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Original Article

The Development of a differentiation-based learning model in football school students

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Abstract
Basic technical skills largely determine the mastery of the game in football. If the basic movements or techniques of football are not taught properly starting from elementary school age, then players will find it difficult to perform the actions in the game of football. Given that the age of football school students ranging from 6-12 years is a golden age for learning and considering the students' abilities and interests are diverse, therefore a learning model is needed that suits the diversity and initial ability of students to optimize basic football technical skills. This study aims to produce a differentiation-based basic football technique skills learning model. The method used in this study was research and development, referring to the stages of development of Borg and Gall adapted into 4 stages of development, namely: (1) preliminary study stage, (2) planning stage, (3) field test stage 1 and initial revision, (4) field test stage 2 and final revision. The data collection instruments used were questionnaires, and the data analysis techniques used were the descriptive statistics with percentages. The research product was in the form of a differentiation-based basic football technique skills learning model. This model was validated by 2 football experts and 1 football school coach (SSB) who had a coaching license. The results of expert validation obtained a score of 25 out of a maximum total score of 30 with a percentage of 83%. Based on these results, it can be stated that the development of a differentiation-based learning model is very feasible to be developed to improve the basic football engineering skills of football school students.
Keyword: **Development, Differentiation learning, Basic football techniques**

Introduction

One of the supporting factors to improve the quality of human resources is through sports. Sports in human life in general are very influential because with the existence of human exercise can improve body fitness and maintain health (Bafirman et al., 2023; HB et al., 2023). In addition to maintaining and improving the condition of body fitness, sports can also be used as a place to obtain achievements, therefore sports really need special attention and coaching in an effort to find new seeds and improve athletes' achievements (Cerqueti et al., 2022).

Sports achievements consist of various sports that are always competed or contested to reach the top rank, including football, badminton, basketball and many more (Antonie, 2023; Madarsa & Mohamad, 2022). These sports have grown rapidly both nationally and internationally (Murray et al., 2022). To achieve achievements in sports, many things must be owned by players, including; physical, technical, tactical, and mental/psychological abilities. Samuel R. et al., (2019) supported that athlete needs to master physical, technical, tactical, and psychological skills to succeed in sports.

According to Aragão e Pina et al., (2021), one of the sports achievements that has become popular in Indonesia is football. It is frequently found that children and adults who do soccer using simple facilities. The factor that causes this sport is very famous and popular because the game has a beautiful value from the techniques displayed during the game. Werner & Dickson (2018) explained that football is a complex game. The physical, technical, tactical and mental components are indispensable during the game.

Football is one of the big ball games played in teams facing each other and requires team solidity to get a good game. Oliver et al., (2020) stated that in order to create a good game in playing football, mastery of good basic football techniques is needed. The basic techniques of the game of football include passing (techniques of passing the ball), controlling (techniques of stopping the ball), dribbling (dribbling techniques), shooting (techniques of kicking or shooting the ball hard into the opponent's goal), heading (techniques of heading the ball), intercepting (techniques of grabbing the ball), sliding tackle (techniques of sweeping the ball), throwing in (throw-in technique), goal keeping (ball catching technique), and juggling (ball carrying technique to train ball control) (A. C. Constantinou et al., 2012; Cust et al., 2019).

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In addition, modern football games with a very fast pace of play make players will often face the ball, both when running and anticipating unexpected situations (A. Constantinou & Fenton, 2017; Quinn et al., 2023). Moreover, players will often face a variety of choices at a fast rate, so it is required for players to be as fast as possible in making decisions. If players are not trained in mastering basic techniques and decision-making in playing football, then players and teams will find it difficult to develop the game (Valencia Sánchez & Arias Arias, 2021; Vasilica et al., 2022). Basic technique and intelligence to play in the game of soccer is very important because with basic techniques and fast decision-making. Players will be able to prepare the next movement according to the demands of the situation in the game (Holmes & McHale, 2023).

The thing that must be done to be able to improve and develop basic techniques in the game of soccer is to do patterned coaching and exercises that suit the needs of students. Lyubovsky et al., (2022) argued that mastery of basic soccer technical skills is a component that cannot be ignored in the coaching process, especially starting from an early age. Clearly, early age football coaching is one of the main factors that affect football sports achievement because it produces professional players needed in achieving maximum achievement (Ghanatian et al., 2023). Coaching that starts from elementary school age systematically and programmatically will support to produce outstanding athletes. In line with what Sucipto et al., stated that achievements can be achieved through long exercises, carried out programmatically, systematically, purposefully and continuously (Wang & Guo, 2023).

