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THE EFFECT OF SMART TV-BASED DOUBLE DANCING MAT MEDIA ON MOTOR SKILLS IMPROVEMENT AMONG PGSD UNIMED

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ABSTRACT

This research is based on the fact that the gross motor skills of PGSD students of Medan State University have not been optimal in the Elementary School Physical Education course. Based on the results of initial observations, there are still weaknesses in the aspects of coordination, agility, and balance of motion, as well as low student involvement in learning activities This study aims to test the effect of the use of Smart TV-based Double Dancing Mat media on improving the motor skills of PGSD students. The research uses a quantitative approach with the Quasi Experiment and design Nonequivalent Control Group Pretest–Posttest. The stages of the research include the preparation of research tools and instruments, the implementation of Pretest In the experimental group and control group, the treatment was given in the form of learning using Double Dancing Mat based on Smart TV in the experimental group and conventional learning in the control group, the implementation of Posttest, as well as data analysis using ANCOVA's hypothesis test. The outputs targeted in this study are scientific articles in national journals accredited by Sinta 4, research report results, and recommendations for models for the use of digital media in sports learning at PGSD. Reviewed from the Technology Readiness Level (TKT), this study is in TKT Level 2-3, namely the stage of conceptual formulation and initial proof of concepts and the use of media in the context of Learning.

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INTRODUCTION

The advancement of digital devices, internet connectivity, and various multimedia-based applications is driving a change in learning patterns from one direction to richer, visual, and responsive (Clemente-Suárez et al., 2024; Zou et al., 2025). This condition requires the world of education to not only follow trends, but also to utilize technology appropriately so that the learning process is more effective, interactive and relevant to the needs of the times (Haleem et al., 2022).

The development of digital technology that is accelerating in the era *Society 5.0* Demanding the world of higher education to carry out an adaptive, innovative, and competency-oriented learning transformation in the 21st century (Supa'at & Ihsan, 2023; Usmaedi, 2021). Prospective elementary school teachers are required to have pedagogic mastery and skills to use information and communication technology creatively (Nurlatifah et al., 2023). Technology is flexible which can be a solution to develop learning to be more meaningful (Fuada et al., 2020). Technology that is now developing can be used as a cognitive tool in the learning process, and the presence of the use of technology in the teaching and learning process can provide many benefits such as increasing learning motivation for students (Syawaudin et al., 2025; Atikah Asna et al., 2025).

Technology that is now developing can be used as a cognitive tool in the learning process. The ability of teachers to manage activity-based learning such as physical learning and educational games that support students' motor development is also something that needs to be considered. Therefore, the development of technology-based learning media that is able to integrate cognitive, affective, and psychomotor aspects is an urgent need in the education of prospective elementary school teachers (Hayudi et al., 2024; Friskawati et al., 2023).

Exergame is a digital game that combines physical activity with games and is used as a learning medium, especially to encourage students to move actively while learning (Rüth & Kaspar, 2020). In contrast to regular games that tend to be passive, exergames require players to perform real body movements such as jumping, running in place, swinging hands, kicking, or mimicking certain movements to be able to play and complete in-game challenges (Calcaterra et al., 2023).

Media *Double Dancing Mat* is a dance game carpet/mat made to be played by two players, usually two pads or one large mat with a footing button to follow the movement of the song like a dance game (Gao et al., 2012; Petraconi et al., 2019). Usage *Smart TV* For education, it can function as a large screen-based learning media connected to the internet to display visual-interactive materials (videos, animations, educational applications) so that the class is more interesting and participatory

Professional education in education is based on the integrity of mastery of the academic field of education that has personality, social, pedagogical, and expertise in both theoretical and practical aspects *(pedagogical content knowledge and skills*) and disciplines according to their fields *(content knowledge)*) and a combination of the two in education in

the field of study *(content specific pedagogy*) which is based on religious, national, and local wisdom values inherent in the philosophy of life of students (Ayesha Nayra E. et al., 2025).

