Articulate storyline-based interactive learning media with character values on natural science learning for 10-11 years old students

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Article Info	Abstrak
	This research was inspired by the underutilized use of character-laden media in science education. The goal of this research is to create character-based interactive learning media on the material properties and changes in the shape of objects using the Articulate Storyline. Also, to test the feasibility and responses of teachers and students toward the developed product. The research method used was development (R&D) adopted from Borg & Gall. This research was carried out in three different schools. Techniques for gathering data include interviews, surveys, and recordkeeping. The data analyses employed were qualitative and quantitative methods. The product validation results were quite suited for usage, with the percentages of feasibility values of 84.16% by linguists, 88.87% by material experts, and 94% by media experts. The response percentages by teachers and students were 85.2% and 91.1%, respectively. The product developed was well-suited for use in the fifth-grade science learning process. It is hoped that additional research will be conducted using other materials to examine the efficiency of this media, particularly in improving character values.

INTRODUCTION

Technological advancements are accelerating (Fitri et al., 2020). The digital world now plays a critical role in the advancement of technology, information, and communication, especially in the field of education (Setiawan & Kumala, 2020). As a result, it necessitates ingenuity and encouragement to constantly update learning (Irfan et al., 2019). Furthermore, the advancement of science has been matched by the advancement of technology and information, resulting in a moral crisis in which the influence of foreign cultures has entered through social media or the internet. In this approach, moral or character development must be strengthened further so that the Indonesian nation's character and identity, particularly among school students, are not lost to technology (Agnia et al., 2021).

Character development is critical and serves the extraordinary function of a proper education system (Supeni, 2015), and it becomes a reflection of events concerning moral degeneration and educational crises (Ahmad & Aljufri, 2019). For example, cheating on a friend during a test, refusing to heed the instructor's instructions, refusing to shake hands when meeting the teacher, opening the door without saying hello, refusing to greet when meeting the teacher, talking loudly with older people, failing to pray immediately, and many more (Sujatmiko et al., 2019).

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The process of character education must begin at a young age and be maximized during elementary school (Annisa et al., 2020). At that age, children are experiencing rapid physical and motor growth, as well as the development of personality, emotional, intellectual, language, character, and moral character (Rusmana, 2019). Moral education must be realized through education policy. As stakeholders, parents, teachers, and administrators must work together to encourage pupils to live these positive values (Agboola & Tsai, 2012). The PPK (Strengthening Character Education) initiative, launched in 2017 by the Ministry of Education and Culture of the Republic of Indonesia, identified five Pancasila-derived character values: religious, nationalist, integrity, independence, and cooperation (Kemendikbud, 2018). It is envisaged that these character values will help to shape the character of a nation's youth in the future holistically and comprehensively (Utomo & Yulianti, 2017). Character education can be incorporated into all subjects (Destiniar, 2018), and one of them is educational science.

Natural science (IPA) is the study of nature and natural events(Fiteriani & Baharudin, 2017; Samatowa, 2018). Many moral ideals can be used as parables with the many phenomena offered in science instruction, allowing character education to be linked with science learning. However, learning media is required to impart science content and character values (Astuti & Bhakti, 2018). Interactive-based media, which is more varied and fascinating, is one of the alternative media to promote science learning (Utami, 2021).

Because the material supplied is interesting, the use of media in learning will assist increase the effectiveness of the process of conveying messages to students (Riasti et al., 2016) and increasing students' attention and enthusiasm (Reffiane & Bayutama, 2019), so that students can absorb the subject matter discussed to the maximum (Sari & Anugraheni, 2021). One of the interactive learning media is Articulate Storyline software. Articulate Storyline is a multimedia authoring tool that is used to produce interactive learning media that combines text, images, graphics, sound, video, and animation. The outcome of the articulate tale is web-based media (html5) or application files that can be accessed on a variety of platforms such as laptops, tablets, smartphones, and so on. (Amiroh, 2020).

The preliminary research was conducted on December 14, 2021, at MIN 2 Pringsewu, January 4, 2022, at MIN 3 Pringsewu, and May 30, 2022, at MIN 12 Bandar Lampung. The researchers conducted initial interviews with each school's fifth-grade science instructors, Muhammad Wildan Mahmud, S.Pd, Sutinah, S.Pd, and Setio, S.Pd. According to the research, fifth-grade teachers continue to use media in the form of textbooks, workbooks, big books, and crossword puzzles while implementing character education and science learning activities. Teachers have not utilized interactive media and have not made full use of technology such as laptop computers and projectors that are available in schools. Character education is typically taught through the lecture technique and group study. According to the findings of the distributed needs analysis questionnaire, the participants' character values are in the medium range. The absence of information technology, such as projectors and laptops, renders the learning process boring and less engaging for students. As a result, media development is required.