Many ways have been done by previous researchers in an effort to improve the basic techniques of playing football for football school students (SSB) aged 6-12 years. Some of them are with modified game methods, small side games, drill methods, and so on. The results of the study showed that these methods can improve the basic engineering skills of SSB students. Among them is research with a game modification approach. The results of this method can improve basic dribbling technique skills in SSB Silampari Tugumulyo participants (Alghamdi, 2023; Wagnsson et al., 2016). Then, the results of the research with a small side game approach showed that small sided games practice was able to provide an increase in the passing accuracy of SSB students. While other studies McHale & Holmes, (2023) who used the drill method also showed that there was a significant improvement in the basic passing technique skills of SSB Sheva Sukakersa students.

All of these methods researchers concluded can improve basic football techniques. However, from the various results of this study, the researchers see that from all approaches, there are still players who do not have improvement, meaning that the training approach given by the coach has not provided changes to students as a whole (Hides et al., 2020; Zhan et al., 2023). Based on preliminary analysis, it turns out that not all students can run the form of play given by the coach because these students have problems with basic movements such as coordination, balance, walking, how to run. This problem often makes students who do not have this the best in the training process because so far the coach provides a one-way form of exercise, in the sense that if a coach wants a drill method, all students must follow the drill exercise, if the coach wants a method of playing all students must follow the form of the game. However, whether all students are fully prepared in carrying out the activities that will be given by the trainer means that the trainer must realize that each individual has different initial abilities (Barrett et al., 2021; Subramaniyan & Ramiah, 2020).

This should be the concern of the coach or teacher. Trainers must know why students are not able to master basic technical skills well. Many factors influence such as student motivation in undergoing the training process, interests and talents that have not been channeled properly. All of these factors put forward can determine a person's success in learning and mastering a form of basic technical skills playing soccer. Rodrigues & Pinto, (2022) In addition, the method of learning / training carried out by trainers or teachers tends to be centered on the trainer / teacher, which students practice basic technical skills based on orders. The ability of students to understand and absorb lessons is definitely different levels. Some are fast, medium and some are very slow. Therefore, they often have to take different ways to be able to understand the same information or lesson (Baboota & Kaur, 2019)

Therefore, the researchers are interested to develop a learning model to improve the basic technical skills of differentiation-based football. In providing football learning at a young age, things that must be considered for coaches or teachers are forms of learning based on student needs, initial abilities, and interests. According to Marlina, differentiated learning is an adjustment to students' interests, learning preferences, and readiness in order to achieve improved learning outcomes (Hewitt & Karakuş, 2023). Differentiated learning is not individualized learning. However, it is more inclined to learning that accommodates students' strengths and learning needs with independent learning strategies. Differentiated learning is in line with the educational philosophy of Ki Hajar Dewantara that education provides guidance for all the abilities of children so that children are able to achieve the highest safety and happiness. Educators or trainers can only guide the growth or life of abilities that exist in children. In the process of guiding, children are given freedom so that children can find their independence in learning. In the end, students will be able to learn according to their respective abilities (Ati et al., 2023).

Based on the analysis of field needs through observation at one of the SSBs in Padang City, namely SSB Musfan, almost all players have difficulty in carrying out the training material given by the coach even though in the form of playing 3 v 3 or 3 v 2 which resembles a match, student motivation in carrying out the training process is reduced. In addition, conventional training methods, centered on trainers without paying

attention to student needs, not all students are ready to run the material provided. Another limitation found is the lack of trainer knowledge about student characteristics and exercise models that are in accordance with the initial abilities of elementary school-age students ranging from 6-12 years. After the researchers conducted interviews with SSB Musfan students, it turned out that there were players who liked fun games to improve multilateral movements; there were also players who liked to play like matches; there were also players who liked to drill to improve basic motion coordination. This means that the needs of the player are different even though the training objectives are the same. If this is not noticed by the coach, the coach still provides one-way exercises to all students. It will have an impact that not all of our students are motivated in carrying out the exercises given.

