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Development of Android-based Gymnastics Learning Media to Improve the Ability to Roll Ahead Straddle Students in Gymnastic Learning

Sri Gusti Handayani
Universitas Negeri Padang (UNP), Indonesia

Sayuti Syahara
Universitas Negeri Padang (UNP), Indonesia

Tjung Hauw Sin
Universitas Negeri Padang (UNP), Indonesia

Anton Komaini
Universitas Negeri Padang (UNP), Indonesia

***Abstract*---**This research aims to develop a valid, practical, and effective gymnastics learning medium to improve the ability to roll ahead to students on gymnastics learning. The development process of this model refers to the Plomp development model. The subject of the study is a student of the Department of Sports Education, Faculty of Sports Sciences. Data collection techniques use tests, interviews, questionnaires, and observations. The collected data is then analyzed quantitatively using the t-test. The results showed that the validity of android-based gymnastic learning media is actualized from the results of the validity of materials, media, language, and assessment instruments The ability to roll forward straddle is on very high validity criteria. The practicality of android-based gymnastics learning media is on very practical criteria. The effectiveness of android-based gymnastics learning media is on the criteria very effective. The average levels of Ability to roll forward straddle on all three sections are 83.65, 84.65, and 73.45, respectively. The average increase scores on each section were 0.61, 0.65, and 0.64.

***Keywords*---**android, gymnastics learning, media, rolling forward straddle, students ability.

***Corresponding author**: Handayani, S. G.; Email: srigusti@fik.unp.ac.id*
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Introduction

Faculty of Sports Sciences is a faculty that gives birth to prospective sports teachers. To give birth to professional teacher candidates, sports education students of the Faculty of Sports Science are required to be able to understand and master learning materials widely and deeply and can practice rolling movements ahead of the straddle with the correct stages. Dale is needed by prospective sports teachers who are responsible for the development of their profession in delivering students to be a person who has the ability in the field of gymnastics. Rolling forward (Front Roll) is a floor gymnastics movement that is done by rolling towards the front over the back of the body (nape, back, waist, and back hips) with a squat and standing prefix (Widowati & Rasyono, 2018; Sari et al., 2017).

Rolling forward the straddle is the movement of toppling the body towards the front with the legs opened to form the letter V or straddle. The ability to carry out this movement is very necessary by prospective sports teachers because it becomes one of the materials in the curriculum in the School, therefore a prospective sports teacher must understand the stages in doing the ability to roll ahead straddle good and correct. In accordance with the child's motor. Fundamental motor skills are a movement used by big muscles such as walking, running, two legs jumping, and hopping the obstacles (Komaini & Mardela, 2018).

The results of measurement of the ability to roll ahead straddle sports education students of the Faculty of Sports Sciences obtained an average score of 60.07. The initial phase ability consisted of 4 indicators, getting a result of 65.00, while the main phase consisting of 7 indicators obtained an average value of 48.00, and the final phase consisting of 2 indicators obtained an average value of 57.00. The results show that the ability to roll ahead straddle in sports education students of the Faculty of Sports Sciences is in the moderate category and needs to be improved. This is due to many things, one of which is a medium of learning (Juansyah, 2015; Jackman, 2020; Pelana et al., 2021).

Based on preliminary studies conducted it appears that the learning media rolled forward straddle existing is still incomplete and can not be accessed offline. The learning media in the Faculty of Sports Science is now in the form of e-learning, where the implementation of learning and learning evaluation still feels incomplete because of the limited capacity in filling out lecture materials and evaluation in the form of videos. Learning media rolled forward straddle available still has limitations. The limitations of existing e-learning media have not supported the maximum learning rolled forward straddle for Sports Education students (Batsunov, 2021; Sari et al., 2019; Mamat & Azmat, 2013). In addition, the e-learning media available can only be used online and always requires networking, Another thing seen from the observations shows that as many as 70% of lecturers in providing gymnastics materials are still conventional and do not use e-learning, as many as 30% of lecturers who carry out learning by using e-learning, As many as 70% of lecturers look inconsistent application of learning media in the form of video, power points within focus, as many as95% seen no lecturers who use android media. As many as 60% of students have network constraints to access e-learning. This shows that it cannot run gymnastics

learning to the maximum as expected, this situation urges researchers to make a breakthrough in developing android-based learning media to support effective gymnastic learning in the Department of Sports Education, Faculty of Sports Sciences (Chiat & Ying, 2012; Delignières et al., 1998; Peter, 2015).