Based on previous research, interactive media have been developed for mathematics learning of geometrical materials (Andrianingrum & Suparman, 2019; Rohaeti et al., 2019), linear programs (Lindasari & Farida, 2021), chemistry learning of solubility materials (Lukman et al., 2022), mathematics learning (Fahmi et al., 2019), and comparative material mathematics learning (Oktavianingtyas et al., 2018). An interactive media platform with an articulate storyline platform has even been built in the Thematic Learning for fifth-grade elementary school students (Utami & Wahyudi, 2021), and cell learning in Biology (Suhailah et al., 2021). However, no research has been conducted to build interactive media containing character education in science material. This research attempted to fill the gap by incorporating all character values novelty. As a result, the research goal was to create interactive learning media with character values based on articulate storylines in science learning for fifth-grade students of elementary schools.

METHOD

This research employed the Borg and Gall research and development technique. R&D is a method for generating a product that has been validated for use in education and learning (Sugiyono, 2021). Borg and Gall define research processes as follows: 1) Potential and Problems, 2) Data Collection, 3) Product Design, 4) Design Validation, 5) Design Revision, 6) Product Trial, 7) Product Revision, 8) Usage Test, 9) Product Revision, 10) Mass Production (Sugiyono, 2021). This research, however, was limited to the seventh stage because it was tailored to the demands of academics who merely wanted to see student engagement and only answer the problem formulation, rather than promote the result widely. Figure 1 depicts the steps of the Borg & Gall development process employed in this research.

Potential and Problems
This study starts with the potential and problems. Pre-research was undertaken at three schools, namely MIN 2 Pringsewu, MIN 3 Pringsewu, and MIN 12 Bandar Lampung, to identify potentials and difficulties.

Data Collection
Field studies and literature studies were used by researchers to obtain data and information. Students completed a need analysis questionnaire and conducted interviews with the fifth-grade science teachers as part of the field study to investigate the difference between expectation and reality.

Product Design
Creating an initial product of interactive learning media containing characters using the Articulate Storyline software. The resulting output is in the form of a link that can be accessed via the internet and the product can also be run on a smartphone or computer.

Design Validation
Design validation is an activity to assess the product design that has been designed. This validation is an assessment based on rational thinking, not based on field facts. In this product validation, the product is validated by several experts, namely linguists, material experts, and media experts.

Design Revision
Researchers revise the product. The weaknesses and shortcomings of the product are corrected to produce products that are following suggestions and input from the experts. After being repaired and re-validated by experts, the product can be tested.

Field Testing
to find out the response of teachers and students to the developed learning media, the product trials were carried out through small-scale trials and field trials.

Product Revision
If the trial gets good results, the product is ready for use without revision. If the results of the product trial are considered less than perfect, the product is revised and refined so that it can produce a final product that is suitable for use.

Figure 1. Development Stages

This research took place at MIN 2 Pringsewu, MIN 3 Pringsewu, and Min 12 Bandar Lampung from January 2022 to August 2022. The subjects of this research were 3 science teachers and 62 fifth-grade students. The instruments used were validation sheets for linguists, materials, and media experts. The researcher also used a questionnaire response sheet for teachers and students. Data analysis was carried out to obtain an assessment of the feasibility and attractiveness of the learning media. This development research employed qualitative and quantitative data analysis. The qualitative data included suggestions or input from experts, teachers, and students. Furthermore, the quantitative data was obtained from the distributed questionnaires.

Validation questionnaires were filled out by material experts, media experts, and linguists. The purpose of validation is to measure the feasibility of the product. Table 1 contains the scoring criteria for the feasibility of learning media:

Table 1. The Scoring Criteria of Media Feasibility

No.	Quantitative Analysis	Likert Scale's Score
1.	Highly feasible	5
2.	Feasible	4
3.	Moderately feasible	3
4.	Not feasible	2
5.	Poorly feasible	1

The researcher distributed a questionnaire to the teachers and students to investigate the attractiveness of the developed interactive learning media. Table 2 contains the scoring criteria:

Table 2. The coring Criteria of Teachers and Students' Responses

No.	Qualitative Analysis	Likert Scale's Score
1.	Strongly agree	5
2.	Agree	4
3.	Unsure	3
4.	Disagree	2
5.	Strongly disagree	1

The instrument used had five answer choices with different scores. The data analysis of the score results was calculated with the following formula:

$$P = \frac{\sum x}{\sum xi} \times 100\%$$

Description:
P = Percentage
$\sum x$ = Total number of answers
$\sum xi$ = Maximum score

The obtained percentage of product feasibility can be interpreted into a feasibility category based on Table 3:

Table 3. Interpretation Criteria of Media Feasibility

Average Score (%)	Category
80% < P ≤ 100%	Highly feasible
61% < P ≤ 81%	Feasible
41% < P ≤ 61%	Moderately feasible
21% < P ≤ 41%	Not feasible
0 < P ≤ 21%	Poorly feasible

Based on Arikunto's criteria, the product is declared feasible to be used theoretically if the percentage of product feasibility reaches > 61% (Arikunto & Jabar, 2018). Table 4 contains the interpretation category for the attractiveness of the media according to the teachers and students:

Table 4. Attractiveness Category based on Teachers and Students' Responses

Percentage (%)	Category
81% < X ≤ 100%	Highly attractive
61% < X ≤ 81%	Attractive
41% < X ≤ 61%	Quite attractive
21% < X ≤ 41%	Unattractive
0 < X ≤ 21%	Highly unattractive

Based on Arikunto's criteria, the product is declared attractive if the percentage of the product's attractiveness reaches > 61% (Arikunto & Jabar, 2018).