The PGSD Study Program offers an Elementary School Physical Education course in the even semester. In line with the PGSD and Faculty of Education visions and missions, learning materials need to be strengthened through the optimization of information and communication technology. Initial observations showed that some students had suboptimal motor skills, particularly in coordination, balance, agility, and strength. The lack of structured learning media for developing these skills highlights the need for *Double Dancing Mat*.

RESEARCH METHODS

This study uses a quantitative approach with the *Quasi-experiment* (Slater & Hasson, 2024). The study used a quantitative approach to examine the effect of treatment through statistically analyzed numerical data. A quasi-experimental method was chosen because the subjects were assigned based on existing classes rather than randomization, while treatment and measurement remained planned and controlled.

The research used a *Nonequivalent Control Group Pretest–Posttest Design* involving two non-randomized groups, both receiving pretest and posttest. The experimental group used *Smart TV*-based *Double Dancing Mat* media, while the control group received conventional Physical Education learning. The pretest was conducted to determine initial conditions and identify potential differences between the groups.

Table . Research Design Scheme

Groups	Pretest	Treatment	Posttest
Experiments	O_1	X	O_2
Controls	O_3	–	O_4

This research was carried out in the current semester of the 2025/2026 academic year at the Elementary School Teacher Education Study Program, State University of Medan. The implementation of the research follows the lecture schedule of the Elementary Physical Education course, which includes *pretest*, learning for six meetings, and *posttest.* The research population is all students of the PGSD Study Program of the State University of Medan who take the Elementary School Physical Education course in the Even semester which totals 13 classes.

The sample was determined by *cluster purposive sampling*, The sample criteria were: active PGSD students, participating in sports courses, and willing to participate in the entire series of research activities. The research involved 2 existing classes, each totaling 35

students. One class is used as an experimental group and one class as a control group. The research variables consisted of, independent variable (X): the use of *Double Dancing Mat* learning media based on *Smart TV*. Bound variable (Y): students' motor skills, which were measured through the components of balance, agility, speed, and *footwork coordination*.

Data collection was carried out using test techniques. Students' motor skills are measured through four types of tests, namely: *Lower Quarter Y Balance Test* (balance), *Illinois Agility Test* (agility), 20 m *Sprint Test* (speed), and *Four Square Step Test* (footwork coordination). In order for test results to be fairly compared between the pretest and posttest, the test is made the same for all participants, both in terms of instructions, tools, test sequence, and rest time.(Plisky et al., 2021)(Salimi & Ferguson-Pell, 2020)(Moore & Barker, 2017). The following are the assessment instruments and rubrics:

Table 1. Assessment Instruments and Rubrics

Components	Instruments	Output/Score	Brief procedure	Rubric
Balance	*Lower Quarter Y Balance Test (YBT-LQ)*	*Reach distance* (cm) in 3 directions: *anterior, posteromedial, posterolateral*	Standing one foot at the central point, the other leg reaches as far as possible in 3 directions without losing balance.	Three measurement experiments per direction (per leg). The final score is the best score out of 3 attempts
Agility	*Illinois Agility Test (IAT)*	Travel time (sec)	The run follows the Illinois track (10 m × 5 m) with a zig-zag pattern through the cones in sequence.	Two measurement experiments. Final score, best time of two attempts
Speed	20 m *Sprint Test*	Travel time 20 m (s)	The maximum sprint from the start line to the finish line is 20 m.	Three measurement experiments. Final score: best time
Footwork coordination (multi-directional stepping)	*Four Square Step Test (FSST)*	Time (seconds)	Fast step following the FSST sequence on 4 boxes while passing the line divider.	Two measurement experiments. Final score: the fastest time of the two attempts.

RESULTS AND DISCUSSION

This research was conducted with PGSD students at Universitas Negeri Medan in the even semester of the 2025/2026 academic year to examine the effect of *Smart TV*-based *Double Dancing Mat* media on motor skills. The research stages included instrument preparation, pretest, treatment, posttest, and data analysis. The study used a *Nonequivalent*

Control Group Pretest–Posttest Design, with the experimental group receiving *Double Dancing Mat* media and the control group receiving conventional learning.