Adult, technology is growing very rapidly and is widely used to develop in the world of Education, one of which is as a medium of learning, which can be developed like an android-based learning medium. With this media, it will be able to provide the right stimulus in learning gymnastics (Komaini et al., 2021). Android is an open-source mobile operating system developed by Google's Linux-based (Noor, 2017; Satyaputra et al., 2016; Lauren, 2013; Ichwan & Hakiky, 2011). The android operating system is used for tablet computers and smartphones. Android provides an open platform for developers to create their apps for application use i.e. troubleshooting that uses one of the application data processing techniques that usually race on a desired or expected transaction or expected data processing (Lauren, 2013). Android app is also useful to help students, teachers, and staff of an institution in their daily academic work (Gore et al., 2017). In the world of education, this plication can be used as one of the learning media.

Media is software (software) that contains information or messages in the field of education that aims to send messages from sender to recipient in the learning process (Siddiq et al., 2008). The medium of learning as a physical means of delivering instructional content, books, films, videotapes, etc. Rusman (2008). Furthermore, Rusman stated that the media is a tool to provide stimulants for learners so that the learning process occurs. Learning media is everything that is used to stimulate the thoughts, attention, feelings, and willingness of students to encourage the occurrence of an effective and efficient learning process in the learning process can be media, tools, or techniques. Rusman (2008); Ashfahany et al. (2017). Android-based learning media presents material effectively, efficiently, and more attractively to help students achieve maximum learning outcomes.

Based on initial observations on the ground it is seen that all sports education students who attend gymnastics lectures have smartphones. Although it already has a smartphone, the use of smartphones as a medium of gymnastic learning on the material rolled forward straddle is still not maximal. This shows that the use of technology as a medium in gymnastic learning in the Sports Education Department is still lagging. In improving the ability to roll ahead of the student straddle in gymnastics learning, with the development of this android-based gymnastics learning media, it can be accessed by students by using their smartphone single. This becomes something new for students because the development of android-based gymnastics learning media in gymnastics learning, especially the rolling forward straddle material in the Department of Sports Education, Faculty of Sports Science has never been done.

One of the efforts to organize learning that can improve the ability to roll forward is by many research that has been done and published in Indonesia that is seen on the Sinta site in Indonesia. Nevertheless, these efforts have not shown maximum results, especially in the learning of gymnastics material rolled forward.

This is because the solutions offered are not yet in a complete form such as learning media in the form of applications. Research conducted titling, Titting et al. (2016), about multimedia learning floor gymnastics based on android. My gymnastics learning media. Ali (2012), use of VCD Media. But to accommodate the needs of the women rolling forward staddle students are not too enough. The media does provide effectiveness in improving learning outcomes but has not accommodated students in the development of exercises that roll forward straddle. Android-based learning media in the form of applications can be accessed by students anywhere and anytime by using mobile phones, smartphones, tablets, and so on which will be offline to make it easier for its users, it is seen from internet connections that are not always smooth and certain areas that are still difficult will be internet network (Titting et al., 2016).

Therefore, researchers feel the need to make solutions as a problem-solving effort, namely the development of learning media made in the form of android-based applications containing syllabuses, lecture materials accompanied by images, and videos of the implementation of motion along with evaluations at each meeting. Developing a valid, practical, and effective android-based gymnastics learning medium in improving the ability to roll ahead of a student's straddle is the goal of this study. It is hoped that this learning media can improve student learning outcomes in gymnastics learning and facilitate students in understanding every material in gymnastics learning. In addition, this research is expected to be used as an alternative reference to improve the quality of learning in other fields (Vuillerme et al., 2001; Vladimir et al., 2013; Astra & Artanayasa, 2017).

