

# Development of 2D Animation Learning Video Media for the TAPPS Learning Model to reduce Mathematics Phobia

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**Abstract:** 2D animated video media emerges as a viable remedy aimed at enhancing student learning outcomes and the effective implementation of the Thinking Aloud Pair Problem Solving (TAPPS) pedagogical approach. The approach adopted involves the utilization of the ADDIE methodology to guide the development of meticulously designed media, a design that has undergone comprehensive validation by multiple assessors, encompassing both content and media scrutiny. This assessment has been conducted across various evaluation criteria. The data collection methodology employed encompassed tests and questionnaires to gauge student reactions. As evidenced by the material validation phase, the average percentage achieved was 77.13%, falling within the "Valid" classification. In tandem, the media validation process yielded an average score of 82.5%, positioning it firmly within the "Highly Valid" classification. Supplementary to the validation assessments, additional scrutiny was directed toward student learning outcomes. The results yielded an average score of 84.35, surpassing the established minimum passing grade of 75. This unequivocally substantiates the comprehensive achievement of learning objectives. Furthermore, student responses towards the learning material were appraised, culminating in an impressive 90.46% satisfaction rate, thus attaining the "Very Good" rating. In light of the meticulous analyses conducted, it is indisputable that the development of 2D animated video media tailored for the TAPPS instructional model stands as a viable and potent strategy to alleviate students' apprehensions towards mathematics.

**Keywords:** 2D Animation Videos; ADDIE; Math Phobia; TAPPS

## Introduction

The problem that occurs at this time is the use of teaching materials, students have also received textbooks or question sheets as evaluation sheets for each student, however, this still makes students unable to understand lessons, especially mathematics. The problem that is faced next is that many students still think that mathematics is a material that is very scary so that students feel an acute phobia of mathematics (Riski et al., 2023).

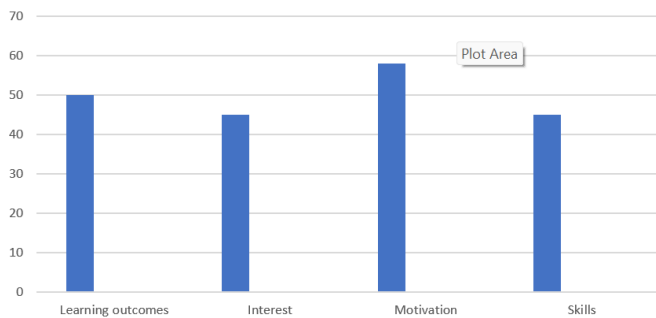
Likewise with the comparison between education in the province of Aceh and other provinces, Jannah et al. (2020) currently education in Aceh is also far behind

(Novianti, Salpina, et al., 2023). This can be seen from the results of the average UAS score and student interest which is relatively low. Based on the results of observations in the field and through filling in answers on the Google form, almost 65% of students lack interest in learning mathematics and have a phobia of mathematics. Even though currently the National Exam has changed its name to ANBK, for the high school graduation process, they still take the exam. Related to the eyes In the statistics lesson there was a decrease in basic concepts, so that there were some students who did not complete it (Farziyani et al., 2019) Based on the results of surveys and observations conducted at SMA N 3 Bireuen, it was found that student learning

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outcomes, especially in mathematics lessons, statistics material at the school was classified as low, this can be seen in the Figure 1.



**Figure 1.** Graph of survey results (Source: G-Form results of SMA N 3 Bireuen students)

Based on some of the opinions Rahayuningsih & Setiawan (2023), innovative learning works are needed both in the form of concrete media and digital-based media. Maulidasari & Novianti (2022), that educators continue to work in creating learning media that can increase student interest and motivation in learning and reduce math phobia. The innovative media that will be applied in this research is 2D animation learning video media. According to Munib & Utomo (2022), 2D animated video media is a very effective medium in assisting the learning process which can be used as a substitute for modules or other teaching materials. Ravilla et al. (2023), Hasanah et al. (2023), learning video media Satira et al. (2023), an audio-visual media, can make students understand the material better and not be boring so that the phobia of mathematics is reduced.