The initial research stage included a literature review, research instrument preparation and validation, and learning media preparation. The instruments used in the study included:

1. *Lower Quarter Y Balance Test (YBT-LQ)* to measure dynamic balance
2. *Illinois Agility Test (IAT)* to measure agility
3. *20 Meter Sprint Test* to measure speed
4. *Four Square Step Test (FSST)* to measure footwork coordination

All instruments are compiled based on relevant previous research references and have gone through the validation stage by experts in the field of physical education. In addition, *Smart TV-based Double Dancing Mat* media has also been prepared and tested before being used in the learning process. Trials are carried out to ensure that the media can be used optimally during the treatment

The pretest is carried out to find out the initial condition of students' motor skills before being given treatment. The implementation of the pretest was carried out in the experimental group and the control group using the same instrument. The results of the pretest data can be seen in the table of pretest results presented.

Table 3. Pretest Results of Student Motor Skills Experiment Class

No	Name	Balance (Cm)	Agility (Seconds)	Speed 20 M (Seconds)	Coordination (Seconds)
1	Elsa	77.6	18.97	4.92	9.96
2	Squirrelly	76.4	18.93	4.67	11.81
3	Feby	80	20.02	4.68	9.91
4	Anita	77.8	16.51	5.27	11.68
5	Aditya	70.5	17.08	5.19	8.71
6	Guess	76.9	18.91	4.32	10.69
7	Fitri	81.6	21.92	4.45	10.66
8	Julita	76.4	18.81	5.19	10.17
9	Andreas	85.2	16.14	3.98	7.02
10	Angel	75.7	18.35	4.52	10.04
11	Septian	76.3	17.37	4.82	9.91
12	Imelda	69.7	16.84	4.82	11.18
13	Ruth	75.1	20.03	4.22	9.55
14	Christin	80.2	21.16	4.47	10.29
15	Yohana	78.6	19.93	4.63	8.76
16	Poop	74.7	17.29	5.33	10.61
17	Listra	79	20.92	4.36	10.53
18	Kisra	78.3	17.24	4.81	10.25
19	Rohana	79.2	18.47	4.45	10.3
20	Stevani	84.4	18.06	5.66	9.79

21	Brizyta	72.6	19.85	4.8	10.04
22	Cristina	82.6	21.35	4.41	10.19
23	Athiyah	72	19.7	4.24	8.72
24	Feby	79.3	17.58	5.22	9.14
25	Stars	73.8	16.46	5.4	10.64
26	Baity	78.2	17.81	4.95	10.06
27	Ruth	76.3	19.41	5.19	9.56
28	Natasha	79	20.08	4.84	10.18
29	Sarah	77.2	17.25	5.45	8.62
30	Sorting	78.3	16.72	4.46	10.42
31	Zakhira	72	19.64	4.94	9.69
32	Urnics	76.9	16.77	5.59	10.67
33	Beautiful	81.4	20.19	4.45	9.66
34	Known	78.3	17.3	4.95	8.61
35	Pomegranate	78.9	16.24	4.47	10.62
36	Nur	71.2	16.5	5.79	9.98
37	Remini	78.5	21.03	5.74	11.58

Table 4. Results of the Pretest of the Student Motor Skills Control Class

No	Name	Balance (cm)	Agility (Seconds)	Speed 20 M (Seconds)	Coordination (Seconds)
1	Vinyl	77.4	18.5	5.55	10.23
2	Tiara	79.7	16.69	5.54	10.23
3	Graceful	75.9	16.13	4.3	10.11
4	Yulia	78.3	19.52	5.54	9.72
5	Chrisman	93.6	14.53	3.77	8.38
6	Micah	76.9	16.32	4.82	9.02
7	Felisa	79.7	18.12	4.7	9.22
8	Cesya	79.4	18.54	4.42	10.64
9	Justa	79.2	21.28	4.54	9.94
10	Kezia	78.4	19.69	4.79	10.25
11	Niswatun	75.2	20.75	5.37	10.73
12	Tiara	77.9	18.17	4.57	10.51
13	Faiza	78.7	21.68	5.34	8.68
14	Juita	76	18.43	4.6	9.98
15	Erlita	75.2	17.76	5.27	10.19
16	Monika	76.7	19.3	4.3	9.14
17	Valentina	74.9	18.78	4.92	10.66
18	Pearl	78.9	17.45	5.58	10.59
19	Slash	74.5	20.37	4.62	9.68
20	Ratna	76.6	20.98	5.51	11.32
21	Haikal	82	16.31	4.36	8.25
22	Steven	85.8	14.42	3.57	8.08
23	Geby	77.2	21.06	5.66	10.46
24	Sustainable	76.3	21.77	4.93	9.06
25	Renanda	79	16.43	4.62	11.14
26	Stuart	77.3	19	4.45	9.84
27	Claudia	79.9	17.47	5.15	10.11

