

THE RELATIONSHIP OF ILLUSTRATIVE CONTENT IN FLIPBOOK TYPE OF E-BOOK AS AN ILLUSTRATIVE LEARNING MEDIA IN IMMUNE SYSTEM WITH READING TEST RESULTS USING FRY GRAPHICS

Vania Nur Azizah

Biology Education, Faculty of Mathematics and Science, Universitas Negeri Surabaya
vaniaazizah@mhs.unesa.ac.id

Widowati Budijastuti

Biology Education, Faculty of Mathematics and Science, Universitas Negeri Surabaya
widowatibudijastuti@unesa.ac.id

Abstract

Illustrative learning media are all things that support the learning of students to obtain knowledge, skills or attitudes that are supported by appropriate illustrations. Illustrations generally take the form of pictures or videos. Some illustrations have supporting texts or as supporting texts themselves. This study aimed to analyze the relationship between illustrated content and readability in the supporting text of the flipbook type of e-book on immune system material. This research was a development study using the ASSURE model. As many as 34.7% of the illustrated content has supporting texts with a high school level of readability. Whereas 65.3% of the illustrative content cannot be analyzed about readability because of supporting texts that less than 100 words.

Keywords: illustrative content, flipbook type of e-book, illustrative learning media, readability

INTRODUCTION

The 2013 curriculum was developed based on the 21st century challenges that require the world community to be more critical and creative in facing competition in it. The competence of attitudes, knowledge, and skills in the 2013 curriculum can be used as the basis for formulating learning objectives. According to Muhammad & Nurdyansyah (2015), students must master knowledge competencies which include factual, conceptual, procedural, and metacognitive knowledge as well as low to high level thinking skills. In addition to knowledge competencies, students must also achieve skills competencies to find out whether the knowledge that students have mastered can be used to solve problems in real life. The 2013 curriculum requires students not only to achieve knowledge competency but also skills competence.

The basic competencies of the immune system material requires student to mastering concepts and campaigning the importance of community participation in immunizations programs and abnormalities in the immune system. The campaign is one of the activities that require the ability of students to communicate well, think critically, and creatively (Kuhu, 2011). In campaigning activities, students must convince the listener or reader to accept the information. Campaign activities are good for

students so they can practice the skills needed in the 21st century which is communication.

Students must convey information that appropriate to the needs of the community in conducting the campaign. The media has an important role in disseminating the right and correct information to the public. One of the media used to support campaign activities is poster. Posters are visual media in the form of images that convey certain information to influence and motivate the behavior of others who see it (Muflihatin, 2014). Poster is print media that contains information with images so it is interesting to see and read. In Gani, et al.'s (2014) study, using control and treatment groups, posters can change knowledge and attitudes about HIV/AIDS prevention.

E-book are books with a format that specifically designed to be accessed through electronic media such as computers or other gadgets. E-book can be developed into flipbook types using Flip PDF pro software so it will be more interactive. Content in a flipbook can be displayed in the form of flipped pages, it can load content such as pictures and videos while still being on the same page (Chandra, 2016). Flipbooks are designed to present e-book that more interesting so learning can be more fun (Sugiyanto, et al., 2013; Rasiman & Pramasdyahsari, 2014). The final result of a flipbook can be saved in files of type .swf, .exe, .html and can be stored offline in pdf format. Flipbook focuses on visual aspects so learning is

more effective so it helps visualization in learning and makes it easier to deliver information from teachers (Sugiyanto, et al., 2013).

Flipbook in this research is an illustrative learning media that can practice the ability to make posters. Ibrahim (2010) defines that learning media is everything that makes students able to obtain knowledge, skills or attitudes. Forms of learning media including hardware (computers, TVs, projectors), software as well as everything that includes all the resources needed in learning. An illustration is the result of a graphic process that clarifies a script, decorates, or enlivens a text in writing (Maharsi, 2016). Illustrations generally take the form of pictures or videos. Illustrative learning media are all things that support student learning to gain knowledge, skills or attitudes that are supported by appropriate illustrations. Illustrations in learning media aim to visualize the text on e-book material. In addition, illustrations are also able to communicate a message properly and form an emotional atmosphere (Kusrianto, 2007). The illustrations in the e-book also aim to motivated students to convey the information that they have.

The validity component on validation test uses an assessment that takes into account appropriateness of content, appropriateness of presentation, and appropriateness of language adopted from the National Education Standards Agency (2014) and Raharjo (2002). One of the criteria for appropriateness of language is the suitability of students' information processing development through readability. Readability is the level of difficulty and ease of reading texts to be understood by users, thus the level of readability should be adjusted to the ability of users (Widyaningsih, 2015). it is important to know the suitability of the level of text readability to grade school level (Himala, 2016). The readability of a text can be measured using a certain formula, this study used the Fry graph. Chen Jie (2012) argues that the Fry Graph Formula is a readability measurement that is considered popular for measuring readability. Thesis students also often use Fry graphs in their research to measure the readability of a learning media.

