Development of Women's Reproductive Health Application as Android-Based Learning Media of Adolescent Knowledge

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Abstract---This study aimed to assess the feasibility of women's reproductive health applications as android-based learning media and determine the increase based on age and education background in adolescent knowledge before and after the intervention of this application. This research was conducted at Abeli Health Center, Kendari City from March to April using the combined method, namely Research and Development (R & D) and Quasy Experiment design one group pretes–post test. The sampling technique used was purposive sampling. The sample in this study amounted to 94 people. The statistical test used is the Wilcoxon Signed Rank Test. The results of this study indicate that the application of women's reproductive health is very feasible to be used as an android-based learning media with a percentage of 90.76% of media aspects and 87.37% of material aspects. The women's reproductive health applications can significantly improve adolescent knowledge and elevate adolescents' knowledge based on age and education. The use of women's reproductive health applications in this study was very feasible in improving adolescent knowledge.
Keywords---adolescent, knowledge, quasy experiment, research and development (R&D), women's reproductive health application

Introduction

Adolescence is a period of transition from childhood to adulthood. Adolescents experience rapid growth and development in physical, psychological, intellectual aspects and have great curiosity (BKKBN, 2013). One of the problems that often occurs in adolescents is the lack of knowledge about reproductive health, leading adolescents to risky sexual behavior such as premarital sex. Then, it may cause unwanted pregnancies, also abortion occurrences which endanger the adolescents themselves (SDKI, 2017). Sexual behavior can be influenced by several things, for

example, by the presence of information media. The current number of information media causes the emergence of curiosity in adolescents (Ulfah, 2019). Thus, a suitable method of delivering health education for adolescents influences perceptions and changes behavior after obtaining information (Rusli, 2001). Access to information media can be found from various sources, such as print and electronic (Wijaya, 2015). Based on research Ulfah (2019), shows that 15% of media access has a direct effect on premarital sexual behavior.

Knowledge is something that someone obtains after sensing an object, and most of the human knowledge is obtained through the eyes and ears (Notoatmodjo, 2010). So, by increasing adolescents' knowledge about their reproductive health, they will have healthy and responsible sexual attitudes and behaviors during adolescence (Widyastuti, 2009). A study conducted by Samidah & Murwati (2017), shows a relationship between sources of information and adolescent attitudes regarding premarital sex with a p-value = 0.000. Research that Novaeni et al. (2017), conducted on 35 students shows that using an android-based reproductive health application can increase knowledge about reproductive health. It is interesting to use and remember the material with the percentage result of the application assessment of 85%. So, this can make it easier for students to understand given material (Warren et al., 1997; Gouws et al., 2000).

Therefore, to overcome the lack of information and knowledge of adolescents about reproductive health and sexuality, it is necessary to provide information and media for reproductive health education for adolescents. This information needs to be obtained from clear and directed sources to not fall into the trap of looking for information through the internet and reading or pornographic films, which cannot be held responsible for the source of information. One of the learning media that can be used is an Android-based reproductive health application that is innovative and creative in providing information to adolescents. As we know, Android-based smartphones have been widely used among adolescents. In addition, android-based applications are more attractive to use than print media such as books and leaflets (Nigg & Courneya, 1998; Valente et al., 2009).

The researchers built and designed an attractive and feasible android-based learning media in women's reproductive health applications. This study aimed to assess the feasibility of women's reproductive health applications as android-based learning media and determine the increase based on age and education background in adolescent knowledge before and after the intervention of this application (Sultan & Paris, 2006; Spelke, 1994).

Research Methods

This study used the Combine Research and Development (R&D) method, a development model that Borg and Gall have simplified, and a quasi-experimental method with a one-group of pretest-posttest design. The population in this study were all young women residing in the working area of the Abeli Public Health Center, Kendari City, amounting to 1680 people. The sample in this study amounted to 94 people by purposive sampling (Kourilsky & Walstad, 1998; Eriksen & Fallan, 1996). The data collection technique was carried out by asking adolescents to download Kespropedia on their respective cellphones, after that a pre test was carried out on women's reproductive health materials ± 15 minutes after that they were given an intervention using an android-based reproductive health application ± 30 minutes then a post test was carried out to measure the level of knowledge adolescents after using women's reproductive health applications (Veréb & Azevedo, 2019; Akcali & Sismanoglu, 2015).