RESULTS AND DISCUSSION

The product of this research is an E-Product based on Articulate Storyline. This research aims to produce interactive learning media containing characters based on Articulate Storyline on the material properties and changes in the shape of objects for fifth-grade elementary school students. The character values in this product are presented in Table 5.

Table 5. Character Values and Their Description

Character	Description
Religiosity	Faith in God Almighty is reflected in the behavior of carrying out religious teachings and beliefs, recognizing religious diversity, maintaining a tolerant attitude toward the execution of worship of other religions and beliefs, and living in harmony and peace with other adherents.
Nationalism	Nationality is a way of thinking, behaving, and acting that demonstrates loyalty, concern, and high regard for the nation's language, and physical, social, cultural, economic, and political environment, putting the interests of the nation and state above their own and their groups'.
Independent	Independent is the attitude and behavior of not depending on others and using all energy, thought, and time, to realize hopes, dreams, and ideals.
Cooperation	Cooperation is the act of appreciating the spirit of cooperation and working together to solve common problems, as well as developing communication and friendship and providing assistance/help to those in need.
Integrity	Integrity is the principle that underpins behavior in an endeavor to become a person who can always be trusted in words, acts, and work, and who is committed to human values and morals (moral integrity).

In this research, researchers employed the Borg & Gall model's research and development technique to develop learning media in the form of interactive media. This research stage is only available from stage one to stage seven. Due to time, financial, and human limits, limitations were imposed. This development research has been tailored to the demands of the researchers and has addressed the problem formulation.

Potential and Problems

The potential of this research and development was the development of interactive learning media based on Articulate storylines to aid in the learning process. The problem identified in this research is the restricted utilization of media developed or employed by teachers in the learning process, particularly in science learning. Researchers investigated the issue based on a requirements analysis conducted through interviews and the completion of questionnaires at MIN 2 Pringsewu, MIN 3 Pringsewu, and MIN 12 Bandar Lampung. The researcher proposes a solution to this problem by creating character-based interactive learning media with Articulate Storyline. The given solution was well appreciated by teachers and students who were interested in using the characters-based interactive learning media with Articulate Storyline.

Data Collection

Researchers gathered data and information that can be used to construct interactive learning media. Field surveys and literature studies were used to collect this data and information. The researchers need distributed need analysis questionnaires to students and interviewed the science teachers as part of the field study. A literature review was conducted by reviewing the literature and the findings of prior studies relevant to the development research. The information was gathered from relevant study books and journals.

Researchers conducted initial interviews with fifth-grade science teachers at each of these schools and acquired data indicating that teachers continued to use media in the form of textbooks, student workbooks, big books, and crossword puzzles in fifth-grade scientific learning activities. Teachers have not utilized interactive media and have not made full use of technology such as laptop computers and projectors that are available in schools. Meanwhile, in this modern era, it is critical to present technology as a learning medium so that participants are familiar with technology not just as an entertainment medium, but also as a learning medium. Students were also given questionnaires on their requirements by the researchers. According to the findings of the distributed needs analysis questionnaire, the character values were in the medium category.

Product Design

The researchers designed the interactive learning media as attractive as possible by choosing a suitable background color, good-quality images, and non-monotonous fonts. The navigation buttons were designed to be harmonious with the display. Besides, interactive learning media is also equipped with basic competence and core competence, materials, experiments, videos, games, and evaluations. Figure 2 contains the Flowchart of the developed interactive learning media:
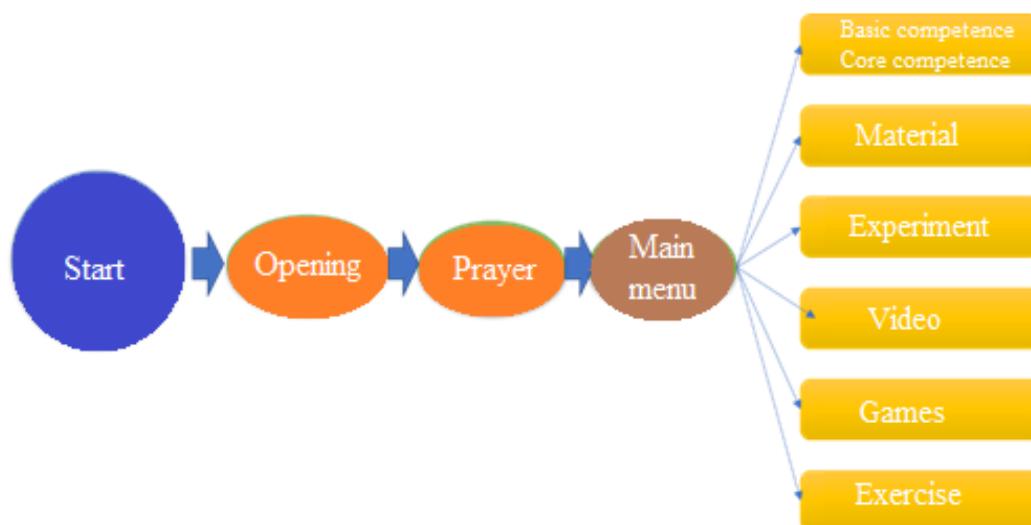
Figure 2. The Flowchart of the Interactive Learning Media