Based on these limitations, the researchers are interested to produce a differentiation-based football learning model. This training model has the principle of learning the game of football through activities needed by the students themselves. The activities given are based on the initial abilities and interests of the students themselves. This principle of differentiated learning is supported by several studies. According to Marlina, differentiated learning is a cyclical process of finding out about students and responding to their learning when trainers / teachers continue to learn about the diversity of their students, professional, efficient, and effective learning will be realized. (Gu et al., 2023). It is more engaging and can improve student learning outcomes. In addition, differentiated learning can accommodate student learning needs that are tailored to student interests, learning styles, profiles and learning readiness. The impact of applying differentiated learning includes; Every student with various characteristics feels welcomed and valued, the coach as a tutor for student success and development, student learning needs are facilitated, as a real form of fairness in the treatment of the learning process (Buraimo et al., 2022).

Material & methods

The research method used in this study was the development research (research and development) to produce a differentiation-based learning model to improve basic technical skills of playing football. This research method was Research and Development (R&D) including 10 general steps that researchers adopted from the research and development of Borg & Gall. The Borg & Gall procedure used was only up to step 7, and was divided into four (4) stages of research as shown in the following table:

Table 1. Research Steps and Procedures

Steps Borg and Gall	Four (4) stages of research Model development
1. Initial Research and Information Collection	1. Problem Identification and Needs Analysis
2. Planning 3. Initial product creation, and expert validation	2. Planning, initial Model creation, and Expert validation
4. Initial field test 5. Initial product revision	3. Field test I, and preliminary revision
6. Main field test 7. Revision of operational products	4. Field test II, and final revision

Adapting 10 steps of development research into 4 development steps which include; (1) Problem identification and needs analysis, (2) Planning, Differentiation-Based Learning Model Creation, and Expert Validation (3) Field test 1 and initial revision, (4) Field test 2 and final revision. The subjects in this study were Musfan's football students aged 6-12 years. Field test I using 24 subjects from several different SSBs. Field test II using 64 subjects from different SSBs with the same character. The data of this study were collected through observation and interviews. Observations were made to the place of practice subjects while interviews were conducted to students and trainers. The data collection instrument in this study was a questionnaire. The questionnaire grid in this study had two variables including: (a) material with indicators of purpose, quality, and variety, and (b) methods with indicators of systematics, effectiveness, and attractiveness.

Questionnaires are used to obtain data on the feasibility of the model that has been designed. The questionnaire in this study used a Likert scale with 5 answer choices as in the table below. The results of these calculations are then used to determine the feasibility of the model being developed using the division of the category range.

Table 2. Eligibility Percentage Criteria

No	Criteria	Percentage (%)
1	Very Worth It	81 – 100
2	Proper	61- 80
3	Pretty Decent	41 – 60
4	Less Decent	21 – 40
5	Not Worth It	0 – 20

The data analysis techniques in this study included all activities of clarifying, analyzing, using, and drawing conclusions from all data that has been collected. The data in this study were qualitative data. Qualitative data were obtained through field observations and interviews with research subjects and validators. The result of the data was made in the form of a statement.

Results

The results of this study were divided into 4 stages. It started with requirements analysis, model designing and expert validation, field test 1 and initial revision, and ends with field test 2 and final revision. *First*, the needs analysis stage, in the form of initial analysis in the field and literature studies. At this stage, several common problems were found in the training process, including: (1) there were still students who are difficult in carrying out the training process given, (2) the training approach was oriented towards trainers, not based on the needs and initial abilities of students (3) it needed a learning model or exercise that can facilitate student needs. Furthermore, a literature study was conducted to develop a learning model product. Literature study activities tried to find alternative solutions where problems can be solved.

Second, the product development stage aims to produce a differentiation-based learning model in Musfan football school (SSB) students aged 6-12 years. Differentiation-based learning referred to here was learning given based on student needs and students' initial abilities. Variations of exercises were given in collaborative form, meaning material that facilitates students' interest in learning.

The description of the differentiation-based basic engineering skills learning model referred to in this study is described in the following table:

Table 3. Draft Differentiated Learning Model

Training Unit Latihan MPB					
Initial assessment or determining the exercise group	Warm up (FUN GAME)	Learn/Play Characteristic 1. Fun Game or drill for groups whose basic grind is still kirang 2. Play that adapts matches for groups that have good starting skills. Ex play 2v2, 3v3 and so on. Purpose: a) to provide a wide range of motion repertoire b) to correct basic motion c) learning with methods that vary based on needs and abilities d) to enhance football playing actions	Analysis Characteristic 1. Trainers and students analyze movement errors in the first learning activity 2. Students look for alternative solutions to movement problems and are required by trainers 3. Students repeat the first activity to correct errors found 4. After a change occurs the trainer increases the exercise from easy to difficult Purpose a) to correct motion errors; b) improve students' cognition;	Play Characteristic 1. Match Format 2. Playgroups Merged 3. Introduce posis play 4. Play 4v4, 5v5 Purpose a) to improve playing skills b) Introduction to the principle of playing based on 3 important moments in football	Cool down