Result

Expert validation assessed the feasibility of the application. This validation was carried out by 2 media experts and 2 material experts. Expert validation results were obtained from the validation questionnaire instrument, as follows:
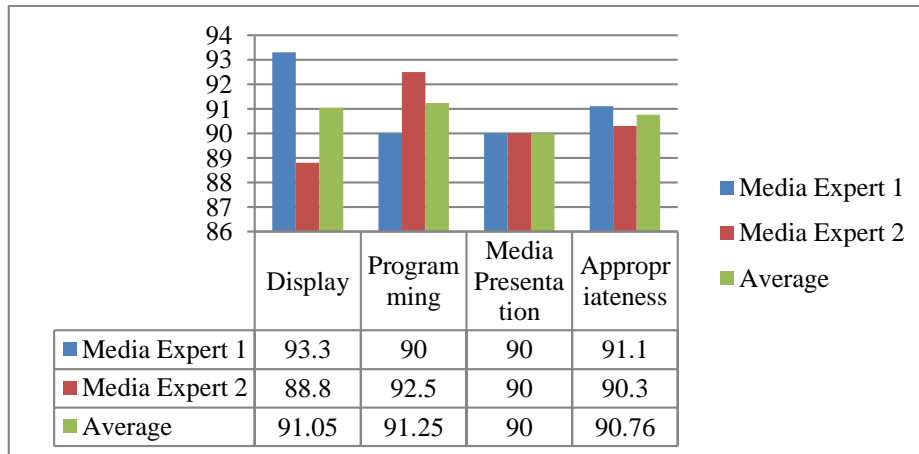
Figure 1. Expert validation results for android-based women's reproductive health applications
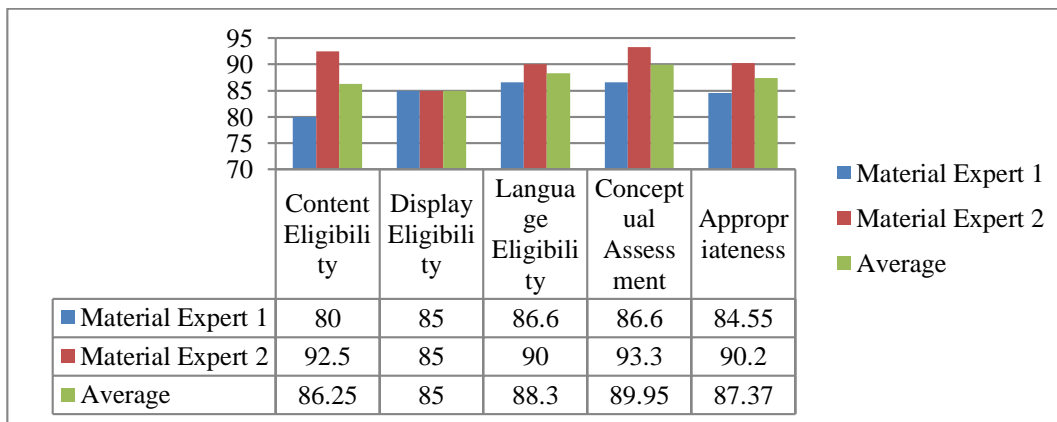
Media Expert 1	Display	Programming	Media Presentation	Appropriateness
Media Expert 1	93.3	90	90	91.1
Media Expert 2	88.8	92.5	90	90.3
Average	91.05	91.25	90	90.76

Figure 2. Expert validation results for android-based women's reproductive health applications

Material Expert 1	Content Eligibility	Display Eligibility	Language Eligibility	Conceptual Assessment	Appropriateness
Material Expert 1	80	85	86.6	86.6	84.55
Material Expert 2	92.5	85	90	93.3	90.2
Average	86.25	85	88.3	89.95	87.37

Based on the results of expert validation provided, the average feasibility assessment was 90.76% for the media, and the average assessment was 87.37% for the material, which means that the application of women's reproductive health was considered very feasible to use.

Table 1
Knowledge results before and after given applications

Category	Pre-Test		Post Test		P - Value
	n	%	n	%	
Good	15	16,0	64	68,1	
Moderate	67	71,3	24	25,5	0,000
Less	12	12,8	6	6,4	
Total	94	100	94	100	

Based on Table 1, most adolescents with the good knowledge category were 67 people (71.3%) at the pretest. However, after the intervention of women's reproductive health application and did posttest, there was an increase in knowledge with good knowledge category as many as 64 people (68.1%).