The following table displays the storyboard of the developed learning media:

Table 6. The Storyboard of the Learning Media

Description	Visualization
The initial page displays the user identity and the 'Enter' button.	
After clicking the 'Enter' button, users will enter the 'Salam' page.	
The users will arrive at the 'Prayer' page which also displays the 'Prayer' button and the 'Main Menu' button. Here the users can find the religious character to pray before studying.	
Main Menu Page: This page contains a user guide, author info, and menu buttons. On the main menu button, there are KI & KD menus, Materials, Experiments, Videos, Games, and Questions.	
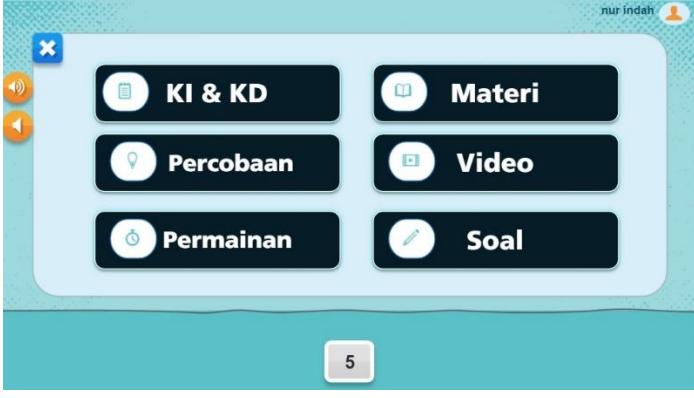
Description	Visualization
User Guide Page: This page contains an explanation of the instructions for using the interactive buttons to run the media.	
The KI & KD page contains core competencies and basic competencies.	
Material Page: contains material properties and shapes of objects, interesting pictures, and interactive buttons.	
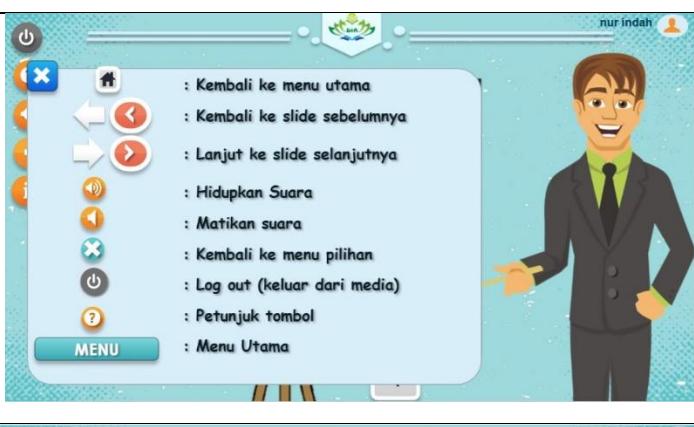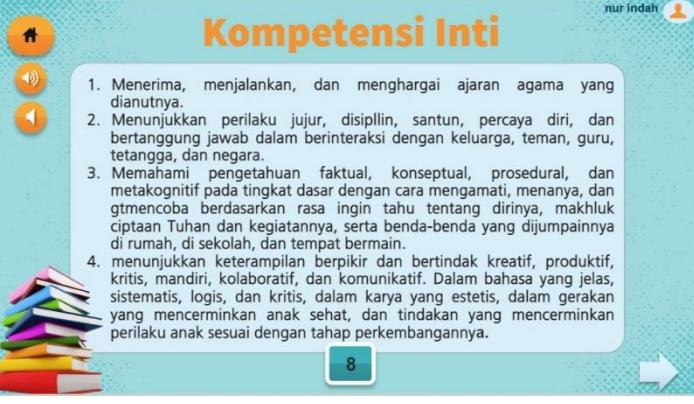
Description	Visualization
Character Values Page: Religious character values, nationalism, independence, cooperation, and integrity	