Methods

The method in this research is Research and Development which aims to develop a valid, practical, and effective android-based gymnastic learning medium. The process of developing android-based gymnastics learning media refers to the Plomp development model. According to Plomp & Nieveen (2013), this stage of development is preliminary research, prototyping phase, and assessment phase.In the preliminary stage of research, needs and context analysis, literature review, and the development of a conceptual framework of android-based gymnastics learning media. Needs and context analysis consists of gymnastic learning analysis, student analysis, curriculum analysis, and material analysis. The result of this preliminary research is to obtain a state-of-the-art media of android-based gymnastics learning.In the prototyping phase stage, namely designing media products learning gymnastics based on android is an application consisting of instructions for the use of media, syllabus and RPS, lecture materials, practice videos, and assignments. In addition, the instruments used to assess development products are also validated first by using the validation instrument assessment sheet. The instruments assessed consist of validation instruments, formative evaluation instruments, and practical instruments. This analysis uses the Likert scale. Calculation of final value data validation results analyzed in scale (0-100) is done using the formula Aiken's (1987), V namely:

$$P = \frac{Q}{R} \times 100$$

As for determining practicality assessment based on the following criteria:

Table 1
Criteria correlation (Arikunto, 2010)

Correlation	Information
0,801 – 1,00	Very high validity
0,601 – 0,800	High validity
0,401 – 0,600	Medium validity
0,001 – 0,400	Low validity
≤ 0,00	Not valid

Once the instrument is declared valid by experts, self-evaluation of the development product is carried out. Then the development product is validated by three experts in gymnastics, learning media, and language. Validation refers to indicators of the assessment of the validity of the contents, the validity of the construct, and the validity of the language. Once declared valid, the product is released through one-to-one evaluation, small group evaluation, and field test. Field tests are conducted in the Department of Sports Education with a section 202110860501code, 202110860391 202110860419. The three sections were selected based on the initial test scores of gymnastic learning, namely high, medium, and low category section codes.

$$P = \frac{Q}{R} \times 100$$

As for determining practicality assessment based on the following criteria:

Table 2
Criterion pgreedy (Riduwan, 2009)

Percentage	Information
0 – 20%	Impractical
21 – 40%	Less practical
41 – 60%	Quite practical
61 – 80%	Practical
81 – 100%	Very practical

Analysis of the effectiveness of android-based gymnastics learning media is obtained from the straddle forward rolling ability assessment instrument which includes the initial phase, main phase, and final phase Analysis of the ability to roll ahead of the straddle on each sub evaluation using the formula:

$$N = \frac{x}{\text{Maximum Score}} \times 100$$

Assessment of straddle forward rolled ability is categorized by classification in Table 3 below.

Table 3
Classification of ability to roll ahead of a straddle

Interval	Criterion
0 ≤ N ≤ 29	Bad
30 ≤ N ≤ 64	Less Good
65 ≤ N ≤ 79	Pretty Good
80 ≤ N ≤ 89	Good
90 ≤ N ≤ 100	Excellent

To measure the improvement of the ability to roll ahead of the straddle students used Gain analysis with the formula:

$$\langle g \rangle = \frac{\langle S_{post} \rangle - \langle S_{pre} \rangle}{100\% - \langle S_{pre} \rangle}$$

Improved ability to roll ahead of a student's straddle is assessed based on the criteria in Table 4 below.

Table 4
Upgrade criterion

Interval	Criterion
g > 0,7	Tall
0,3 < g < 0,7	Keep
g < 0,3	Low

Results and Discussions

Prototype development and expert validation

The preparation of a prototype of android-based gymnastics learning media begins by analyzing the handstand capabilities of sports education departments intended to determine the material to be published in the media. This aims so that the learning media developed can help students effectively master handstand materials that can teach it properly. The scope of handstand material in the Department of Sports Education is presented in Table 5 below.