The learning model outlined in the table above is a reference that can be developed by trainers themselves based on the diversity of students trained and based on training objectives. The learning model or exercises compiled at the initial stage consists of 18 variations of exercises. This model was then discussed and validated by 3 football experts including: 2 football instructors and 1 SSB coach who already had a coaching license. After being validated by experts, there were 3 variations of exercises that fall and the remaining 15 variations of exercises that were worthy of proceeding to the next stage. The statements of experts are described in the following table:

Table 4. Recap of Expert Validation statements

Validators	Input
Validation 1	It is worth considering the number of players, distance, and rules of the game
Validation 2	It is worth considering the intensity, volume, and time of the children's level
Validation 3	The form of exercise is unrealistic, in the form of playing it is also necessary to pay attention to multilateral movements, in the form of pairs there should not be long queues

After being validated by experts and trainers, revisions to the model were carried out referring to the expert validation statements described in table 4. After the draft model was fixed, the next stage was field test 1.

Third, field test stage 1, this stage was applied to the subjects of 24 students after the initial draft of the

model was revised and produced 15 variations of exercises that were ready to be implemented. After field test 1, the results were obtained that the learning model developed was in the feasible category. For a description of the research results and validator statements can be seen in the following table:

Table 5. Expert Validation Value Recap

No	Expert Validation	Earned Score	Max Score	Percentage	Information
1	Validation 1	23,93	30	79,78	Proper
2	Validation 2	22,20	30	74,00	
3	Validation 3	23,27	30	77,56	
	Total	23,13	30	77,11	

Based on table 5, from the capture of expert validation values with all existing variables and indicators, a percentage criterion result of 77% was obtained with the feasible category, meaning that this training model can be applied because it can already be done in an effort to improve basic football technical skills. The input from experts is as follows:

Table 6. Recap of Expert Validation Statements

No	Validators	Input
1	Validation 1	1. 1. The learning model can already be applied as an exercise in improving basic football technique skills 2. 2. The learning model has good quality in the process of practice Note: include the player's weak legs.
2	Validation 2	1. The learning model is a form of one variation in improving the skills of basic techniques of playing football 2. The learning model has been structured from easy to difficult in the process of practicing basic football technical skills
3	Validation 3	1. The learning model already has good effectiveness in the training process. 2. The learning model is appropriate to the needs of each student. Note: expand the variety of exercises

After being validated by experts and trainers, a second revision was carried out referring to the input and suggestions that the researchers had described in table 6. After the model was improved, the next stage was the main field test involving more subjects, namely 64 students from several football schools (SSB).

Fourth, field test stage 2, this stage is applied to more subjects than field test 1, field test 2 is applied after the model is revised. In field test 2, it was found that the learning model developed was in the very feasible category. For a description of the research results and validator statements can be seen in the following table:

Table 7. Expert validation value recap

No	Expert Validation	Earned Score	Max Score	Percentage	Information
1	Validation 1	25,20	30	84,00	Very Worth It
2	Validation 2	24,87	30	82,89	
3	Validation 3	24,93	30	83,11	
	Total	25,00	30	83,33	

Based on table 7, from the recap of expert validation scores with all existing variables and indicators, a maximum score of 25 and a maximum score of 30 were obtained with a percentage criterion result of 83.33%, meaning that the training model developed is in the very feasible category because it can be done well in an effort to improve basic football technical skills.

Based on the entire series that has been passed, it is known that the differentiation-based learning or training model developed in this study is considered to meet the requirements to be socialized and applied in the practice of basic football playing technique skills in football schools (SSB). Based on input from expert validation, it can be concluded that the learning model is very feasible to be applied in an effort to improve students' basic engineering skills. In addition, this model has a goal that can improve the basic technical skills of football and the model is already in accordance with the needs of students. Thus this model meets all the criteria that are ready to be used as guidelines for coaches or physical education teachers in providing football training material. Confirmatory Factor Analysis (CFA)

Kaiser-Meyer-Olkin test

	MSA
Overall MSA	0.500
T1	0.500
T2	0.500
T3	0.500
K1	0.500
K2	0.500
K3	0.500
V1	0.500
V2	0.500
V3	0.500

The results of the Kaiser-Meyer-Olkin (KMO) test on exploratory factor analysis showed an overall MSA (Measure of Sampling Adequacy) value of 0.500, as well as uniform values for each indicator variable (T1, T2, T3, K1, K2, K3, V1, V2, V3), which indicated that the sample used in the analysis had a good enough level of suitability for exploratory factor analysis.

