gross Motor Development Second Edition (TGMD-2) developed by Dale A. Ulrich, PhD (Hu et al., 2023; Ma & Luo, 2023). The TGMD-2 is recognised as a valid and reliable tool for measuring gross motor development in children. It is specifically designed to assess gross motor skills in the context of a specific physical activity. Using the TGMD-2, researchers can measure students' progress before and after the intervention.

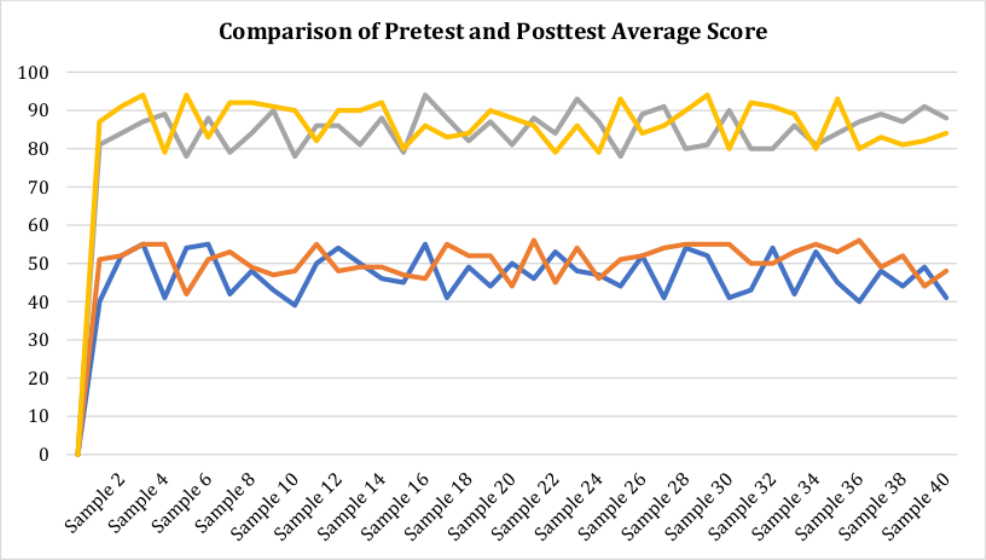

Figure 1. Graph of Pretest and Posttest Results

Table 9. Results One-Sample Test of Gross Motor Development, Second Edition

Conditions	T value	Average Difference	Confidence Interval 95%	Significance
Pretest	106.36	48.80	47.87 - 49.73	Very Significant
Posttest	209.36	85.65	84.82 - 86.48	Very Significant

The results of the t-test carried out to assess the difference between the pre-test and the posttest showed significant results. The T-value for the pretest is 106.361 with degrees of freedom (df) of 39, and the p-value (Sig. (2-tailed)) was .000. This shows that the pretest score is significantly different from 0, with a mean difference of 48.80000. The 95% confidence interval for this difference ranges from 47.8720 to 49.7280, indicating that the mean pretest score is 48.8 at the 95% confidence level.

The T-test results for the posttest also showed high significance, with a T-value of 209.356, df of 39, and a p-value (Sig. (2-tailed)) of .000. This shows that the posttest score is also significantly different from 0, with a mean difference of 85.65000. The 95% confidence interval for this difference is between 84.8225 and 86.4775, indicating that the mean posttest score is 85.65 at the 95% confidence level.

The results of this study indicate that the circuit games model with auditory motor sequencing is very effective in improving basic motor skills. The pretest means of 48.8 and the posttest mean of 85.65 showed a significant improvement after the intervention. A very high t-value and a very small p-value (p = .000) indicate that this increase is not due to chance but to the intervention.

Model circuit games with auditory motor sequencing are designed to improve basic motor skills through a combination of physical exercise and auditory motor sequencing. A significant increase from pretest to posttest supports the hypothesis that this model has a positive effect on students' motor skills. With strong evidence from statistical test results, the circuit game model can be recommended in physical education and training programmes to effectively improve basic motor skills.