28	Dian	84.1	18.94	5.32	10.63
29	Merry	68.9	21.45	5.51	9.55
30	Isma	78.1	21.46	4.37	9.87
31	Sarah	82.3	21.91	4.42	11.95
32	Shirley	75.1	16.73	5.29	9.95
33	São Paulo	85.2	18.32	3.74	8.11
34	Jonathan	85.7	18.33	4.3	7.74
35	Ariel	81.5	15.4	4.58	8.31
36	Cristianov	83.7	14.55	3.58	8.18
37	Hanif	83.2	14.77	3.65	8.24

Initial measurements showed that students in both groups had relatively moderate motor abilities with no significant differences, indicating comparable initial conditions. However, students still experienced difficulties in movement coordination, balance, and agility. Treatment was conducted over six meetings with 37 experimental-group students using *Smart TV*-based *Double Dancing Mat*. The two-player dancing mode integrated movement, step coordination, balance, and visual-audio responses, requiring students to follow movement patterns on the screen according to rhythm and direction.

The control group received conventional Physical Education learning through demonstrations and exercises without interactive technology. Observations showed that the experimental group was more active, enthusiastic, and engaged. After treatment, posttest results showed improvements in balance, coordination, agility, and movement speed in the experimental group.

Table 5. Postest Results of Student Motor Skills Control Class

Yes	Name	Balance (cm)	Agility (seconds)	Speed 20 m (s)	Coordination (seconds)
1	Elsa	84.8	17.42	4.63	9.18
2	Squirrelly	83.5	17.28	4.39	10.92
3	Feby	87.2	18.36	4.43	9.14
4	Anita	84.9	15.35	4.98	10.84
5	Aditya	77.3	15.98	4.88	8.06
6	Guess	84.0	17.34	4.08	9.84
7	Fitri	88.5	20.15	4.21	9.88
8	Julita	83.8	17.29	4.92	9.39
9	Andreas	91.6	14.86	3.75	6.51
10	Angel	82.6	16.91	4.24	9.26
11	Septian	83.4	16.10	4.55	9.08
12	Imelda	76.2	15.67	4.55	10.35
13	Ruth	82.3	18.42	3.98	8.83
14	Christin	87.1	19.43	4.21	9.53
15	Yohana	85.6	18.37	4.36	8.09

16	Poop	81.5	16.03	5.02	9.81
17	Listra	86.2	19.18	4.10	9.71
18	Kisra	85.3	15.98	4.55	9.44
19	Rohana	86.1	17.11	4.20	9.49
20	Stevani	91.0	16.72	5.31	9.05
21	Brizyta	79.8	18.29	4.53	9.28
22	Cristina	89.5	19.61	4.18	9.44
23	Athiyah	79.4	18.21	4.02	8.03
24	Feby	86.0	16.28	4.91	8.43
25	Stars	80.9	15.18	5.10	9.84
26	Baity	85.4	16.43	4.67	9.31
27	Ruth	83.6	17.88	4.90	8.82
28	Natasha	86.1	18.54	4.56	9.43
29	Sarah	84.0	15.91	5.16	7.96
30	Sorting	85.2	15.44	4.21	9.61
31	Zakhira	79.3	18.12	4.67	8.93
32	Urnics	83.8	15.51	5.28	9.86
33	Beautiful	88.4	18.55	4.20	8.91
34	Known	85.2	15.99	4.67	7.94
35	Pomegranate	85.9	15.01	4.22	9.80
36	Nur	78.3	15.26	5.47	9.17
37	Remini	85.8	19.34	5.39	10.72

1. Descriptive Statistical Analysis

Descriptive statistical analysis was carried out to find out an overview of the research data. The analysis included the mean values, standard deviations, minimum values, and maximums of the pretest and posttest results of the two groups.