2D animation learning video media is a media that has been integrated with electronic media which is able to combine audio and visual technology together to produce a dynamic and interesting show (Setiawan & Permana, 2021). In overcoming math phobia, students are also trained with innovative learning models that are varied, (Salehha et al., 2021) namely the Thinking Aloud Pair Problem Solving (TAPPS) learning model. The TAPPS learning model is a learning model that has a context of solving problems in pairs verbally. According to Mulyanti (2020), the TAPPS model is a skill in solving problems so that you have the ability to choose and develop the right solution. So with the use of the TAPPS learning model it can solve problems in mathematical material, namely Statistics (Rufiana et al., 2020). So that students better understand the purpose of learning and students are more motivated in following the learning process (Ediyani et al., 2020).

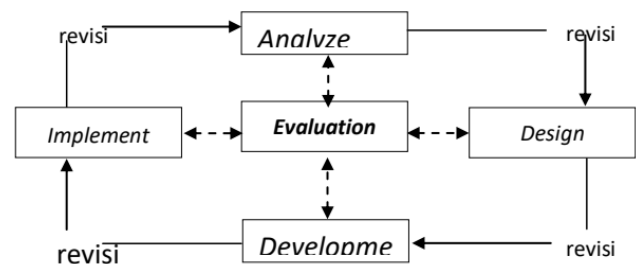
In addition to the application of the 2D animation media used (Chasani et al., 2023), the application of the Thinking Aloud Pairs Problem Solving (TAPPS) (Aulia et al., 2022) learning model is also an alternative in

research. The TAPPS model is a cooperative learning model in which pairs solve problems orally (Syafitri et al., 2018; Nusywari et al., 2022). Maghvira et al. (2019) the TAPPS model can improve communication skills in solving problems. The problems that occur are How to design 2D animation learning video media so that it can be used by students in the learning process, the learning process using the Thinking Aloud Pair Problem Solving (TAPPS) learning model and Can efforts to use 2D Animation Media reduce children's math phobia in the learning process (Neelofar et al., 2022).

The objectives of the problems being faced are 1) to be able to design instructional media that are as attractive as possible with 2D animation learning video media; 2) To be able to carry out all the indicators that exist at the stages of the TAPPS learning model process; 3) To be able to reduce math phobia with the media innovations used. 2D animation learning video media is designed with audio visuals along with interesting pictures.

### Method

The method used in the development of sources and media is the ADDIE method as stated (Lana Rahardian et al., 2022). The ADDIE method consists of five stages, namely Analysis, design, development, implementation and evaluation (Akmal & Festiyed, 2023; Aprilia et al., 2023).



**Figure 2.** Development the using ADDIE model (Sugiyono, 2017)

The data collection techniques Maulida (2020), that are carried out when applying to schools are: Test (Evaluation) this test is carried out to find out directly the learning outcomes of students related to the learning process that has been carried out, Questionnaires are used to obtain responses from each student in collecting data from several aspects of the assessment, (Novianti, Zaiyar, et al., 2023) Documentation data is made in the form of documents, numbers, writing and pictures that support research that has been carried out according to the research design (Spatioti et al., 2022).

**Result and Discussion**

Related to the results of research on statistics subjects for data concentration material for Class XII SMA N 3 Bireuen, which was developed using 2D Animation Learning Video learning media by applying the TAPPS learning model to reduce Mathematics phobia. This study uses the ADDIE model (Branch, 2010), namely analysis, design, development, implementation and evaluation (Novianti, Zaiyar et al., 2023).