This finding is consistent with previous research by Al Anshory and Sulistijorini (2019) and Eng (2022), which states that a game-based approach can significantly improve students' motor skills (Al Anshory & Sulistijorini, 2019; Eng, 2022). Their research used games as a learning medium to improve motor skills by actively engaging students and providing interesting stimulation. This research supports the theory that motor skills can be improved by providing varied and interesting stimulation for children (Gomes et al., 2024; Gustian et al., 2024; Júnior et al., 2022).

According to Caravaca-Rodriguez et al. (2022) and Gao et al. (2020), a multisensory approach that combines auditory and visual stimulation can accelerate the process of motor learning in children (Caravaca-Rodriguez et al., 2022; Gao et al., 2020). The Rizwan (2023) study supports this finding by demonstrating that play-based physical activity interventions had a greater impact on motor development than more traditional methods (Rizwan, 2023).

This research is also in line with (Ito, 2020; Mota-Rojas et al., 2024; Sabet et al., 2023), which emphasises the role of experiential learning in improving motor skills. Using games as a learning medium activates different sensory areas in children, which then promotes the improvement of their motor skills. This is supported by (Aarabi et al., 2023; Nees, 2024; Russell, 2020), which found that social and sensory interactions in games support children in exploring their motor skills.

In addition, the study provides new insights into the important role of auditory aspects in motor learning. Children's motor coordination skills improved more quickly when they engaged in activities that included auditory stimuli (Liang et al., 2023). This suggests that motor learning approaches that focus on physical movement alone, without additional sensory stimulation, may be less effective than multisensory approaches.

The use of the Test of Gross Motor Development Second Edition (TGMD-2) as a measurement tool in this study also supports the validity of the findings. The TGMD-2 is a reliable and valid tool for measuring motor skills in school-aged children (Pomper et al., 2020). TGMD-2 effective in identifying changes in motor skills following game-based interventions (Gustian et al., 2024). Previous research has also highlighted that physical and cognitive stimulation together have a synergistic effect on motor development. Children who engage in structured physical activity that includes auditory and cognitive elements have faster motor development than those who engage in conventional physical activity (Jurado et al., 2021; Sogabe et al., 2022).

Overall, the findings of this study make an important contribution to the growing literature on motor learning, particularly in the context of primary education. This is consistent with the recommendations (Glannon, 2021; Zheng, 2023) which emphasises that the development of motor skills requires not only physical activity, but also the integration of cognitive and sensory elements to achieve optimal results..

Learning models that combine auditory, and motor aspects show better results than conventional methods that focus only on physical movement without additional sensory stimulation. This study provides new insights into the importance of integrating auditory aspects in motor learning, which may have been under-recognised in related research to date. Using the Test of Gross Motor Development, Second Edition (TGMD-2), the study showed that this tool was effective in measuring changes in students' motor skills before and after the intervention.

This research has important practical implications for physical education teachers and other practitioners. With strong evidence from these statistical test results, the circuit games model with auditory motor sequencing can be recommended for use in physical education and training programmes to effectively improve basic motor skills. Innovative and game-based learning approaches not only improve physical skills but can also increase student engagement and motivation in the learning process. Thus, this model can become an integral part of the physical education curriculum to support the holistic development of students. However, there are limitations to this research. Firstly, the study was carried out with only one group of primary school children, so the results of the study are limited. Secondly, the duration of the intervention may not have been long enough to see the long-term effects of this learning model. Further research is needed to explore the long-term effects and applicability of this model to the wider population. In addition, researchers can also explore different combinations of games and other sensory stimulation to find the most effective methods of improving motor skills.

CONCLUSION

This study shows that the circuit games model with auditory motor sequencing is very effective in improving basic motor skills in primary school children. This approach broadens the understanding of how additional sensory stimulation can effectively improve children's motor skills, and this study makes a new contribution by emphasising the importance of integrating auditory aspects into motor learning models. In practical terms, the results of this study suggest that physical education teachers and practitioners can consider using circuit game models with auditory motor sequencing in their physical education programmes. This approach not only improves students' basic motor skills but can also increase students' involvement and motivation in the learning process. The integration of auditory aspects of motor learning can be an important component of the physical education curriculum to support the holistic development of students. This research provides a solid foundation for the application of innovative learning models

and paves the way for further research to extend these findings and improve the practice of motor education.

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CONFLICT OF INTEREST

The authors declare that they have no competition.

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