Table 2
Knowledge results before and after given applications
based on age characteristics

Age (Years)		Knowledge level				P-Value
		Pretest		Posttest		
	Category	n	%	n	%	
10 – 13	Good	0	0	17	18,1	
	Moderate	28	29,8	12	12,8	0,003
	Less	6	6,4	5	5,3	
14 – 16	Good	10	10,6	30	31,9	
	Moderate	23	24,5	7	7,4	0,000
	Less	5	5,3	1	1,1	
17 – 19	Good	5	5,3	17	18,1	
	Moderate	16	17,0	5	5,3	0,001
	Less	1	1,1	0	0	
Total		94	100	94	100	

Table 2 shows that most early adolescents had sufficient knowledge at the time of the pretest based on age characteristics (29.8%). Meanwhile, after the application and posttest were given, there was a significant increase in knowledge in each age characteristic, and most were in middle adolescents (31.9%).

Table 3
Knowledge results before and after given applications
based on characteristics of education level

Education Level		Knowledge level				P-Value
		Pretest		Posttest		
	Category	n	%	N	%	
Elementary school	Good	0	0	12	12,8	
	Moderate	21	22,3	9	9,6	0,023
	Less	5	5,3	5	5,3	
Yunior high school	Good	4	4,3	25	26,6	
	Moderate	23	24,5	6	6,4	0,000
	Less	5	5,3	1	1,0	
Senior high school	Good	11	11,7	27	28,7	
	Moderate	23	24,5	9	9,6	0,000
	Less	2	2,1	0	0	
Total		94	100	94	100	

Based on Table 3, Based on the characteristics of the level of education, they had sufficient knowledge at pretest, specifically of elementary education (22.3%), junior high school (24.5%), and high school (24.5%). Furthermore, after being given the application and posttest, there was a significant increase in knowledge at each level of education, and the highest was in high school education (28.7%).

Discussion

Eligibility of women's reproductive health application

Current technological developments allow a person to obtain information from anywhere. One example of android-based learning media is a smartphone that adolescents often use. The use of smartphones as learning media can make it easier for adolescents to learn about women's reproductive health because they are easy to use anytime and anywhere. In this Kespropedia application, in addition to reproductive health material, there are also several animated videos and quizzes about myths and facts related to women's reproductive health that can increase youth's interest in studying women's reproductive health. This is in line with research conducted by Aksoy (2012), that using the animation method can improve student learning outcomes compared to traditional teaching methods. In addition,

the myth and fact quiz menu on the application of women's reproductive health in this study can also help adolescents play while learning to understand the myths circulating in the community regarding women's reproductive health. Android-based multimedia as a proper adolescent reproductive health education media meets the eligibility category from the media and material aspects. In this study, the reproductive health application as an android-based learning media based on a feasibility test carried out by media experts and material experts got a very feasible category, specifically 90.76% of media aspect and 87.37% of material aspect. This is in line with research conducted by Novaeni et al., (2017) the percentage of overall application assessment is 85%, which means very good (Beal, 1999; Karp et al., 2020).

Adolescent knowledge of women's reproductive health

Knowledge is something that a person obtains after going through sensing an object. Most of the human knowledge is obtained through the eyes and ears. One factor that influences knowledge is the mass media/sources of information (Notoatmodjo, 2010). The source of information in this study was obtained from the application of women's reproductive health designed according to the needs of adolescents. The results in this study indicated an increase in knowledge before and after the application of women's reproductive health given 67 people (71.3%) at the pretest. However, after the intervention of women's reproductive health application and did posttest, there was an increase in knowledge with good knowledge category as many as 64 people (68.1%). This is in line with the research conducted by Sri Dinengsih; there was an increase in knowledge after being given an android application with an average knowledge of reproductive health is 86.3 ± 7.063 (p-value 0.000) (Dinengsih & Hakim, 2020). The increase in knowledge about women's reproductive health in adolescents may be caused by adolescents who commonly have an Android cellphone. The use of smartphones today is limited as a communication tool and as a tool for social interaction through cyberspace. Almost all people use smartphones, including adolescents (Isni et al., 2019).