Table 5
Scope of material rolls ahead straddle

Competency	Indicator
Abilityto roll forward straddle	The initial attitude of self with both hands beside the ears both hands are on the shoulder-width mat Both legs are straightened, the elbows of the hands bent, the head folded until the chin touches the chest The body is tilted forward so that the weight is in both palms Roll forward by landing the neck first and both legs open with knees remain straight such as forming a letter Vor a stretcher

Competency	Indicator
	Both hands relax the focus from the mat, with the hands moving towards the front between the left foot and the right foot and res resing the hands to try to get up. Back to standing straight with your legs tight ready position.

The resulting product is an android-based gymnastics learning medium in the form of applications that can be accessed on the Android system. The use of gymnastics learning media contains media instructions, syllabus and RPS, lecture materials, attendance, practice videos, and assignments as an evaluation that supports improving the ability to roll ahead straddle. Android-based gymnastics learning media in learning material rolled forward straddle has a logo that says "Gymnastics" presented in Figure 1 below.

Figure 1. "Gymnastics" presented

Android-based gymnastics learning media has5 main menus, namely, Instructions for media use, syllabus and RPS, Lecture Materials, Practice Videos, and assignments. Before entering the learning, then on the first page, there is a Figure 2 as below:

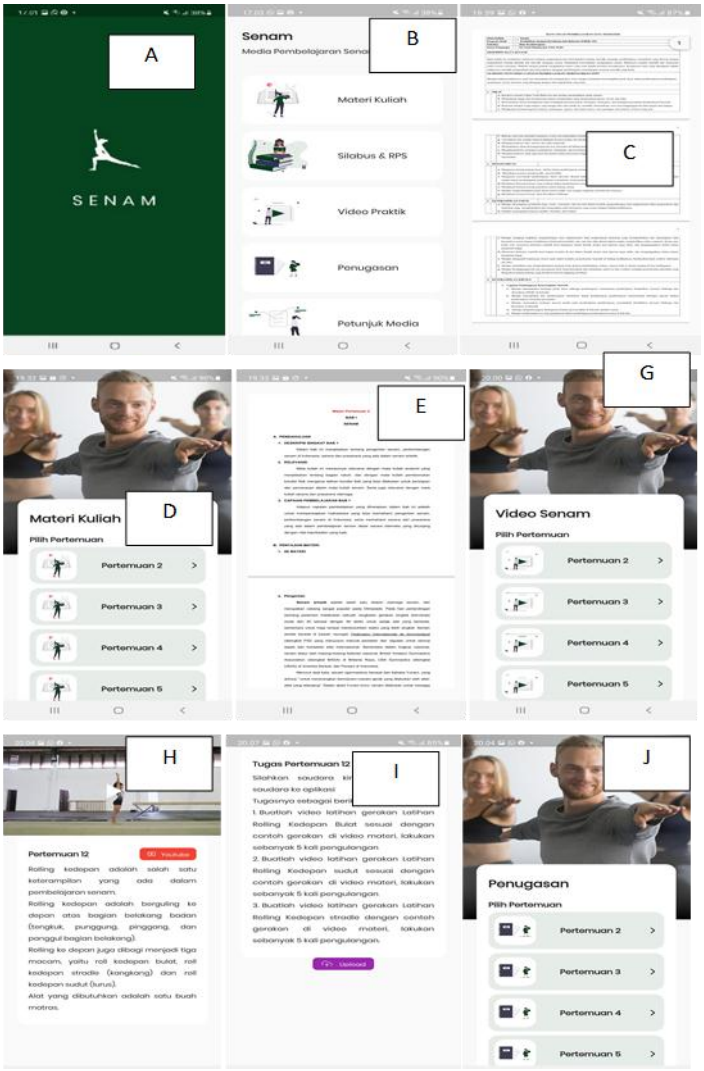

Figure 2. A) Image of page opener; B) Image menu options; C) Syllabus image; D) Image menu of Lecture Material; E) Image of Gymnastics Video; F) Lecture material menu; G) Fill in the Assignment; H) Menu Content Assignment; I) and J) Practice Menu Video Menu