Flipbook type of e-book on immune system material are designed to have an attractive appearance and features that support students in making posters that contain a lot of illustrations. There were 24 illustrations on the flipbook, some illustrations have supporting text while others do not. Both illustrative content or readability are validated and tested according to each character. However, because it was related, the results from the

validation of the illustrative content and the readability test need to be linked.

Based on the background description, the research aim is to analyze the relationship of illustrated content in e-book of flipbook type as illustrative learning media on the immune system with the readability test results using Fry graphs.

METHODS

This was developmental study, which developing an flipbook type of e-book as learning media of the immune system. The development model used by ASSURE includes Analyze learners, State objectives, Select methods, media, and materials, Utilize media and materials, Require learner participation, Evaluate and revise (Smaldino, et al. 2008). Media development was done in September 2018-July 2019 at Biology Department of UNESA. The validation test of the flipbook type of e-book illustrative content was done by comparing the contents of the content and illustrations based on the assessment of experts which were lecturer of learning media, lecturer of immune system and biology teacher. Furthermore, the readability test activity have been done by involving 20 students from various schools using Google Forms.

Beside the validation test on the content of the material, a readability test on the supporting text was also carried out. The readability test involved 20 students randomly from various schools, 8 students chosen the same sample so we only have analyzed 12 samples. The readability test method was done by selecting the reading of 100 words on a flipbook which counted by the number of sentences and syllables in 100 words. The number of syllables obtained then multiplied by 0.6. The analysis techniques were as follows. Converted the number of sentences and the number of syllables on the Fry graph. The vertical line on the graph showed the number of sentences per 100 words, while the horizontal line on the graph showed the number of syllables per 100 words. The point of meeting of the vertical line with the horizontal showed the level of the reader class. The Fry graph readability formula could be seen as shown below.

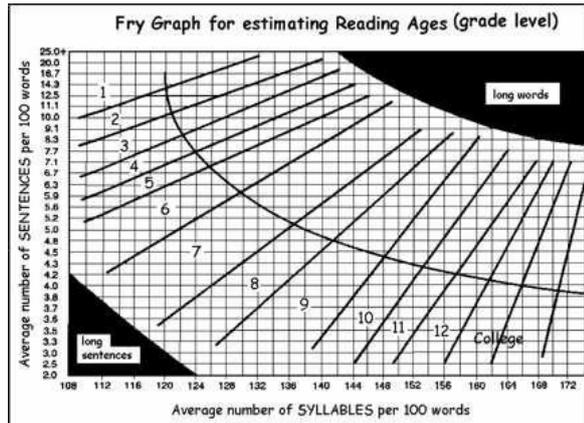


Figure 1. Fry Graph (Yasa, 2013)

DISCUSSION AND RESULTS

The results of this study were flipbook type of e-book as an illustrative learning media immune system material. Flipbook type of e-book had several features that support in practicing the ability to make posters. These features include information and lure students to analyze the condition of their environment so they conveyed information by the situation of the community. As illustrative learning media, e-book contained some illustrative content that aimed to illustrate material content. Illustrations in e-book acted as the content of the material itself or add information from the text.

Table 1. Content Validation Results Illustration of Flipbook E-book Types on Immune System Materials