Adolescent knowledge of women's reproductive health by age

Age is one factor that can affect knowledge. The older a person is, the more mature the way they think and work (Asiyah et al., 2015). In addition, their capture power will also develop in receiving information about women's reproductive health (Mursit & Rahmawati, 2018). This study indicates that most early adolescents had sufficient knowledge at the time of the pretest based on age characteristics (29.8%). However, after the application and posttest were given, there was a significant increase in knowledge in each age characteristic, and most were in middle adolescents (31.9%). This is in line with research conducted by Oktiva & Muhlisin (2010), to adolescents aged 16-18 years, who explained that at that age, adolescents could think about what is good and bad, so they can absorb information about reproductive health and can apply it in their daily life. In middle adolescence (14-16 years), sexual urges have begun to appear, so researchers assume that adolescents may want to find new information about what is happening to them. In addition, at this age, the ability to think has begun to perfect in concluding information.

Adolescent knowledge of women's reproductive health based on education level

Education level is a stage in education determined based on the level of development of students or adolescents (Pratiwi, 2017). In theory, education can affect a person's learning process; the higher a person's education, the better his knowledge. The results of this study indicated that at the time of the pretest, based on the characteristics of the level of education, they had sufficient knowledge at each level of elementary education (22.3%), junior high school (24.5%), and high school (24.5%). However, after being given the application and posttest, there was a significant increase in knowledge at each level of education, and the highest was in high school education (28.7%).

This is in line with research conducted by Ayu Darmawati, who said that the higher a person's education, the easier it is for them to receive the information obtained (Dharmawati, 2016). Conversely, the lower a person's education, the more likely it is that it will be difficult to receive information. So the researchers assume that the possibility of increasing knowledge in high school education occurs because adolescents have previously studied reproductive health in Biology subjects so that they have a little picture of women's reproductive health.

Conclusion

The application of women's reproductive health in this study is very suitable to be used as an android-based learning media with a percentage of 90.76% of media aspects and 87.37% of material aspects. Women's reproductive health applications in this study can increase adolescent reproductive health knowledge based on age and education level.

References
Akcali, B. Y., & Sismanoglu, E. (2015). Innovation and the effect of research and development (R&D) expenditure on growth in some developing and developed countries. *Procedia-Social and Behavioral Sciences*, *195*, 768-775. https://doi.org/10.1016/j.sbspro.2015.06.474

Aksoy, G. (2012). The effects of animation technique on the 7th grade science and technology course. *Online Submission*, *3*(3), 304-308.

Asiyah, N., Kusumawati, D. A., & Anita, Y. (2015). The Relationship between Knowledge of Young Women Age 11-14 Years with Anxiety Levels in Facing Secondary Sex Changes at MTs Safinatul Huda Sowan Kidul Jepara. Journal of Nursing and Midwifery Sciences, 6(3).

Beal, M. W. (1999). Acupuncture and acupressure: applications to women's reproductive health care. *Journal of Nurse-Midwifery*, *44*(3), 217-230. https://doi.org/10.1016/S0091-2182(99)00054-3

BKKBN. (2013). Comprehensive Sexual and Reproductive Health Technical Guidance. Jakarta: BKKBN.

Dharmawati, I. G. A. A. (2016). The relationship between education level, age, and years of service with the level of knowledge of dental and oral health of elementary school health and physical education teachers in Tampak Siring District, Gianyar. Journal of Dental Health (Dental Health Journal), 4(1), 1-5.

Dinengsih, S., & Hakim, N. (2020). The Effect of the Android-Based Application Method on the Knowledge of Adolescent Reproductive Health. JKM (Journal of Midwifery Malahayati), 6(4), 515-522.

Eriksen, K., & Fallan, L. (1996). Tax knowledge and attitudes towards taxation; A report on a quasi-experiment. *Journal of economic psychology*, *17*(3), 387-402. https://doi.org/10.1016/0167-4870(96)00015-3

Gouws, E., Kruger, N., Burger, S., & Snyman, D. (2000). *The adolescent*. Pretoria: Heinemann. https://doi.org/10.1016/C2013-0-01046-8

Isni, K., Putra, L. D., & Anwar, N. (2019). Peer Review "Needs Analysis" SIDIKA "As A Youth Health Promotion Media".