Table 6. Descriptive statistical analysis test pretest experimental group

Variabel	N	Minimum	Maximum	Mean	Std. Deviation
Keseimbangan	37	69.70	85.20	77.3000	3.59390
Kelincahan	37	16.14	21.92	18.5630	1.66430
Kecepatan 20 M	37	3.98	5.79	4.8554	.46697
Koordinasi	37	7.02	11.81	10.0054	.94689
Valid N (listwise)	37				

Based on the results of descriptive statistical analysis, it was obtained that the number of respondents in the experimental class was 37 students. The results showed that students' initial abilities across the four variables were relatively homogeneous. Balance ranged from 69.70–85.20 cm, with a mean of 77.30 cm and a standard deviation of 3.59. Agility ranged from 16.14–21.92 seconds, with a mean of 18.56 seconds and a standard deviation of 1.66. 20-meter running speed ranged from 3.98–5.79 seconds, with a mean of 4.86 seconds and a standard deviation of 0.47. Coordination ranged from 7.02–11.81

seconds, with a mean of 10.01 seconds and a standard deviation of 0.95. Overall, the results indicate that the students' initial abilities were relatively uniform.

Table 7. Descriptive statistical test post test

Variabel	N	Minimum	Maximum	Mean	Std. Deviation
Keseimbangan Post	37	76.20	91.60	84.3108	3.53009
Kelincahan Post	37	14.86	20.15	17.1216	1.48563
Kecepatan 20 M Post	37	3.75	5.47	4.5805	.43892
Koordinasi Post	37	6.51	10.92	9.2400	.87961
Valid N (listwise)	37				

Descriptive statistical analysis was conducted to describe students' abilities after treatment using *Smart TV*-based *Double Dancing Mat*, including N, minimum, maximum, mean, and standard deviation. The experimental class consisted of 37 students.

Posttest results showed improvement in all measured variables. Balance increased from a pretest mean of 77.30 cm to 84.31 cm, an increase of 7.01 cm. Agility improved from 18.56 seconds to 17.12 seconds, a decrease of 1.44 seconds, indicating better performance. 20-meter sprint speed improved from 4.86 seconds to 4.58 seconds, a decrease of 0.27 seconds. Coordination improved from 10.01 seconds to 9.24 seconds, a decrease of 0.77 seconds. Overall, the results indicate that the treatment improved students' motor skills across all measured aspects.

2. Normality and Homogeneity Test

The normality test was carried out using the Shapiro-Wilk test to determine the distribution of the research data. Based on the test results, all data had a significance value of > 0.05 so that the data was declared to be normally distributed.

Table 8. Tests of Normality

Variabel	Kolmogorov-Smirnov Statistic	df	Sig.	Shapiro-Wilk Statistic	df	Sig.
Keseimbangan Pre	.120	37	.197	.971	37	.443
Kelincahan Pre	.142	37	.059	.942	37	.055
Kecepatan 20 M Pre	.120	37	.200*	.963	37	.246
Koordinasi Pre	.136	37	.084	.941	37	.051
Keseimbangan Post	.128	37	.132	.971	37	.436
Kelincahan Post	.133	37	.099	.949	37	.091
Kecepatan 20 M Post	.132	37	.100	.962	37	.241
Koordinasi post	.127	37	.136	.946	37	.069

The normality test is carried out to find out whether the research data is distributed normally or not. In this study, the normality test used the Shapiro-Wilk method because the sample size was less than 50 respondents (n = 37).

Based on the table of normality test results, it is known that all research variables have a significance value (Sig.) greater than 0.05. The significance value for the pretest balance variable was 0.443, pretest agility was 0.055, the speed of the 20-meter pretest was 0.246, and the pretest coordination was 0.051. Meanwhile, in the posttest data, the balance significance value was 0.436, agility was 0.091, 20-meter speed was 0.241, and coordination was 0.069.