The media instruction menu explains how to use online and offline media. The menu of learning materials contains material in each week of the lecture ranging from meetings 1 to 16 in pdf form and can be directly read by students without uploading it. The syllabus menu and One RPS contain learning achievements for one semester and an overview of the material that students will learn within one semester. The lecture material menu contains material in theory that is equipped with images ranging from meetings 1 to 16. The video menu practice, contains video tutorials on the implementation of movements starting from the initial phase, main phase, and final phase In the video menu and practice is also called video implementation Basic exercises for rolling movements ahead of the straddle, such as video Sit up exercises for abdominal muscles strength, Push up

exercises for hand muscle strength, weight training in the hands for hand muscle strength, Press exercises for hand muscle strength when standing after rolling, weight training rests on the hands. The assignment menu contains tasks that are uploaded to students by the materials studied.

Validity of android-based gymnastics learning media

Assessments include the feasibility of content, constructs, and language. Product validation is carried out by experts of three people, done in written form, and discussion until a condition is reached where experts agree that the android-based learning media developed is valid. The validation results that have been done can be seen in Table 6 below.

Table 6
Product validation results

Product	Component	Validity	
		Shoes (V)	Information
Application	Construct	0,89	Very High
	Accounts	0,86	Very High
	Language	0,85	Very High
Material	Construct	0,86	Very High
	Accounts:	0,85	Very High
	Language	0,87	Very High
Language	Construct	0,90	Very High
	Accounts	0,89	Very High
	Language	0,89	Very High

The practicality of android-based gymnastics learning media

According to Plomp & Nieveen (2013), the practicality of developed products (interventions) is seen from the ease of use. The practicality of android-based Gymnastics Learning Media is demonstrated by the consistency between the typology of expectation with assessment, and expectation with operations. That is, the practicality of the learning media is determined by the assessment of experts who state that the product developed can be applied, and the reality that shows that what is developed is indeed applicable. In this case, it is known that the instructions for the use of media and language used in android-based Gymnastics Learning Media in the opinion of validators at the validation stage can be implemented with the average values V respectively being 0.82, 0.78, and 0.84. Then these results were compared with the response of lecturers and students regarding the practicality of android-based Gymnastics Learning Media which was actualized with the application of gymnastic learning applications. The results of the practicality according to lecturers can be seen in Table 7 below.

Table 7
The results of the practicality according to lecturers

Assessment Aspects	202110860501	202110860391	202110860419
Lecturer Application			
Ease of application of lecturers in gymnastics learning.	3,61	3,70	4
The benefits of the application of lecturers in gymnastics learning	3,65	4	3,65
Related to lecturerapplication in gymnastics learning	4	3,76	3,81
Average (%)	93,18	95,45	95,45
Overall Average (%)	94,70		
Category	Very Practical		
Student Application			
Ease of using student applications in gymnastics learning	4	3,66	4
The benefits of the application of lecturers in gymnastics learning	3,80	4	3,76
Application relatedness in gymnastics learning	3,63	4	3,83
Allocation of application time ingymnasticsran defenders	4	4	3,70
Average (%)	95,31	98,43	95,3
Overall Average (%)	96,35		
Category	Very Practical		

Table 7 above suggests that the android-based gymnastics learning media that is actualized with applications used by lecturers and students is practically used and makes it easier for lecturers to convey straddle rolled material. The average percentage of applications by lecturers and students is at intervals of 80-100 with very practical categories. Respondents assessed that android-based gymnastics learning media can make learning activities more practical, both for lecturers and students. Then the results of media practicality according to students can be seen in the following Table 8 below.