Karp, C., Wood, S. N., Galadanci, H., Kibira, S. P. S., Makumbi, F., Omoluabi, E., ... & Moreau, C. (2020). 'I am the master key that opens and locks': Presentation and application of a conceptual framework for women's and girls' empowerment in reproductive health. *Social Science & Medicine*, *258*, 113086. https://doi.org/10.1016/j.socscimed.2020.113086

Kourilsky, M. L., & Walstad, W. B. (1998). Entrepreneurship and female youth: Knowledge, attitudes, gender differences, and educational practices. *Journal of Business venturing*, *13*(1), 77-88. https://doi.org/10.1016/S0883-9026(97)00032-3

Mursit, H., & Rahmawati, A. (2018). The Relationship of Knowledge about Reproductive Health with Preventative Attitude to Adolescent Pregnancy at Smk N 1 Saptosari, Gunungkidul In 2018 (Doctoral dissertation, Poltekkes Kemenkes Yogyakarta).

Nigg, C. R., & Courneya, K. S. (1998). Transtheoretical model: Examining adolescent exercise behavior. *Journal of adolescent health*, *22*(3), 214-224. https://doi.org/10.1016/S1054-139X(97)00141-9

Notoatmodjo, S. (2010). Health behavioral science.

Novaeni, N., Dharminto, D., Agusyahbana, F., & Mawarni, A. (2018). Development of Android-Based Adolescent Reproductive Health Education Applications for Biology Learning at Pius High School, Purworejo Regency in 2017. Journal of Public Health (Undip), 6(1), 138-147.

Oktiva, Y. D., & Muhlisin, A. (2010). The relationship between the level of knowledge about adolescent reproductive health and parenting patterns with adolescent attitudes about free sex in SMA N 1 Tawangsari Sukoharjo.

Pratiwi, N. K. (2017). The effect of education level, parental attention, and student interest in learning Indonesian language learning achievement for health vocational high school students in Tangerang City. Poets, 1(2), 31.

Rusli, I. (2001). Health Promotion with Behavioral Theory Approach, Media, and Its Application. Semarang: PT. King Grafindo Persada.

Samidah, I., & Murwati, Y. E. (2017). Relationship of Reproductive Health Information Source Utilization with Adolescent Premarital Sexual Attitudes and Behaviors. J Nurs Public Heal, 5(2), 60-71.

SDKI. (2017). Preliminary Report on Reproductive Health Problems in Adolescents. In BKKBN Statistics Center. Jakarta.

Spelke, E. (1994). Initial knowledge: Six suggestions. *Cognition*, *50*(1-3), 431-445. https://doi.org/10.1016/0010-0277(94)90039-6

Sultan, C., & Paris, F. (2006). Clinical expression of polycystic ovary syndrome in adolescent girls. *Fertility and sterility*, *86*, S6. https://doi.org/10.1016/j.fertnstert.2006.04.015

Ulfah, M. (2019). Factors influencing premarital sexual behavior in junior high and high school adolescents in the administrative ex-city area of Cilacap. Designing, 16(3), 137-142.

Valente, T. W., Fujimoto, K., Chou, C. P., & Spruijt-Metz, D. (2009). Adolescent affiliations and adiposity: a social network analysis of friendships and obesity. *Journal of Adolescent Health*, *45*(2), 202-204. https://doi.org/10.1016/j.jadohealth.2009.01.007

Veréb, V., & Azevedo, A. (2019). A quasi-experiment to map innovation perception and pinpoint innovation opportunities along the tourism experience journey. *Journal of Hospitality and Tourism Management*, *41*, 208-218. https://doi.org/10.1016/j.jhtm.2019.10.003

Warren, S. L., Huston, L., Egeland, B., & Sroufe, L. A. (1997). Child and adolescent anxiety disorders and early attachment. *Journal of the American Academy of Child & Adolescent Psychiatry*, *36*(5), 637-644. https://doi.org/10.1097/00004583-199705000-00014

Widyastuti, Y. (2009). Proposed Research: The Effect of Providing Local Content Curriculum for Reproductive Health Education on Students' Attitudes About Pre-Marriage Sex Life and Drug Abuse (A Study on Students of SMU 9 Yogyakarta).

Wijaya, E. C. (2015). Access to Information, Knowledge Level of Reproductive Health and Premarital Sexual Behavior in Adolescents in Indonesia (Further Analysis of 2012 SDKI Data).