Because the total significance value is greater than 0.05, it can be concluded that all pretest and posttest data on the variables of balance, agility, speed of 20 meters, and coordination are normally distributed.

Furthermore, the homogeneity test was carried out using the Levene test. The test results showed that the significance value was > 0.05 so that the variance of the two groups was declared homogeneous.

Table 9. Homogeneity Test Balance

Pengujian	Levene Statistic	df1	df2	Sig.
Based on Mean	.007	1	72	.934
Based on Median	.010	1	72	.919
Based on Median and with adjusted df	.010	1	71.999	.919
Based on trimmed mean	.008	1	72	.928

Table 10. Homogeneity Test Agility

Pengujian	Levene Statistic	df1	df2	Sig.
Based on Mean	.909	1	72	.344
Based on Median	.872	1	72	.353
Based on Median and with adjusted df	.872	1	71.423	.353
Based on trimmed mean	.890	1	72	.349

Table 11. Homogeneity Test Speed 20 meters

Pengujian	Levene Statistic	df1	df2	Sig.
Based on Mean	.153	1	72	.697
Based on Median	.143	1	72	.707
Based on Median and with adjusted df	.143	1	71.707	.707
Based on trimmed mean	.149	1	72	.701

Table 12. Homogeneity Test Coordination

Pengujian	Levene Statistic	df1	df2	Sig.
Based on Mean	.085	1	72	.772
Based on Median	.082	1	72	.775
Based on Median and with adjusted df	.082	1	71.551	.775
Based on trimmed mean	.080	1	72	.778

The variance homogeneity test was performed to determine whether the variance of data in the experimental group and the control group was the same (homogeneous). The homogeneity test in this study uses the Levene's Test on the basis, based on the results of the homogeneity test using Levene's Test, the following results were obtained.

Table 13. Homogeneity Test Results

Variable	Living Statistic	Sig.	Remarks
Balance	0,007	0,934	Homogeneous
Agility	0,909	0,344	Homogeneous
Speed 20m	0,153	0,697	Homogeneous
Coordination	0,085	0,772	Homogeneous

Interpretation

1. Equilibrium Variables

   Based on the results of the Levene's Test on the balance variable, a Levene Statistic value of 0.007 was obtained with a significance value (Sig.) of 0.934. Since the significance value is greater than 0.05, it can be concluded that the variance of the balance data between the experimental group and the control group is homogeneous.

2. Agility Variable

   The results of the Levene's Test on the agility variable showed a Levene Statistic value of 0.909 with a significance value of 0.344. The significance value is greater than 0.05, so it can be concluded that the variance of agility data in both groups is homogeneous.

3. Variable Running Speed 20 Meters

   In the 20-meter running speed variable, a Levene Statistic value of 0.153 was obtained with a significance value of 0.697. Because the significance value was

greater than 0.05, the variance of 20-meter running speed data in the experimental group and the control group was declared homogeneous.

4. Coordination Variables

   The results of the Levene's Test on the coordination variable showed a Levene Statistic value of 0.085 with a significance value of 0.772. The value was greater than 0.05, so it can be concluded that the variance of coordination data between the experimental group and the control group was homogeneous.

Based on the results of the homogeneity test using Levene's Test, significance values were obtained for all research variables, namely balance (0.934), agility (0.344), running speed of 20 meters (0.697), and coordination (0.772), all of which were greater than 0.05. Thus, it can be concluded that the variance of data between the experimental group and the control group is homogeneous.

Because the homogeneity assumption has been met, the data meets one of the requirements for parametric statistical analysis, such as the Independent Sample t-test, ANCOVA, and MANOVA, so that the analysis can proceed to the hypothesis testing stage.

3. Hypothesis Test Using ANCOVA

The results of the analysis showed that there was a significant difference between the experimental group and the control group after the treatment was given. The significance value obtained was less than 0.05 so that the research hypothesis was accepted.