Table 8
The results of media practicality according to students

Assessment Aspects	2021108603501	202110860391	202110860419
Ease of following the material on the application in gymnastics learning.	3,25	3,08	3,32
The benefits of the application of lecturers in gymnastics learning	3,47	3,37	3,39
Related application for student learningin gymnastics	3,48	3,45	3,45

Assessment Aspects	2021108603501	202110860391	202110860419
Allocation of application timefor students in gymnastics learning	3,60	3,52	3,47
Average (%)	86,71	84,45	85,46
Overall Average (%)	85,54		
Category	Very Practical		

Table 8 above suggests that android-based gymnastics learning media that is actualized with applications for students can help and facilitate students in the gymnastics learning process. The average percentage of its assessment is at intervals of 80-100 with very practical categories.

Effectiveness of android-based gymnastics learning media

According to Plomp & Nieveen (2013), the effectiveness of developed products (interventions) is seen from the level of achievement of an expected goal. That is, android-based gymnastics learning media is declared effective if it can develop the ability to roll ahead of the straddle. As for the results shown at the field test stage, students experienced an increase at each meeting. The results of the Ability level obtained in the three sections and the analysis of the increase can be seen in Table 9 and Table 10.

Table 9
Ability assessment result scroll forward straddle

Sex 202110860501					
Aspects observed	19th meeting Pre-Treathment	I	II	III	IV
Early Phase	57,54	59,60	67,55	74,76	83,56
Main Phase	43,60	52,30	65,78	72,92	83,20
Final Phase	69,35	72,35	80,35	84,24	86,89
Average	53,74	61,41	71,22	77,30	84,55
Criterion	Low	Enough	Enough	Enough	Tall
Sex 202110860391					
Aspects observed	19th meeting Pre-Treathment	I	II	III	IV
Early Phase	52,87	64,67	72,34	82,35	87,76
Main Phase	46,52	60,54	66,67	75,76	78,89
Final Phase	69,98	74,26	80,34	84,98	89,35
Average	56,45	66,48	73,11	81,03	85,33
Criterion	Low	Enough	Enough	Tall	Tall
Sex 202110860419					
Aspects observed	19th meeting Pre-Treathment	I	II	III	IV
Early Phase	52,23	64,59	70,46	78,69	83,90
Main Phase	46,54	55,72	69,83	73,74	77,69
Final Phase	70,25	70,15	74,82	82,91	89,74
Average	56,34	63,48	71,70	78,44	83,77

Criterion	Low	Enough	Enough	Enough	Tall

Table 10
N-Gain score of skill rolled ahead straddle

That's what I'm going to do.	N-Gain Score			Average
	Early Phase	Main Phase	Final Phase	
202110860501	0,63	0,60	0,65	0,62
202110860391	0,73	0,56	0,66	0,65
202110860419	0,70	0,61	0,64	0,65
Average	0,64			
Category	Keep			

At the first meeting, the average scores of ability rolled forward the straddle of Faculty of Sport Science - Universitas Negeri Padang students section 202110860501, 202110860391, and 202110860419 were 61.41, 66.48, and 63.48, respectively. Subevaluation that still falls into the low category is the main phase in the movement of rolling forward straddle. But the value of the ability to roll ahead of the straddle in 202110860501 and 02110860419 has reached the category of enough, which is 64.67, and 64.56, while the 202110860391 is still relatively low, which is 59.60. This is because the medium used in gymnastics in caring for aspects of hand strength and body thrust is still low in the main phase of learning movements rolling ahead of the straddle. Hamalik (2010), divided learning activities into 8 groups, namely visual, audio, oral, writing, describing, metric, mental, and emotional activities, but in this study researchers only examined 6 learning activities namely visual, audio, oral, mental, metric, and emotional.