At the Analysis stage, what was carried out was that the research team carried out an analysis related to analyzing the problems mathematic phobias faced by students in studying mathematics. Therefore, related to this needs analysis, a 2D animation video media development was carried out which would be implemented for class XII students of SMA N 3 Bireuen. The following are the results of the research documentation






Figure 3. Carrying out research activities in class

In the Design Stage, the research team designed a product in the form of 2D learning video media, especially in statistical material (Data Concentration) (Nababan, 2020). At the development stage, what is carried out is an analysis and design that has been collected into a component where the media is ready to be used. The following is the development of 2D animation video learning media in table 1.

From the media example it is ready to be designed, (Salas-Rueda et al., 2020) validation will be carried out by two validators, both from material expert validation and media expert validation to see the feasibility of the media that has been prepared. The validation test was carried out by 2 validators for each validation instrument by directly assessing the 2D animation video media to be assessed according to the instruments provided. Based on the results of the suggestions and input from the validator team, several things were obtained that had to be corrected, which can be seen in the table 2.

**Table 1.** Examples of 2D Animation Media

Picture	Information
	Cover page
	Concept introduction
	Explanation regarding the mean
	Examples of questions and solutions mean
	Explanation regarding the median
	Examples of questions and solutions median
	Explanation regarding the modulus
	Examples of questions and solutions modulus

Picture	Information
	Conclusion
	Exercise
	Finish

**Table 2.** Results of criticism and suggestions from the validator team

Criticism and suggestions	Revision
There is no explanation of the completeness of the material either from the identity of the material from KD or KI	Added slides regarding KD and KI Information
Answer from exercise are not displayed	Should have added on the next slide the answer to the question
The movement from the stiry slides before and after was too fast, giving time gaps in understanding the material	Fixed the time lag used
The example questiongs given should be more HOTS	Improving examples of questions thet can improve students' critical thinking skills

Based on the results of suggestions and input from Ardiansah et al. (2022), the media that has been designed, then quantitatively, the results of the validation for material and media.

**Table 3.** Material Expert Validation

Aspects and criteria	Percentage (%)	Category
Content	87.7	Very Valid
Presentation	62.2	Valid
Language	81.5	Very Valid

Based on Table 3, the criteria for the content section obtained an average percentage value of 87.7% where the content section includes the completeness of the material, accuracy of concepts and definitions, accuracy of examples in everyday life and encourages curiosity thereby reducing math phobia. also with the presentation criteria, a percentage value of 62.2% was

obtained where the indicators assessed were concept coherence, sample questions, exercises, introductory words and the linkages between learning activities. As well as for linguistic criteria, it is assessed from indicators of the accuracy of sentence structure, understanding of information, ability to motivate, suitability of student development, and accuracy in grammar. After validation by material experts, then validation is carried out by media experts consisting of several criteria, namely 2D Animation media presentation, eligibility (cover and content), Video Display Quality, images and videos, and Video usage and operation (Oktaviani & Arini, 2021). The results of media experts can be seen in Table 4.

**Table 4.** Media Expert Validation

Aspects and criteria	Percentage (%)	Category
Presentation of 2D animation media	87.5	Very Valid
Graphic elibility(Cover and Body)	62.5	Valid
Picture and Video	87.5	Very Valid
Video display quality	100	Very Valid
Video use and operatio	75	Valid

**Table 5.** Results of Students' Pretest and Posttest Scores

Pre-test value	Post-test Value
45	85
56	88
50	90
65	93
66	68
40	87
40	88
55	70
68	100
54	75
44	80
57	80
66	95
54	90
35	65
35	85
45	95
51.47	84.35

From Table 4, it is obtained that 87.5% of the presentation of 2D animation media is in the Very Valid category. For the eligibility aspect of the cover and content, it is obtained 62.5% with Valid, then for the quality of images and videos it is included in the percentage of 87.5% with a very valid category 100% is obtained for the aspect of video display quality, and the last is the use and operation of the video with a percentage of 75% with Valid criteria. Kuartbekov et al. (2023), in the Implementation and evaluation stages, what was carried out was to conduct trials directly on

class XII IPA 1 students at SMA N 3 Bireuen by applying the TAPPS learning model. Learning is carried out by applying the TAPPS learning model and using 2D Animation learning media. From the results of the final ability test conducted, it can be seen in the analysis table of student learning outcomes, which totaled 17 students.

