

## Validity test digital booklet of human digestive system for students in class XI senior high school

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### Article Information

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### Abstract

Learning media is everything that is used to distribute information in learning. The use of appropriate and varied media can overcome the passive nature of students in the teaching and learning process. The results of the analysis of observational questionnaires on students and teachers, it is known that the media that tend to be used are textbooks and modules. Therefore, teachers and students still want other learning media that are able to attract interest in reading and can easily be used anytime and anywhere by students. Based on this, a digital booklet on the material of the human digestive system was developed as a valid learning medium for class XI SMA/MA students. This research was conducted at the Department of Biology, FMIPA UNP and SMAN 1 Rao, using a 4D development model (define, design, develop and disseminate) which is abbreviated at the develop (3D) stage. The data obtained were analyzed by descriptive statistics. The average value of validation is 90.95% with a very valid category. This criterion was obtained from four aspects tested, namely aspects of the feasibility of content, language, presentation and graphics. Digital booklets with very valid criteria are appropriate for use in the student learning process.

### Abstrak

Media pembelajaran merupakan segala sesuatu yang digunakan untuk menyalurkan informasi dalam pembelajaran. Penggunaan media yang tepat dan bervariasi dapat mengatasi sifat pasif peserta didik dalam proses belajar mengajar. Hasil analisis angket observasi terhadap peserta didik dan guru, diketahui media yang cenderung digunakan adalah buku teks dan modul. Oleh karena itu guru dan peserta didik masih menginginkan media pembelajaran lain yang mampu menarik minat baca dan dengan mudah dapat digunakan kapan dan dimana saja oleh peserta didik. Berdasarkan hal tersebut dikembangkanlah *booklet* digital pada materi sistem pencernaan manusia sebagai media pembelajaran yang dilengkapi dengan gambar dan video yang interaktif untuk peserta didik kelas XI SMA/MA yang valid. Penelitian ini dilakukan di Departemen Biologi FMIPA UNP dan SMAN 1 Rao, dengan menggunakan model pengembangan 4D (*define, design, develop* dan *disseminate*) yang disingkat pada tahap *develop* (3D). Data yang diperoleh dianalisis secara statistik deskriptif. Nilai rata-rata validasi 90,95% dengan kategori sangat valid. Kriteria ini diperoleh dari empat aspek yang diuji yaitu aspek kelayakan isi, kebahasaan, penyajian dan kegrafikaan. Booklet digital dengan kriteria sangat valid layak digunakan dalam proses belajar oleh siswa.

## A. Introduction

Learning media is a means of communication used in the learning process so that it can provide a real learning experience (Pakpahan et al., 2020). Learning media functions as a communication link between teachers and students (Fitri et al., 2021), and also to visualize something that is difficult to see so it looks clear (Sumiharsono & Hasanah, 2018). Learning media is used so that the learning process is more effective and efficient (Masykhur & Risnani, 2020), with digital media the learning process does not depend only on the classroom (Pangestuti & Prasmala, 2018). The selected learning media must be in accordance with the characteristics of students so that the material provided becomes meaningful, acceptable, learned and understood easily by students (Yudistira et al., 2021), students are said to be successful when they understand and master the learning material (Ramadhani et al., 2021). The reality on the ground is very different from what teachers should do.

The results of the analysis of the observation questionnaire conducted at SMAN 1 Rao, it is known that teachers tend to use textbooks available in the library and LKPD in the form of books printed using newsprint in the learning process. As a result, students tend to be passive who only listen to explanations from the teacher in the learning process. From the results of the observation questionnaire analysis it is also known that students find it difficult to understand material on the human digestive system because the media or learning resources available are less interesting, too much material and is rote in nature which is thought to have an impact on students' daily test scores which are on average still below the Minimum Completeness Criteria (KKM).

**Table 1 Average UH scores of class XI TP 2020/2021 students on digestive system material**

No	Class	Class Average	Value Criteria (%)		KKM
			<KKM	≥KKM	
1	XI IPA 1	80,02	39,47	60,52	76
2	XI IPA 2	66,21	73,68	26,31	
3	XI IPA 3	59,84	76,31	23,68	
4	XI IPA 4	66,51	57,89	42,10	
5	XI IPA 5	66,30	61,11	38,88	
6	XI IPA 6	72,68	57,89	42,10	

(Source: Class XI Biology Teacher at SMAN 1 Rao)

The low activity and value of students is thought to be closely related to the lack of variety of learning media used. The average test scores of students on the digestive system material can be seen in Table 1.