Description	Visualization
Experiment page: Contains experiments regarding the nature and changes in the shape of objects.	
The video page contains learning videos about nature and changes in the shape of objects	
The game page contains interesting games about the nature and shape of objects	
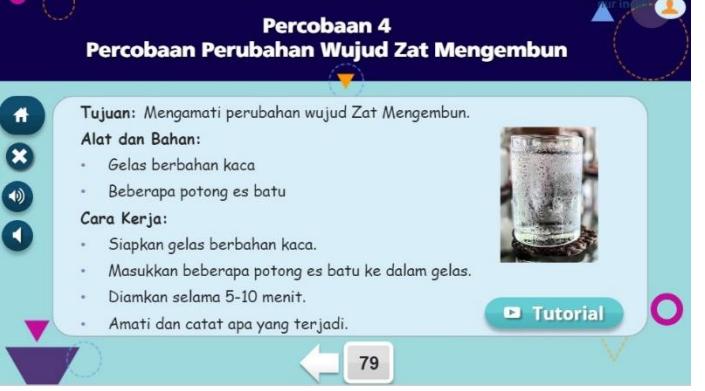
Description	Visualization
The question page contains practice questions and evaluations.	
The closing page contains prayer after studying then a button to exit the media	
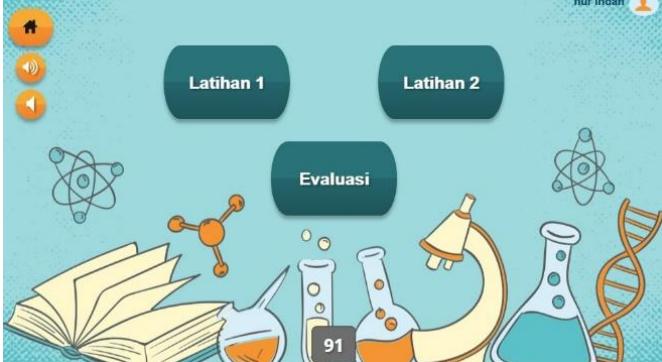
Design Validation

After the researcher visualized the design into an interactive learning media product, the product was ready to be assessed by expert validators, namely, two linguists, two material experts, and two media experts. The results of the validation by several experts are described in Figure 3 as follows::
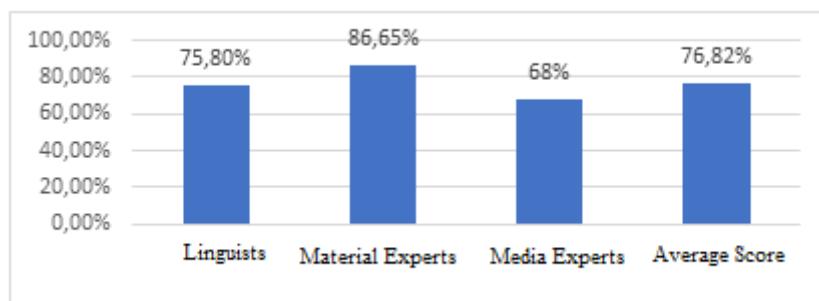
**Figure 3.** The Graphic of Expert Validation Results

The assessment was performed by linguists who assessed the language feasibility which consisted of 12 assessment indicators. At the initial product validation stage, the average score was 75.8% in the "feasible" category with a few notes. The assessment by material experts covered three aspects, namely content, presentation feasibility, and contextual aspects which consisted of 10 assessment indicators. The assessment by the material experts got an average score of 88.87% in the "highly feasible" category so the product was very feasible to be used and tested in the field. The assessment carried out by media experts covered three aspects, namely content, instructional, and display aspects which consisted of 12 assessment indicators. At the initial product validation stage, the average score was 68% in the "feasible" category with a few notes.

Design Revision

After carrying out the initial media validation stage, the product was declared feasible with some improvement notes. Improvements provided by the language validators covered the punctuation, fonts, and sentences. Improvements given by the media validator covered the animations, navigation buttons, details that match the material, font colors, and pages. After revisions, the researchers re-validated the product to the experts. Table 7 depicts the results of the revision of learning media.

Table 7. The Results of Revision

Before Revision	After Revision

Before Revision	**After Revision**

Based on Figure 4, after completing the revision, the average score rose to 84.16% with the "highly feasible" category so that the language of developed learning media was highly feasible to be used and tested in the field. Assessments from material experts got an average score of 88.87% with the "highly feasible" category so the interactively learning media was very feasible to be used and tested in the field. After the revision, the average score rose to 94% with the "highly feasible" category so that the interactive learning media was highly feasible to be used and tested in the field.
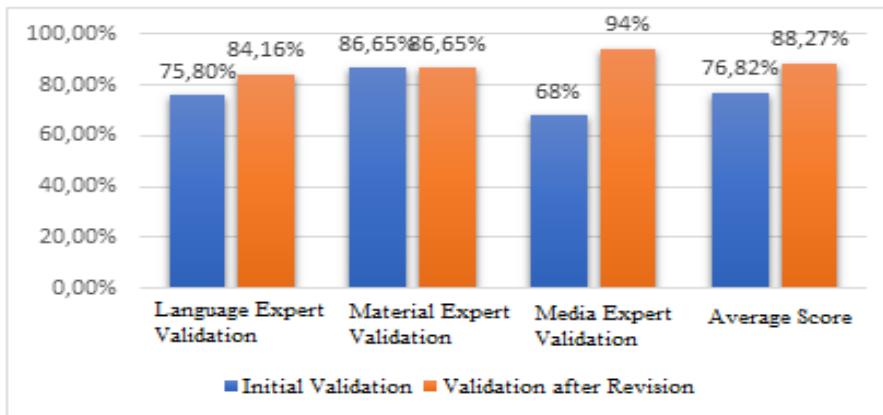

Figure 4. The Graphic of Validation and Revision

Product Trials

After the product was considered feasible to be used and tested by expert validators, the product was tested on small-scale and large-scale trials to assess the attractiveness of the product by the teachers and students.