At the next meeting, the average score of ability to roll forward the straddle of Faculty of Sport Science - Universitas Negeri Padang students section 202110860501, 202110860391, and 202110860419 were 71.22, 73.11, and 71.70, respectively. No sub-evaluation falls into the low category, all sub evaluation has reached the sufficient category. This increase suggests that students are getting used to android-based gymnastics learning media. The level of complexity of android-based gymnastics learning media that is at a sufficient level also gives a positive effect in this increase. This is because of the media used in gymnastics learning. This medium is one of the effective and relevant educational media once applied in the learning of tailors, especially floor gymnastics (Ali, 2012). The ability to roll ahead of the straddle which was initially still low at the first meeting, at this meeting has reached the category enough. This indicates that problems that existed in previous classes that familiarize students with understanding learning materials using conventional methods can be addressed. This shows that the utilization of android for gymnastics learning media adds to students' motivation to be active in learning activities. By research Razzaq et al. (2018), states that the use of gadgets can provide intrinsic motivation to learners to actively learn independently or in groups.

There is a sub-evaluation that has reached a high category at this second meeting, namely the final phase. The achievement is in section 202110860391, 202110860501 the value is 80.35 and 80.34, respectively, but in the

202110860419 sections is still an insufficient theory, which is 74.82. This achievement is due to the arrangement of activities in the android-based gymnastics learning media that gives rise to a positive stimulus in students, such as doing weight training in the hands independently and doing standing exercises after rolling straddle. This exercise shows the benefits of android-based learning media that can be used by students anywhere and anytime online and offline (Vuillerme & Nougier, 2004; Ribbans et al., 2016).

Furthermore, at the third and fourth meeting, the average score of Ability rolled forward the straddle of students section 2021108603501,202110860391 and 202110860419 continues to increase. At the third meeting were 77.30, 81.03, and 78.44, respectively, and the fourth meetings were 84.55, 85.33, and 83.77, respectively. The results of the three schools are already in the high category. But among the three sub evaluations, the ability to roll ahead of the straddle of sexy students 202110860501, and 202110860391 is still in the category with the average in each section is 83.25 and 78.89. Judging from the indicator of sub-evaluation of the ability to roll ahead of the straddle, the ability in the main phase is the indicator that is the lowest value than other indicators, thus affecting the average achievement of sub evaluation of the ability to roll ahead of the student straddle itself. This is because this indicator is needed in the ability of the student's movement. But judging by the improvement, the ability to roll ahead of the straddle section 202110860501 and 202110860419 has a better N-Gain score than the main phase. This indicates that android-based gymnastics learning media can have a positive influence on the development of the ability to roll ahead of the straddle of Faculty of Sport Science - Universitas Negeri Padang students.

Based on the results obtained from the four meetings in the three sections, the sub evaluation of the main phase when rolling with the knee straight and holding the handstand attitude for 2 seconds does not show a significant anomaly. This is because in all the features there are an android-based gymnastics learning media that accommodates the implementation of the Movement. Overall, all three sub-evaluation abilities to roll ahead of the student straddle experienced a significant increase with an N-Gain score above 0.50 in all three sections. The average N-Gain ability score rolled forward the straddle of sexy students 202110860501,202110860391 and 202110860419 were 0.63, 0.73, and 0.70, respectively. The score is in the moderate category. The results show that android-based gymnastics learning media can increase the ability to roll ahead of the student straddle. Therefore, it can be stated that android-based gymnastics learning media meets the criteria for the quality of the third intervention, namely effective learning media (Millar et al., 2021; Taylor et al., 2011; Widana et al., 2020).

Conclusion

The results of the study concluded that android-based gymnastics learning media has a high quality of validity, practicality, and effectiveness. The results of the validity of language, matter and media, and assessment instruments the ability to roll forward straddle are on very high validity criteria, both in terms of material, media, and language. This means that droid-based gymnastics learning media has met the criteria of relevance and consistency. The use of android-based

gymnastics learning media according to lecturers and students meets the criteria of ease, usefulness, and exposure. In terms of effectiveness, android-based gymnastics learning media can improve the ability to roll ahead of the student straddle with an average N-Gain score in each school is 0.62, 0.65, and 0.61. In other words, android-based gymnastics learning media has a significant influence on the development of the ability to roll ahead of the student straddle. Therefore, android-based gymnastics learning media can be used by gymnastics lecturers or in other science midwives as an option in improving the quality of learning and developing the ability to roll ahead of the student straddle.

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