Based on the Table 5, the results of student scores at the pretest obtained an average of 51.47. This means that at the time of the pretest assessment, almost all students did not understand the data centering material. However, after the treatment by developing 2D animation video media, an average value of 84.35 was obtained, where the average value was above the Minimum Completeness Criterion (KKM) > 75.

#### Student Learning Response Results

The results of student responses to the application of the TAPPS learning model using 2D animation learning videos consist of several aspects of assessment which can be seen in the Table 6.

**Table 6.** Student Response Results

Assessment aspect	Percentage(%)	category
Presentation of content	86.39	Very good
Benefit	88.64	Very good
Learning motivation to reduce math phobia	89.57	Very good
Media		
Benefit Media	97.24	Very good

Based on Table 6, it was found that the average percentage score for student responses was 90.46 with a very good category. This proved that with the use of 2D animation media students were more motivated and reduced self-phobia. There are several relevant research results, namely where (Halomoan Lumbantoruan, 2022) states that the development of mathematics modules by applying the Cooperative learning model can improve learning outcomes. Development of electronic teaching materials using international flip pdf is more effective by not using other learning media (Sriwahyuni et al., 2019).

#### Conclusion

Media Quality 2D Animation learning video from the results of the material expert validator obtained an average percentage score of 77.13% in the Valid category while for the media expert validator the average value percentage was 82.5% with a very Valid category. Student learning outcomes can be concluded that there are differences in student learning outcomes before and after using 2D animation learning media

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#### Author Contributions

The first and second acted as researchers and compiled statistical material and designed 2D animation media validator instruments and the third author acted as designing 2D animation teaching media with material prepared by other team members

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#### Conflict of Interest

No Conflicts of interest.

#### References

- Akmal, A. U., & Festiyed. (2023). Development of Contextual Teaching and Learning-Based Test Instruments to Improve 21st Century Skills in Students. *Jurnal Penelitian Pendidikan IPA*, 9(7). <https://doi.org/10.29303/jppipa.v9i7.4191>
- Aprilia, C., Anggereini, E., Nazarudin, N., & Ahda, Y. (2023). Development of Web-Based Learning Media (Glideapps) to Improve Digital Literacy and Science Literacy About Materials Human Digestive Systems. *Jurnal Penelitian Pendidikan IPA*, 9(3). <https://doi.org/10.29303/jppipa.v9i3.2618>
- Aulia, T., Nurcahyono, N. A., & Agustiani, N. (2022). Penerapan Model Pembelajaran Thinking Aloud Pair Problem Solving (TAPPS) Terhadap Kemampuan Pemecahan Masalah Matematis Siswa SMP Ditinjau dari Self Efficacy. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, 6(3). <https://doi.org/10.31004/cendekia.v6i3.1618>
- Branch, R. M. (2010). *Instructional design: The ADDIE approach*. New York: Springer. <https://doi.org/10.1007/978-0-387-09506-6>
- Chasani, A., Nasir, M., & Erviyenni, E. (2023). Development of Interactive Learning Media for H5P-Based Elasticity Materials in the Mobilizing School Curriculum. *Jurnal Penelitian Pendidikan IPA*, 9(4). <https://doi.org/10.29303/jppipa.v9i4.3109>
- Ediyani, M., Hayati, U., Salwa, S., Samsul, S., Nursiah, N., & Fauzi, M. B. (2020). Study on Development of Learning Media. *Budapest International Research and Critics Institute (BIRCI-Journal): Humanities and Social Sciences*, 3(2). <https://doi.org/10.33258/birci.v3i2.989>
- Farziyani, F., Khaulah, S., & Novianti, N. (2019). Perbandingan Nilai Ujian Nasional SMA Negeri dan Swasta Di Kabupaten Bireuen. *Jurnal Asimetris*, 1(2), 50–56. <https://doi.org/10.51179/asimetris.v1i2.143>
- Hasanah, S., Wahyuni, R., & Novianti, N. (2023). Peningkatan Kemampuan Pemecahan Masalah dengan menggunakan Model Talking Stick berbantuan Video Pembelajaran di MTs Swasta