Putri & Ardi (2021), states that the use of appropriate and planned learning media can help students understand learning material. Goes along with it Okra & Novera (2019), also stated that the provision of facilities such as learning media would improve the quality of learning.

The results of the observation questionnaire analysis given to teachers and students note that in the learning process teachers and students want learning media with reading criteria accompanied by pictures, using language that is easy to understand, electronic or digital in nature, the material delivered is short, concise and clear and color on every page. From the criteria mentioned, it can be concluded that teachers and students want learning media in the form of digital booklets that can be accessed online using cellphones or PC by students and teachers to help understand the material.

Digital booklets are learning resources or media that can be learned easily (Yelviana et al., 2020) and can increase reading interest because it displays readings accompanied by interesting pictures and can be effectively and efficiently used anytime and anywhere (Fitriasih et al., 2019). The advantage of the booklet is that it can help students more easily understand the material, because they no longer need to record the material that has been delivered by the teacher (Octiana et al., 2020). The digital booklet contains clear and easy to understand information and also contains videos that increase the effectiveness of the learning process (Nurutami et al., 2022), learning media that are digital are known to increase interest in learning, provide convenience and help students learn the material (Sarip et al., 2022), accessibility Online media can be accessed at any time of the day and allows people from all over the world to access it (Cunha et al., 2022). Digital based learning media will indeed be more attractive to students than printed learning media (Putri et al., 2021), same with Putrawangsa & Hasanah (2018), states that digital media greatly influences the world of education today.

Based on the problems that have been raised, research on the development of digital booklet learning media on human digestive system material is carried out which is valid for use in the learning process.

## B. Material and Method

This type of research is research and development using the 4D development model (define, design, develop and disseminate), but the disseminate stage was not carried out because it required a long

time. The product developed was validated by filling out a validity questionnaire by the validators, namely three Biology lecturers at FMIPA UNP and two biology subject teachers at SMAN 1 Rao. The aspects assessed in the validity test are aspects of content feasibility, language, presentation and graphics.

Digital booklet validity analysis data was obtained based on a validation questionnaire sheet that had been filled in by the validator. The analysis is carried out with the following steps:

- 1) Give a score with four alternative answer choices arranged according to a modified Likert scale (Nurutami et al., 2022), as follows:
  - 4 = Strongly Agree
  - 3 = Agree
  - 2 = Disagree
  - 1 = Strongly Disagree

- 2) Calculates the highest score using Formula 1.

Highest score = number of validator's × number of indicators × maximum score ..... Formula 1

- 3) Calculate the validation value using Formula 2.

$$\text{Validity Value} = \frac{\text{Sum of all scores}}{\text{Highest total score}} \dots\dots\dots \text{Formula 2}$$

- 4) Provide a validity assessment with the category of (Purwanto, 2009) which has been modified as Table 2.

**Table 2 Validity criteria**

Validity Percentage	Criteria
90%-100%	Very valid
80%-89%	Valid
60%-79%	Pretty valid
0%-59%	Invalid

### C. Results and Discussion

The results of the validation analysis of the five validators are; three Biology lecturers at FMIPA UNP and two Biology subject teachers at SMAN 1 Rao. The aspects assessed in the validation stage are aspects of content feasibility, language, presentation and graphics.

During the validation process, several suggestions were obtained from the validator including the use of images and logos on the cover, writing consistency, and use of citations in the material presented, the relationship between Basic Competencies (KD) and learning objectives and the home menu on the mind map. From the several suggestions given by the validator, a valid digital booklet was produced.