No.	ILLUSTRATION	SKOR			Average	Category
		V ₁	V ₂	V ₃		
1.	Introductory video	4	4	4	4	Very Valid
2.	Figure 1. Antibody-antigen interaction	3	4	4	3,7	Very Valid
3.	Cough med. advertisement video	4	4	4	4	Very Valid
4.	Mucus mechanism video	4	3	4	3,7	Very Valid
5.	Figure 2. Blood component that have a role in immune system	4	4	4	4	Very Valid
6.	Figure 3. Finger wound	4	4	4	4	Very Valid
7.	Figure 4. Inflammatory process in pop up	4	4	4	4	Very Valid
8.	Figure 5. Phagocytosis process on page 11	4	4	4	4	Very Valid
9.	Figure 6. Forming lymphocytes process on page 14	4	4	4	4	Very Valid
10.	Figure 7. Structure of each immunoglobulin at pop up page 16	4	4	3	3,7	Very Valid
11.	Figure 8. Elementary school students with HIV / AIDS accommodated by the Lentera Foundation	4	3	3	3,3	Very Valid
12.	Figure 9. Medications that must be consumed by children with HIV-AIDS	4	4	3	3,7	Very Valid
13.	Video symptoms of HIV / AIDS	4	4	4	4	Very Valid
14.	Video allergy mechanism	4	3	3	3,3	Very Valid
15.	Figure 10. Mrs. Ani who is undergoing treatment	4	4	4	4	Very Valid
16.	Figure 11. Comparison of blood component composition	4	4	4	4	Very Valid
17.	Illustration of immunization on background	4	4	4	4	Very Valid
18.	Figure 12. Injection immunization	4	4	4	4	Very Valid
19.	Figure 13. Oral immunization through drops	4	4	4	4	Very Valid
20.	Video of how vaccines work	4	4	4	4	Very Valid
21.	Figure 14. Rashes in measles sufferers	4	4	4	4	Very Valid
22.	Picture of conditions in the Asmat on the Bio News feature page 32	4	4	4	4	Very Valid
23.	Image of Asmat tribe children on Bio News feature page 32	4	4	4	4	Very Valid
24.	Video tutorial for making a poster through Canva.com on page 34	4	4	4	4	Very Valid
TOTAL					93,4	
AVERAGE					3,89	Very Valid

Based on the description of the validity of the e-book illustrative content above, the average score that often appears in each illustration was 4. The other score that appeared were 3.7 and 3.3. The lowest average score was 3.3. There are 24 illustrations found in the e-book, both in the form of pictures and videos. Illustrations which had an average score of 4 were 75%, had an average score of 3.7

as many as 16.7%, and had an average score of 3.3 as much as 8.3%. The overall average score of the illustrative content was 3.89 which classified to very valid category. In addition to the validation test on the content of the material, a readability test on the supporting text was also carried out. The recapitulation of the readability test results was presented in Table 2.

Table 2. Readability Test Results of Flipbook E-book Types on Immune System Materials

Sampel	Parts per 100 words	Page	Number of sentences	The number of syllables multiplied by 0.6	Readability level
1	Immunization	27	7	168	11
2	Mucus	8	6	142.2	8
3	Immune deficiency in paragraph 3-4	18	6	160.8	11
4	How vaccines work	29-30	6	159	10
5	Immune system mechanism	3	11	162	10
6	Second line of defense	10	8	160.8	10
7	Phagocytosis	11	9	159.6	10
8	Elementary school students with HIV/AIDS	19	7	151.2	10
9	Plants vs Zombies	1	7	148.2	10
10	Fever	12	7	141	10
11	Immune deficiency in paragraph 1-2	18	9	186.6	12
12	Allergy	23	7	160.8	10
Average			7,5	158,5	10

The illustrative content validity on flipbook type of e-book was tested by comparing the illustrative content in image or video forms with the description of the illustrations in the e-book. The illustrations referred to this e-book media were visual depictions in image or video forms that were able to supported explanation of the text, animated the text or communicated the purpose of writing from the author also as decoration that could attract attention (Muflihatin,2014; Sulistyono, 2015; and Maharsi, 2016).

The overall average score of illustrative content validity was 3.89 with a very valid category. From 24 illustrations, there were 18 illustrations which had an average score of 4, 4 illustrations had an average score of 3.7, and 2 illustrations had an average score of 3.3. The illustration which had average score of 4 reached 75%, the illustration which had an average score of 3.7 as much as 16.7%, and with an average score of 3.3 as much as 8.3%. The improvements can be made to the illustrations with an average score of 3.7 and 3.3 although both are still in the very valid category.

Illustration of the interaction of antibodies with antigens on e-book page 4 gets an average score of 3.7 with a very valid category. Improvements were made by

adding explanations in the form of the text so that the reader can better understand the purpose of the illustrations. The text can also be a supporter of an illustration so that the reader can clearly understand the meaning implicit in the visual illustration (Maharsi, 2016). Illustration in the form of a video about how mucus works in the body on e-book page 8 had an average score of 3.7. Another video about the mechanism of allergies on e-book page 24 had an average score of 3.3. Both videos were used English videos that were not accompanied by subtitles. Improvement could be done by did dubbing into Indonesian. Merkt (2011) states that the use of appropriate video in learning directs students to the concept of thinking more effectively than using print media. This shows that the thought process will be more easily improved by using video media that is used appropriately.

From the readability test that has been done, 8 students chose the same text so that the sample of texts that can be analyzed was only 12 samples. From the 12 samples in Table 4.8, the average number of sentences was 7.5 and the number of syllables multiplied by 0.6 was 158.5. These results are interpreted into the Fry graph so that readability was obtained at the 10th level which means the level of readability is following high school level students.