Bartlett's test

X^2	df	P
∞	36.00	< .001

Based on the results of Bartlett's test conducted on the development of a differentiation-based learning model in football school students with the title "Development of a Differentiation-Based Learning Model in Football School Students", a statistical value of χ^2 of ∞ with 36 degrees of freedom, and a p value of < .001. These results indicate that there are significant differences in variance between different learning groups.

Chi-squared Test

	Value	df	P
Model 1	393.504	19	< .001

The results of the chi-squared test on "Development of a Differentiation-Based Learning Model in Football School Students" showed a statistical value of 393,504 with 19 degrees of freedom, and a p value of <.001. These results illustrated the existence of a significant relationship between the variables observed in the context of differentiation-based learning models. Thus, it can be concluded that such learning models can statistically be associated with significant changes in the distribution of observed variables. These findings provide empirical support to the effectiveness of differentiation-based learning models in the context of football schools, confirming that the implementation of such models is positively correlated with improved learning quality. This makes a valuable contribution to practical and theoretical understanding related to the development of differentiation learning models in the world of football education, and can be a foundation for the development of more effective and relevant learning strategies in increasing student achievement and understanding in the field of football.

Factor Loadings

	Factor 1	Factor 2	Uniqueness
K1	0.999		0.013
K3	0.872		0.245
V2	0.499		0.733
K2	0.476	0.484	0.588
T1		0.722	0.330
T3		0.722	0.330
V1		0.528	0.715
V3		0.528	0.715
T2		0.458	0.625

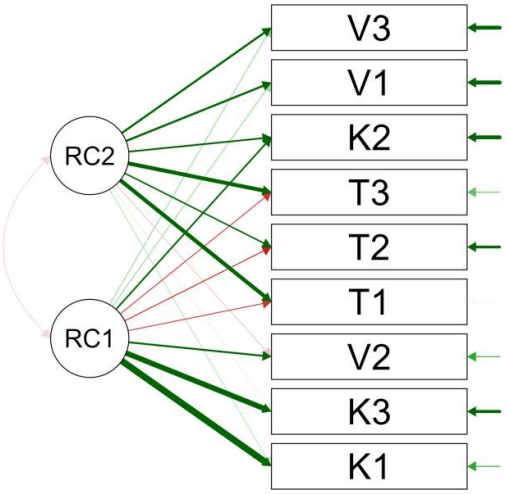
Note. Applied rotation method is promax.

Factor Characteristics

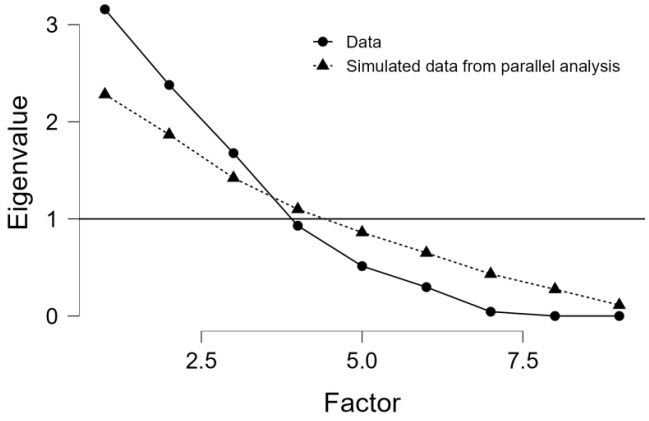
	Unrotated solution			Rotated solution		
	SumSq. Loadings	Proportion var.	Cumulative	SumSq. Loadings	Proportion var.	Cumulative
Factor 1	2.827	0.314	0.314	2.625	0.292	0.292
Factor 2	1.878	0.209	0.523	2.080	0.231	0.523

In the characteristic factor analysis, the no-rotation solution showed that Factor 1 had a total sum of squared loadings of 2,827, covering 31.4% of the variance, while Factor 2 had a total sum of squared loadings of 1,878, covering 20.9% of the variance. In the rotated solution, Factor 1 maintained most of the load at 2,625, showing 29.2% variance, while Factor 2 gained an increase of 2,080, covering 23.1% variance.