A small-scale trial was conducted at MIN 2 Pringsewu with 15 fifth-grade students from 1 class with a statement instrument sheet composed of three aspects, namely material aspects, language, and media attractiveness. The small-scale trial obtained an average student response assessment score of 91.2% in the "very attractive" category

A large-scale trial was carried out at MIN 3 Pringsewu consisting of 26 students and MIN 12 Bandar Lampung consisting of 21 students using statement instrument sheets consisting of three aspects, namely material aspects, language, and media attractiveness. The average score of 90% was obtained from the student's responses in MIN 3 Pringsewu and 92% was obtained from MIN 12 Bandar Lampung. Therefore, the average score from the two schools was 91% in the "very attractive" category.

The assessment by teachers was carried out in three schools, namely MIN 12 Bandar Lampung, MIN 2 Pringsewu, and MIN 3 Pringsewu. The assessment was carried out using questionnaires that contained four aspects, namely the quality of content and objectives, instructional quality, technical quality, and character values which consisted of 19 assessment indicators. The assessments by teachers obtained an average score of 85.2% in the "very attractive" category. Figure 5 displays the results of the teachers' and students' responses.
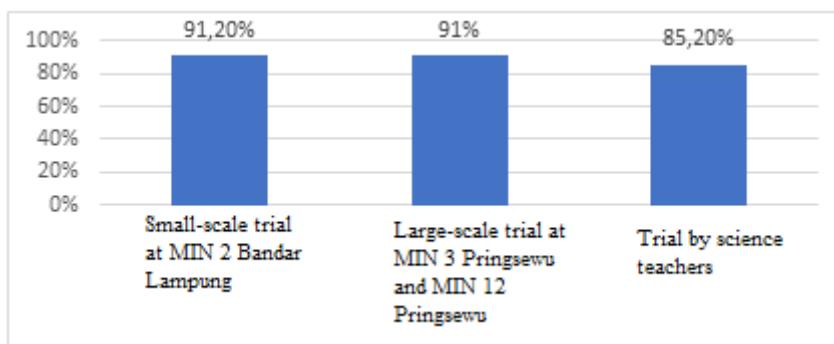
Figure 5. The Graphic of Teachers and Students' Responses

The responses of science teachers and students from three different schools were good toward the developed Articulate Storyline-based interactive learning media with character values on the properties and changes in the shape of objects for the fifth-grade students of elementary school.

Product Revision

The development resulted in a product in the form of Articulate Storyline-based interactive learning media containing character values in science learning on the properties and changes of object shapes for fifth-grade elementary school students. This product is a digital media created using Articulate Storyline software and published on the web (Safira et al., 2021). his interactive learning media has been developed and has been tested for its feasibility and use so that it can and is feasible to be used as a learning medium.

The results of the study prove that the media that has been developed is feasible and valid. Feasibility is seen based on the validation of linguists, material experts, and media experts and is supported by positive responses from teachers and students. Previously, research on the development of interactive media has also been carried out for several different materials, such as research on the development of interactive media in thematic learning (Haqih et al., 2022), spatial construction materials (Rohaeti et al., 2019), and comparison materials (Oktavianingtyas et al., 2018). Therefore, research on the development of interactive media has been widely developed for mathematics material and there is still little development for science material. In addition, there has been researched that has developed and tested its effectiveness in learning outcomes with a percentage of 94.18% in the complete category (Jais & Amri, 2021). There has even been research that has developed interactive science media for elementary schools that are integrated with character education (Rianto & Budiarti, 2021). However, the character values that are developed are only those who care about the environment. This research is a renewal research from previous research, where the material contains the values of character education in science material. The character values contained in this research include all characters.

There are several advantages and disadvantages to this media development process. The advantage is interactivity which can be used to study independently. This media is equipped with character education content and is equipped with pictures and videos to visualize nature and changes in the shape of objects. Practice questions, evaluations, experiments, video tutorials, and games also complement this medium. This media can be accessed through laptops/PCs, mobile phones, and tablets. The weakness of this media is that the material is limited to the nature and changes of objects' shapes for the fifth-grade elementary school students on theme 7 (Events in life) only. Therefore, it needs to be further developed in various materials.

This research contributes to the body of knowledge addressing the incorporation of character values in the media. Character education can be imparted through media platforms. This research also provides an outline of how this product was designed to produce usable findings. However, the research phase of this research contains limitations. The research has merely looked at the feasibility of the products that have been developed and has not yet been put to the test of media effectiveness, particularly in strengthening the character values of students.