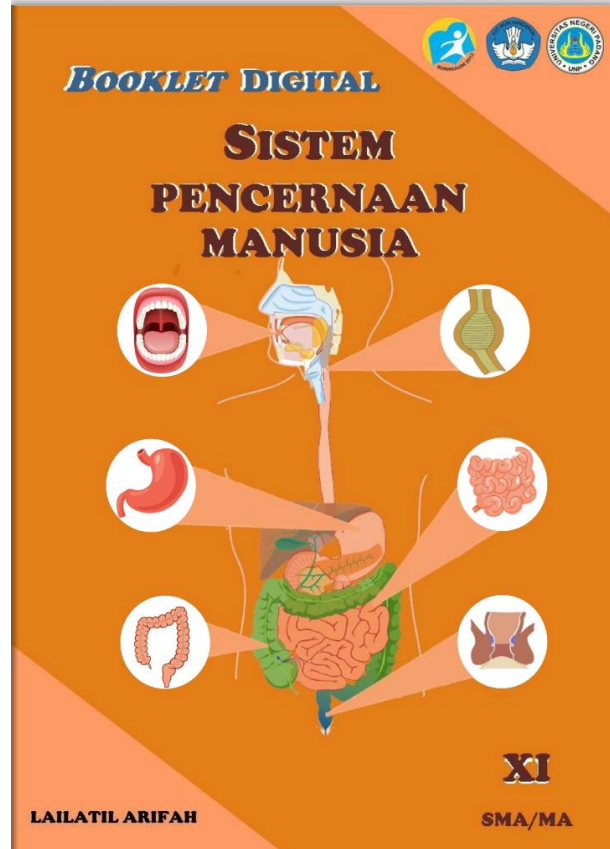


Figure 1 Digital Booklet Cover (in Indonesia)

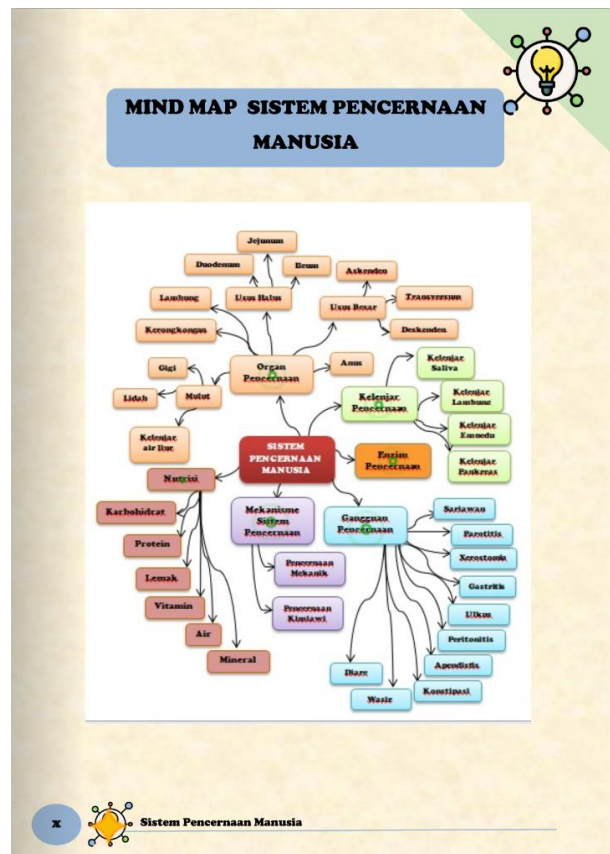


Figure 2 Mind Map (in Indonesia)

**Sistem Pencernaan Manusia**

Sistem pencernaan makanan merupakan kumpulan organ yang bertugas untuk mencerna makanan menjadi bentuk yang siap diserap oleh tubuh. Proses pencernaan makanan berlangsung secara mekanik (fisik), dan secara kimiawi (enzimatis) (Pujiyanto & Ferniah, 2016:124).

**Fungsi sistem pencernaan:**

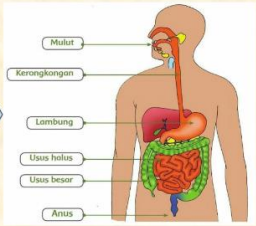
1. *Ingesti* (memakan/menelan)
2. *Digesti* (mencerna)
3. *Absorpsi* (penyerapan)
4. *Eliminasi* (mengeluarkan) (Diyono & Mulyanti, 2013:3-4).

**Macam-macam proses pencernaan:**

1. Pencernaan secara mekanik (memecah, memperkecil, atau menghaluskan makanan)
2. Pencernaan secara kimiawi, (proses pencernaan dengan bantuan enzim pencernaan) (Kusnadi et al., 2017: 219)

**Organ-organ sistem pencernaan:**

1. Mulut
2. Kerongkongan
3. Lambung
4. Usus halus
5. Usus besar
6. Anus (Khamim, 2019:2).



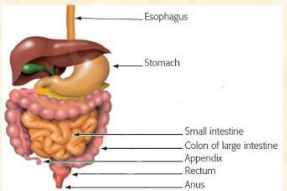
Gambar 1. Organ Pencernaan Manusia (Adrimuh, 2018)

**1** Sistem Pencernaan Manusia


Figure 3 Material Descriptions (in Indonesia)

Setelah makanan diproses dalam lambung selanjutnya masuk ke usus halus. Dalam usus halus kimus diproses secara kimiawi dengan bantuan enzim (Wijaya, 2017: 53-54). Dalam usus halus nutrisi akan diserap oleh usus penyerapan atau ileum.