Table 14. ANCOVA Test Results

Pair	Perbandingan	Mean	Std. Deviation	Std. Error Mean	95% CI Lower	95% CI Upper	T	Df	Sig. (2-Tailed)
Pair 1	Keseimbangan Pre - Keseimbangan Post	-7.01081	.23308	.03832	-7.08852	-6.93310	-182.967	36	<.001
Pair 2	Kelincahan Pre - Kelincahan Post	1.44135	.19064	.03134	1.37779	1.50492	45.988	36	<.001
Pair 3	Kecepatan 20m Pre - Kecepatan 20m Post	.27486	.03097	.00509	.26454	.28519	53.989	36	<.001
Pair 4	Koordinasi Pre - Koordinasi Post	.76541	.07183	.01181	.74146	.78935	64.821	36	<.001

Based on the results of the Paired Sample t-test, all study variables, namely balance, agility, 20-meter running speed, and coordination, had a significance value of < 0.001 (less than 0.05). Thus, there is a significant difference between the pretest and posttest scores on all motor skill indicators. These results show that after being given treatment, the students' motor skills have significantly improved. These results show that the use of *Smart* TV-based

Double Dancing Mat media has a significant effect on improving the motor skills of PGSD UNIMED students.

Discussion

The results showed that the use of *Smart TV*-based *Double Dancing Mat* media significantly improved the motor skills of PGSD UNIMED students compared with conventional learning. This improvement occurred because *exergame*-based media integrates physical activity with interactive visual and audio stimulation. The findings are consistent with Rüth and Kaspar (2020), who reported that *dance exergames* can improve students' learning motivation and motor skills, and Gao et al. (2012), who found that interactive *dance mat* games can enhance physical activity and movement coordination.

Observations during learning also showed that students in the experimental group were more active and enthusiastic than those in the control group because the media was interactive, challenging, and enjoyable. This supports *active learning* in line with 21st-century learning demands. Thus, *Double Dancing Mat* not only improves motor skills but also provides an innovative learning experience for PGSD students as prospective elementary school teachers.

CONCLUSIONS AND SUGGESTIONS

Based on the results of data analysis and hypothesis testing, it can be concluded that the application *of Smart* TV-based *Double Dancing Mat* media has a very significant influence on the improvement of motor skills of PGSD UNIMED students in the Elementary Physical Education course. Improvements were seen in all aspects measured, namely dynamic balance increased by 7.01 cm, agility improved by 1.44 seconds, 20-meter sprint speed increased by 0.27 seconds, and *footwork coordination* improved by 0.77 seconds. The results of the ANCOVA test and *the Paired Sample t-test* showed a significance value of $p < 0.001$, so that the increase in the experimental group was proven to be superior to that of the control group. In addition to improving motor skills, Smart *TV-based Double Dancing Mat* media also creates more active, interactive, and fun learning. The integration of audio-visuals, rhythm challenges, and two-player games can increase student motivation, engagement, and responsiveness. Thus, this media is effective as an innovation in Physical Education learning in higher education.

There are several strategic suggestions recommended to various related parties to optimize the utilization and development of the results of this research:

1. **For Teaching Lecturers and Physical Education Teachers:**

Lecturers teaching Elementary Physical Education are encouraged to integrate interactive technology-based media, such as *Smart TV*-based *Double Dancing Mat*, into lectures. This media can be used as a fun and measurable alternative for basic movement learning while reducing student boredom during kinesthetic activities.

2. **For Elementary School Students:**

Students should make the learning experience using this Double Dancing Mat media as a pedagogical insight and a concrete example of interactive sports learning innovations. This experience is expected to be an applicative provision for students in the future when teaching PJOK courses in elementary school, so that they are able to design physical learning activities that are creative, interesting, and relevant to the characteristics of students.

3. **For Study Programs and Institutions (PGSD UNIMED):**

The PGSD FIP UNIMED Study Program is recommended to support the sustainability of this innovation by incorporating scenarios for the use of technology-based learning media into the Semester Learning Plan (RPS) and strengthening the facilities and infrastructure to support laboratories/digital sports classes.

4. **For Further Researchers and Learning Innovation Developers:**

For advanced researchers, it is recommended to develop this research to the Research and Development (R&D) stage by integrating real-time automated feedback system features or artificial intelligence to record movement precision in more depth.

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