- Pandrah. *JUMPER: Journal of Educational Multidisciplinary Research*, 2(1), 90–101. <https://doi.org/10.56921/jumper.v2i1.63>
- Jannah, O. J., Novianti, N., & Apriani, W. (2020). Perbedaan Nilai Ujian Nasional dan Nilai Ujian Sekolah Mata Pelajaran Matematika Tahun Ajaran 2018/2019. *Jurnal Asimetris*, 1(2), 77–81. <https://doi.org/10.51179/asimetris.v1i2.147>
- Kuatbekov, A., Vershitskaya, E., Kosareva, I., & Ananishnev, V. (2023). E-Learning as a basis for the development of media competences in students. *Journal of Information Science*, 49(4). <https://doi.org/10.1177/01655515211040656>
- Maghvira, I., Yogica, R., Selaras, G. H., & Syamsurizal, S. (2019). The Influence of Thinking Aloud Pair Problem Solving (TAPPS) Learning Model Charged Science Literacy on Students Learning Competencies in the Material of Human Reproductive System at SMAN 1 Enam Lingkung. *Jurnal Atrium Pendidikan Biologi*, 4(3). <https://doi.org/10.24036/apb.v4i3.6165>
- Maulida. (2020). Teknik Pengumpulan Data Dalam Metodologi Penelitian. *Darussalam*, 21. Retrieved from <http://ojs.iaidarussalam.ac.id/index.php/darussalam/article/view/39>
- Maulidasari, M., & Novianti, N. (2022). Upaya Peningkatan Hasil Belajar Siswa Kelas III Pada Konsep Pecahan Melalui Penerapan Model Pembelajaran Picture and Picture. *Jurnal Asimetris*, 3(2), 90–94. <https://doi.org/10.51179/asimetris.v3i2.1560>
- Mulyanti, K. (2020). Implementasi Model Pembelajaran Think Aloud Pair Problem Solving (TAPPS) Untuk Meningkatkan Kemampuan Pemecahan Masalah di Program Studi Akuntansi. *Competitive*, 14(2). <https://doi.org/10.36618/competitive.v14i2.621>
- Munib, A., & Utomo, N. B. (2022). Development of 2D Animation Learning Media Akhlakul Karimah Materials (Ukhuwah and Husnudzon). *Edukasi*, 16(2). <https://doi.org/10.15294/edukasi.v16i2.41559>
- Nababan, N. (2020). Pengembangan Media Pembelajaran Berbasis Geogebra Dengan Model Pengembangan Addie Di Kelas XI SMAN 3 Medan. *Jurnal Inspiratif*, 6(1). Retrieved from <https://jurnal.unimed.ac.id/2012/index.php/jpmi/article/view/19657>
- Neelofar, Rajoria, Y. K., Alsaraireh, I., & Boadh, R. (2022). The Initial Investigation of Mathematical Anxiety & Phobia: It's Solution in Middle School Students. *Journal of Positive School Psychology*, 6(6). Retrieved from <https://journalppw.com/index.php/jpsp/article/view/9106>
- Novianti, N., Salpina, S., & Abdillah, T. R. (2023). Pembelajaran guru SLB dalam mendesain media e-modul of math berbasis kearifan lokal. *Jurnal Pembelajaran Pemberdayaan Masyarakat*, 4(2), 499–507. <https://doi.org/10.33474/jp2m.v4i2.20519>
- Novianti, N., Zaiyar, M., Khaulah, S., Fitri, H., & Jannah, R. (2023). Pengembangan E-Modul Berbasis Problem Based Learning Terhadap Kemampuan Berfikir Kritis Siswa. *Jurnal Ilmu Sosial Dan Pendidikan (JISIP)*, 7(3), 2369–2375. Retrieved from <https://ejournal.mandalanursa.org/index.php/JISIP/article/view/5370>