Path Diagram



Scree plot



Discussions

It is very important in every variety of exercises, especially at a young age, to apply a learning model that makes students active and motivated to carry out the exercise process according to the needs of the students themselves. Where the model that can facilitate students to learn from experiences they find themselves means that this learning model in addition to improving basic techniques according to the form of exercise they are interested in also to increase the creative thinking power of them. Creative thinking referred to here is the ability of students to be able to solve problems with different and uncommon strategies by developing an idea that has existed before (Wheatcroft, 2020)

The activities carried out by students in this learning model are not only limited to the demands of trainers who sometimes do not match the needs of students and in the end students are not motivated and difficult to develop themselves. The differentiated learning model that the researchers developed is able to make each student play an active role, meaning that it can facilitate student diversity and all the potential possessed by

students. Therefore, all students can achieve satisfactory learning outcomes according to the personal characteristics they have. Elliott et al., (2020) The learning model developed in this study is a variation that dominates fun activities, such as modified games, games that resemble matches, and for students who are found not to have good motion coordination will be given a form of learning in pairs or groups that are fun to improve students' basic movements. This model with a fun form of activity can improve related to the physique and performance of the chosen such as speed, agility, dribbling, passing, and receiving the ball (Joseph et al., 2006)

This variability in movements during the learning process that is pleasurable and adapts to needs contributes to the development of more general motor programs to cope with a variety of similar but different situations (Umar et al., 2023; Yendrizal et al., 2023 Jacob et al., 2023) In addition, the differentiated learning model that the researchers developed has referred to the methods and principles of exercise that should be with the emphasis that individual differences are important things that must be considered. In line with a theory that states that the method chosen must be adjusted to the purpose of the exercise, the availability of tools and facilities, and the individual differences of trainees (Gheorghe et al., 2013).

The research and development of this learning model is only at the stage of field trials 1 and field tests 2, it takes one more step to reach the final stage of the development research process, namely effectiveness testing. Need further research with a large number of research subjects and from different backgrounds.

As the result, to improve basic technical skills and understanding of play, children in the first phase of rapid growth will be more directed through methods that have fun activities according to the abilities and needs of students. With this differentiation-based learning approach, it will motivate all students to love football, make it easier for them to understand the exercises given and make it easier to improve playing skills. Therefore, it can finally be proven that this differentiation-based basic football technique training model can improve the basic technical skills of football school students.

1. Model Advantages

The advantage of this model is that it has good quality training dan improve basic soccer technique skills. Then, this training model has a high appeal so that it makes students happy in carrying out activities. This model also has a good purpose in the process of improvement and improvement of basic technical skills of playing football. On the other hand, this model has good variation quality in adjusting student diversity. Variations of this model can enrich basic motion. Variations of this model are structured based on the principle of training from easy to difficult, and variations of this model have great appeal to football school students.

2. Model Weaknesses

The weakness of this model is in terms of quantity which only displays a few variations. In fact, to become a reliable player, so many components must be presented to young students.

3. Model Supporting Factors

The result of this research is in the form of a product, which is a guidebook that contains a learning model or practice of basic differentiation-based football technique skills. The benefits are certainly used in the training process to improve the basic technical skills of playing football. Coaching to produce players who can compete at the world level is contained in the model that the author designed. This has indirectly supported the author to create this model.

4. Model Inhibiting Factors

There are several things that hinder the author during the process of applying this model, namely; Time and cost constraints in conducting effectiveness tests and developing a wide variety of exercises

Conclusions

The conclusion of this study confirms that the development of a differentiation-based basic football technical skills learning model, through the stages of research and development, has succeeded in creating a very relevant and effective model to improve the basic technical skills of football school students aged 6-12 years. By a focus on the diversity of students' abilities and interests, this model not only responds to individual needs but also ensures a solid mastery of basic engineering skills. Validation from two football experts and a football school coach with a coaching license provides strong support for the feasibility of this model. By a validation score of 83%, These results showed that differentiation-based learning models were reliable and appropriate to be applied in the context of football teaching at primary school level. Therefore, this research makes an important contribution to the development of more adaptive and efficient learning methodologies, as well as providing a solid basis for the improvement of basic football technical skills in the golden age of children's development.

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