Also, the entire sample in the readability test was at level 10 to 12 which also means it was appropriate for high school level students.

Based on the relationship between illustrative content validity and readability, 8 out of 23 or 34.7% of illustrations have supporting texts whose readability levels were following the high school level. However, as many as 13 out of 23 or as much as 65.3% of illustrations cannot be read out because the number of words in the supporting text did not meet 100 words. This could be caused by the method used in testing the readability of illustrative learning media was not appropriate. The suitability the level of readability for its users is an important aspect so students can understand well about the contents (Kaldum, 2016). Readability test using Fry graph can find out the level of criteria based on the vocabulary used in the texts. The higher the level of readability in the Fry Graph means the more syllables in the words contained in the texts. However, it could not measure the ability of supporting texts in e-book to increase understanding of illustrations. Then it was necessary to have another readability test so the text can be measured properly.

According to Gilliland (1972), there are five ways to determine the readability of the text, namely the subjective assessment of experts, the question and answer method, the readability formula, the chart, and the cloze test. The readability formulas referred to are formulas that produce numbers as readability indexes, one of which is the Fry graph (Nuttall, 1985). Based on Yasa's (2013) research, it can be seen that the Fry chart is an English-based legibility formula as is the case with the Flesch, Fog Index, and SMOG formula, while the Indonesian-based one is the BI formula. Most experts such as Hartley, Trucman, and Burnhill quoted by Ginting (1990) agree that all readability formulas can predict whether a reading material will be more difficult or easier for readers to understand when compared to other text.

According to Yasa (2013), the readability formula is not careful in the testing description text, whereas most of the text in e-book is description text. According to Slater and Thompson in Widodo (1995), readability formulas or graphs are less accurate when used to measure the readability of science text. This was caused by the basic readability measurement only relies on vocabulary and sentence factors, and did not involve the concept difficulty factor. In addition, the structure of the Indonesian language was different from English that caused the measurement of readability difficult to used a readability formula.

Beside the readability test through the Fry chart, the readability of the e-book was also assessed by experts on

appropriateness of language in validation sheet. But that did not measure students' understanding of the text, so there still need another test. According to Harjasujana & Mulyati (1996), the most appropriate method in testing the readability of science material is to use a cloze test. Cloze test is a method of capturing messages from the source (writer or speaker), changing language patterns by eliminating parts, and conveying to recipients (readers and listeners) so that they try to refine the overall patterns that produce a number of unit clumps which can be considered (Taylor, 1953). Cloze test was then translated into the Tes Rumpang by Widodo (1993).

CONCLUSION

The results of the flipbook type of e-book readability test on the immune system material obtained the 10th level which means the level of readability was following high school level students. There were 34.7% of the illustrative content had supporting texts with a level of readability by the level of high school. While the illustrative content which could not be analyzed because of supporting texts that did not reach 100 words as much 65.3%. Further research could use other readability test methods except readability formulas such as Fry, Flesch, Fog Index, and SMOG graphics. Readability test could be done by subjective assessment of experts, question and answer method, chart, or cloze test so that it could be known the right method for testing the readability of illustrative learning media.

ACKNOWLEDGMENT

The author would like to thank those who have helped complete this research namely, Dr. Widowati Budijastuti, M.Sc., Dr. Rinie Prastiwi Puspitawati, M.Sc., and Nur Qomariyah S.Pd., M.Sc. for the advice and input provided, as well as Dra. Umi Chabibah, M.M. who have been willing to become a validator of flipbook type of e-book on immune system material as illustrative learning media. Also thanks to Eva Kristinawati Putri, S.Pd., M.Si. as a reviewer on this article.

REFERENCES

- BSNP. 2014. *Naskah Akademik Instrumen Penilaian Buku Teks Pelajaran Pendidikan Dasar dan Menengah*. Jakarta: Badan Standar Nasional Pendidikan
- Chandra, R. 2016. *Pengembangan Media Buku Cerita Bergambar Flipbook untuk Peningkatan Hasil Belajar pada Pembelajaran Ilmu Pengetahuan Sosial Peserta didik Kelas IV Sekolah Dasar Islam As-Salam*