- Nusywari, W., Prayitno, S., Junaidi, J., & Hikmah, N. (2022). Pengaruh Penerapan Model Pembelajaran Thinking Aloud Pair Problem Solving (TAPPS) terhadap Kemampuan Pemecahan Masalah Matematika. *Jurnal Riset Pendidikan Matematika Jakarta*, 4(1). <https://doi.org/10.21009/jrpmj.v4i1.23023>
- Rahayuningsih, H. F., & Setiawan, D. (2023). Pdf-Based Digital Comic Innovation Class V Human Respiratory System Material. *Jurnal Penelitian Pendidikan IPA*, 9(8). <https://doi.org/10.29303/jppipa.v9i8.4085>
- Ravilla, T. D., Rahma, R., & Novianti, N. (2023). Pengembangan Video Learning Berbasis Problem Based Learning Berbantuan Aplikasi Renderforest Pada Materi Pythagoras. *JEMAS: Jurnal Edukasi Matematika Dan Sains*, 4(1), 12–18. Retrieved from <http://journal.umuslim.ac.id/index.php/jemas/article/view/1907>
- Riski, D., Wahyuni, R., & Novianti, N. (2023). Peningkatan Kemampuan Berpikir Kreatif Melalui Soal Tipe HOIS Dengan Model Pembelajaran Discovery Learning. *Jurnal Asimetris*, 4(1), 35–41. <https://doi.org/10.51179/asimetris.v4i1.1986>
- Rufiana, I. S., Sa'Dijah, C., Subanji, & Susanto, H. (2020). Development of geogebra learning media based on statistical reasoning on statistics materials of junior high school students and its influence for the intelligent of student. *Indian Journal of Forensic Medicine and Toxicology*, 14(2). <https://doi.org/10.37506/ijfimt.v14i2.3161>
- Salehha, O. P., Khaulah, S., & Nurhayati, N. (2021). Pengaruh Model Pembelajaran Thinking Aloud Pair Problem Solving (TAPPS) Terhadap Kemampuan Berpikir Kritis Matematis Siswa Berbantuan Kartu Domino. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, 6(1). <https://doi.org/10.31004/cendekia.v6i1.1015>
- Satira, U., Novianti, N., & Khaulah, S. (2023). Peningkatan Hasil Belajar Peserta Didik Melalui Strategi Learning With Team Quiz Menggunakan Media E-Modul. *Jurnal Asimetris*, 4(2), 137–145. Retrieved from

<http://journal.umuslim.ac.id/index.php/asm/article/view/2316>

- Setiawan, I. M. D., & Permana, I. K. P. (2021). Dampak Media Pembelajaran Daring Berbantuan Video Animasi 2D pada Mata Kuliah Matematika. *Jurnal Imiah Pendidikan Dan Pembelajaran*, 5(3). <https://doi.org/10.23887/jipp.v5i3.38649>
- Spatioti, A. G., Kazanidis, I., & Pange, J. (2022). A Comparative Study of the ADDIE Instructional Design Model in Distance Education. In *Information (Switzerland)*, 13(9). <https://doi.org/10.3390/info13090402>
- Sugiyono. (2017). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Alfabeta.
- Syafitri, E., Saragih, E. M., & Astuti, D. (2018). Mathematics Learning By Using Learning Model Tapps To Improve Students' Mathematical Communication Skill. *International Workshop And Conference Of Asean Studies In Linguistics, Islamic And Arabic Education, Social Sciences And Educational Technology*, 585-591. Retrieved from <https://osf.io/preprints/inarxiv/3fcqm/>