CONCLUSION

The development of Articulate Storyline-based interactive learning media with characters values on the properties and changes in the shape of objects for the fifth-grade students of elementary school was very good, interesting and suitable for use in learning. The product assessment results based on the language experts were 84.16%, material experts were 88.87%, and media experts were 94%. The average percentage of expert validation was 89% in the "highly feasible" category. The teachers' responses yielded a percentage of 85.2% in the "highly feasible" category. The students' responses through questionnaires to determine the attractiveness of the product in the small-scale trial obtained a percentage of 91.2% in the "very attractive" category. Furthermore, the large-scale trial obtained a percentage of 91% in the "very attractive" category. Therefore, the developed Articulate Storyline-based interactive learning media containing character values on the properties and changes in the shape of objects for the fifth-grade of elementary school students was considered "highly feasible" and "very attractive". Thus, the product can be used in science learning activities. The learning material was limited to fifth-grade science material and has not been widely disseminated. Also, this research was limited to looking at the feasibility of the product. It is hoped that further research can develop diverse materials and test the effectiveness of this media, especially in increasing character values.

REFERENCES

Agboola, A., & Tsai, K. C. (2012). Bring character education into classroom. *European Journal of Educational Research, 1*(2), 163–70. https://doi.org/10.12973/eu-jer.1.2.163.

Agnia, A. S. G. N., Furnamasari, Y. F., & Dewi, D. A. (2021). Pengaruh kemajuan teknologi terhadap pembentukan karakter siswa. *Jurnal Pendidikan Tambusai* 5(3), 9331–35.

Ahmad, A., & Aljufri, S. (2019). Pendidikan islam membentuk nilai dan karakter peserta didik. *Guru Tua : Jurnal Pendidikan*, *2*(1), 1–81. https://doi.org/10.31970/gurutua.v2i1.21.

Amiroh, A. (2020). *Mahir membuat media interaktif articulate storylie*. Pustaka Ananda Srva.

Andrianingrum, F., & Suparman, S. (2019). Design of interactive learning media based on contextual approach to improve problem solving ability in fourth grade students. *International Journal Of Scientific & Technology Research, 8*(11), 3906-3911.

Annisa, M. N., Wiliah, A., & Rahmawati, N. (2020). Pentingnya pendidikan karakter pada anak sekolah dasar di zaman serba digital. *Bintang : Jurnal Pendidikan dan Sains, 2*(1), 35–48. https://doi.org/10.36088/bintang.v2i1.558.

Arikunto, S., & Jabar, C. S. A. (2018). *Evaluasi program pendidikan pedoman teoritis praktis bagi mahasiswa dan praktisi pendidikan*. PT Bumi Aksara.

Astuti, I. A. D., & Bhakti, Y. B. (2018). Interactive learning multimedia based microsoft excel on the temperature and heat. *Unnes Science Education Journal, 7*(1), 1–6. https://doi.org/10.15294/usej.v7i1.21355.

Destiniar, D. (2018). Membangun generasi berkualitas melalui pendidikan karakter. *Wahana Didaktika*, *16*(1), 42–52.

Fahmi, S., Priwantoro, S. W., Cahdriyana, R. A., Hendroanto, A., Rohmah, S. N., & Nisa, L. C. (2019). Interactive learning media using kvisoft flipbook maker for mathematics learning. *Journal of Physics Conference Series, 1188*(2019), 012075.

Fiteriani, I., & Baharudin, B. (2017). Analisis perbedaan hasil belajar kognitif menggunakan metode pembelajaran kooperatif yang berkombinasi pada materi IPA di MIN Bandar Lampung. *Terampil: Jurnal Pendidikan dan Pembelajaran Dasar, 4*(2), 1–30. https://doi.org/10.24042/terampil.v4i2.2224.

Fitri, R., Gunawan, I., & Amirudin, A. (2020). The development of problem solving-based interactive learning media using lectora inspire. *Indonesian Journal of Science and Mathematics Education*, *3*(1), 79–86. https://doi.org/10.24042/ijsme.v3il.5059.

Haqih, M. K., Hakim, Z. R., & Pribadi, R. A. (2022). Pengembangan multimedia interaktif berbasis software articulate storyline pada kegiatan pembelajaran tematik. *Jurnal Pendidikan Dasar*, *10*(1), 33–44. https://doi.org/10.46368/jpd.v10i1.473.

Irfan, I., Muhiddin, M., & Ristiana, E. (2019). Pengembangan media pembelajaran IPA berbasis powerpoint di sekolah dasar. *Indonesian Journal of Primary Education, 3*(2), 16–27. https://doi.org/10.17509/ijpe.v3i2.21765.

Jais, M., & Amri, U. (2021). Pengaruh penggunaan media pembelajaran berbasis articulate storyline 3 terhadap hasil belajar siswa mata pelajaran IPA di SDN 2 Gantarang Keke Kabupaten Bantaeng. *Jurnal Studi Guru dan Pembelajaran, 4*(3), 795–801. https://doi.org/10.30605/jsgp.4.3.2021.1531.

Kemendikbud. (2018). *Penguatan pendidikan karakter di Sekolah Dasar*. Pusat Penelitian Kebijakan Pendidikan dan Kebudayaan, Badan Penelitian dan Pengembangan, Kementerian Pendidikan dan Kebudayaan.