- Malang. Malang: Universitas Islam Negeri Maulana Malik Ibrahim Malang.
- Chen Jie. 2012. *A Survey of New Readability Formulas*. China.
- Gani, H.A., Istiaji, E., & Kusuma, A.I. 2014. Perbedaan Efektivitas Leaflet dan Poster Produk Komisi Penanggulangan AIDS Kabupaten Jember Dalam Perilaku Pencegahan HIV/AIDS. *Ikesma: Jurnal Ilmu Kesehatan Masyarakat*, 10(1), 31-47.
- Gilliland, J. 1972. *Readability*. London: Holder and Stroughton.
- Ginting, S. 1990. Kajian Tentang Metode Uji Keterbacaan sebagai Penentu Kefektifan Materi Bacaan (Tesis) Malang: Fakultas Pascasarjana IKIP Malang.
- Harjasujana, A.S. & Mulyati, Y. 1996. *Membaca 2*. Jakarta: Depdiknas.
- Himala, S.P.T., Ibrahim, M., & Fitrihidajati, H. Keterbacaan Teks Buku Ajar Berbasis Aktivitas pada Materi Ruang Lingkup Biologi Kelas X SMA. *BioEdu*, 5(3), 445-448.
- Ibrahim, M. 2010. *Dasar-Dasar Proses Belajar Mengajar*. Surabaya: Unesa University Press.
- Kaldum, M.I. 2016. Tingkat Keterbacaan Wacana Nonfiksi pada Buku Teks Bahasa Indonesia Pegangan Siswa SMA Kelas X Kurikulum 2103 dengan Menggunakan Metode Grafik Fry. *Jurnal Humanika*, 1(16), 1-19.
- Kuhu, M. 2011. Pengaruh Penggunaan Kartu Bergambar sebagai Media Promosi Kesehatan di Sekolah terhadap peningkatan pengetahuan bahaya merokok pada peserta didik SD Negeri Karangmangu Kabupaten Banyumas. Yogyakarta: Program Pascasarjana Fakultas Kedokteran Universitas Gadjah Mada.
- Kusrianto, A. 2007. *Pengantar Desain Komunikasi Visual*. Yogyakarta: Penerbit Andi.
- Merkt, M., Weigand, S., Heier, A., & Schwan, S. 2011. Learning with Videos vs. Learning with Print: The Role of Interactive Features. *Learning and Instruction*, 21(6), 687-704.
- Muflihatin, A. L. 2014. Peningkatan Hasil Belajar Peserta didik melalui Media Poster Tema Lingkungan pada Pelajaran IPA di Sekolah Dasar. *Pendas*, 7(4), 307-425.
- Muhammad, M. & Nurdyansyah. 2015. Pendekatan Pembelajaran Sainifik. Sidoarjo: Nizamia Learning Center
- Nuttall, C. 1985. *Teaching Reading Skill in a Foreign Language*. London: Heinemann Educational Books.
- Raharjo, B. 2002. Rancangan abc eBook. <http://budi.insan.co.id/articles/ebooks/ebooks.pdf>. Diakses tanggal 25 September 2018.
- Rasiman dan Pramasdyahsari, A. 2014. Development of Mathematics Learning Media E-Comic Based on Flipbook Maker to Increase the Critical Thinking Skill and Character of Junior High School Students. *International Journal of Education and Research*, 2(11), 535-544.
- Smaldino, S. E. 2011. *Instructional Technology and Media for Learning*. Penerjemah: Arief Rahman. Jakarta: Kencana.
- Sugiyanto, D., Abdullah A. G., & Elvyanti, S. 2013. Modul Virtual: Multimedia Flip Book Dasar Teknik Digital. *INVOTEX*, 9(2), 101-116.
- Sulistiyono, Y. 2015. Penyusunan Media Pembelajaran Poster Berbasis Teks: Studi Kasus Media Pembelajaran Poster Karya Mahasiswa Semester 5 Pendidikan Bahasa Indonesia UMS. *Jurnal Varia Pendidikan*, 27(2), 208-215.
- Taylor, W.L. 1953. Cloze procedure: a tool for measuring readability. *Journalism Quarterly* 30:415- 33.
- Widyaningsih, N., Zuchdi, D. 2015. Uji Keterbacaan Wacana Buku Teks Bahasa Indonesia Kelas V SD Negeri di Kecamatan Wonogiri. *Jurnal Ling Tera*, 4(1), 144-155.
- Widodo, A. T. 1993. Tingkat Keterbacaan Teks: Suatu Evaluasi Terhadap Buku Teks Ilmu Kimia Kelas I Sekolah Menengah Atas. Disertasi. Jakarta: IKIP Jakarta.
- Widodo, A. T. 1995. Modifikasi Tes Rumpang untuk Bahan Ajar MIPA. Semarang: Lembar Penelitian UNNES.
- Yasa, K.N. 2013. Kecermatan Formula Keterbacaan sebagai Penentu Keefektifan Teks Berbahasa Indonesia. *Jurnal Pendidikan dan Pengajaran Universitas Pendidikan Ganesha*, 46 (3), 238-245.