Lindasari, L. M., & Farida, F. (2021). Interactive learning media with realistic mathematics approach: facilitating distance learning on linear program materials. *Online Learning in Educational Research, 1*(1), 37-48.

Lukman, I., Silalahi, A., Silaban, S., & Nurfajriani, N. (2022). Interactive learning media innovation using lectora inspire solubility and solubility product materials. *Journal of Physics Conference Series, 2193*(1),012067.

Oktavianingtyas, E., Salama, F. S., Fatahillah, A., Monalisa, L. A., & Setiawan, T. B. (2018). Development 3D animated story as interactive learning media with lectora inspire and plotagon on direct and inverse proportion subject. *Journal of Physics Conference Series, 1108*(2018), 012111.

Reffiane, F., & Bayutama, L. (2019). Interactive media development based macromedia flash 8 on themeliving matter of primary class IV. *International Journal of Active Learning, 4*(1), 18–23. http://dx.doi.org/10.15294/ijal.v4i1.14099.

Rianto, M. A., & Budiarti, W. N. (2021). Pengembangan media pembelajaran interaktif ipa sd terintegrasi pendidikan karakter peduli lingkungan. *Jurnal Pendidikan Dasar Nusantara, 6*(2), 71–82. https://doi.org/10.29407/jpdn.v6i2.14974.

Riasti, M. F., Suyatna, A., & Wahyudi, I. (2016). Pengembangan media interaktif model tutorial pada materi impuls dan momentum. *Jurnal Pembelajaran Fisika, 4*(1), 81–91.

Rohaeti, E. E., Bernard, M., & Primandhika, R. B. (2019). Developing interactive learning media for school level mathematics through open-ended approach aided by visualbasic application for excel. *Journal on Mathematics Education*, *10*(1), 59-68

Rusmana, A. O. (2019). Penerapan pendidikan karakter di SD. *Eduscience: Jurnal ilmu Pendidikan*, *4*(2), 74–80.

Safira, A. D., Sarifah, I., & Sekaringtyas, T. (2021). Media pembelajaran berbasis Articulate Storyline berpengap terhadap motivasi belajar dan kepuasan belajar siswa. *Prima Magistra: Jurnal Ilmiah Kependidikan, 2*(2), 237–253. https://doi.org/10.37478/jpm.v2i2.1109.

Samatowa, U. (2018). *Pembelajaran IPA di sekolah dasar*. PT Indeks.

Sari, N, & Anugraheni, I. (2021). Pengembangan media pembelajaran berbasis Android pada pembelajaran tematik kelas IV tema 6 subtema 1 di sekolah dasar. *Jurnal Guru Kita, 5*(2), 33–43. https://doi.org/10.24114/jgk.v5i2.23903.

Setiawan, D. A., & Kumala, F. N. (2020). Multimedia interaktif tipe Adobe Flash CS6 berbasis kurikulum 2013 dalam meningkatkan literasi verbal siswa sekolah dasar. *Jurnal Pendidikan Dasar Nusantara, 6*(1), 32–49. https://doi.org/10.29407/jpdn.v6i1.14358.

Sugiyono, S. (2021). *Metode penelitian kuantitatif, kualitatif, dan R&D*. Alfabeta.

Suhailah, F., Muttaqin, M., Suhada, I., Dindin, J., & Paujiah, E. (2021). Articulate storyline: Sebuah pengembangan media pembelajaran interaktif pada materi sel. *Pedagonal: Jurnal Ilmiah Pendidikan, 5*(1), 19–25. https://doi.org/10.55215/pedagonal.v5i1.3208.

Sujatmiko, I. N., Arifin, I., & Sunandar, A. (2019). Penguatan pendidikan karakter di SD. *Jurnal Pendidikan, 4*(8), 1113–1119. http://dx.doi.org/10.17977/jptpp.v4i8.12684.

Supeni, S. (2015). Pengembangan model internalisasi pendidikan karakter pancasila pada guru pendidikan anak usia dini. *Cakrawala Pendidikan, 34*(1), 118–127. https://doi.org/10.21831/cp.v1i1.4182.

Utami, R. G. (2021). *Pengembangan media pembelajaran interaktif berbasis articulate storyline materi IPA pada tema 4 kelas V SD/MI*. Universitas Islam Negeri Raden Intan Lampung.

Utami, Y. S., & Wahyudi, W. (2021). Pengembangan media interaktif berbasis articulate storyline pada pembelajaran tematik peserta didik kelas V SD. *Jurnal Riset Pendidikan Dasar, 4*(1), 62–71. https://doi.org/10.26618/jrpd.v4i1.5056.

Utomo, A. P. Y., & Yulianti, U. K. (2017). Pengembangan media interaktif menyunting karangan bermuatan nilai-nilai karakter berbasis tik pada mata kuliah umum Bahasa Indonesia. *Jurnal Pendidikan Bahasa dan Sastra Indonesia, 6*(2), 48–55. https://doi.org/10.15294/jpbsi.v6i2.16521.