Di usus besar terjadi menyerapan kembali air dan garam-garam amoniak yang masih dibutuhkan oleh tubuh. Sisa metabolisme atau feses selanjutnya akan didorong ke rektum dengan gerakan peristaltik dan kontraksi (Diyono & Mulyanti, 2013: 14). Apabila feses sudah siap untuk dikeluarkan maka otot spinkter rektum akan mengatur pembukaan dan penutupan anus. Jadi proses defekasi atau buang air besar dilakukan secara sadar, yaitu dengan adanya kontraksi otot dinding perut dan diikuti mengendurnya otot-otot spinkter anus dan kontraksi kolon serta rektum, akibatnya feses dapat didorong keluar anus (Bahtiar et al., 2021:38). Untuk lebih jelasnya silahkan simak video berikut ini!



Gambar 12. Saluran Pencernaan (Campbell et al., 2013)



Video sistem pencernaan manusia (Guru IPA, 2020).

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Figure 5  
Material Description Accompanied by Interactive Video (in Indonesia)

The values of the four aspects given by the validator can be seen in Table 3.

**Table 3 Results of validation analysis by validators**

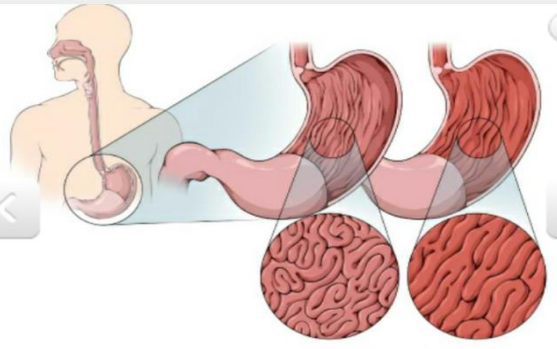
No	Assessment Component	Validity Value (%)	Category
1	Content Eligibility	89%	Valid
2	language	91,25%	Very Valid
3	Presentation	91,67%	Very Valid
4	graphics	91,88%	Very Valid
<b>Average</b>		<b>90,94%</b>	<b>Very Valid</b>

The results of the digital booklet validation questionnaire analysis by the validator obtained an average value of 90.94%, from this value it is known that the digital booklet on human digestive system material meets the very valid category. According to Putri et al. (2021), the results of the validity of digital booklets are said to be very valid in terms of several aspects. The aspects assessed are content feasibility, language, presentation and graphics.

The feasibility aspect of the contents of the digital booklet that was developed received a score of 89% which was categorized as valid. This shows

keringnya selaput lendir, mukosa mulut menjadi kering, mudah mengalami iritasi dan infeksi. Serta proses mengunyah dan menelan sulit dilakukan (Rukmo, 2017: 62).

Untuk melihat gambar silahkan klik ikon ini!



**Gambar 16. Gastritis (Pittara, 2021)**

berbentuk akut atau kronis. Peritonitis akut disebabkan penurunan aktivitas motorik dari usus, menyebabkan lumen usus menjadi distensi (penuh) dengan udara dan cairan

Untuk melihat gambar silahkan klik ikon ini!

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Figure 4  
Description of the Material Accompanied by Interactive Images (in Indonesia)

that the digital booklet developed is in accordance with the Core Competencies (KI) and KD of the 2013 Curriculum, the material in the digital booklet is clear and correct so that it supports the achievement of learning objectives and adds knowledge and insight for students.

The linguistic aspect of the digital booklet scores 91.25% which is categorized as very valid, indicating that the digital booklet that has been developed contains clear information using short, concise and clear language and is in accordance with good and correct Indonesian writing with no ambiguous sentence structure and lead to multiple interpretations so that it is easy to read. Research result by Apriyeni et al. (2021); Nisa et al. (2021); Maisyura et al. (2021) states that the developed booklet must be made clear and not contain ambiguous words so that students are not confused in reading and studying the media provided.

The presentation aspect of the digital booklet that has been developed scores 91.67% in the very valid category. The developed digital booklet contains the subject matter and detailed material in a concise and systematically arranged manner according to KD, indicators of competence attainment and learning objectives to be achieved. This is according to Nurrita (2018); Dwiqi et al. (2020); Ihsan et al. (2021), which states, that learning media that has material presented in a systematic and interesting sequence can improve the quality of learning and also the interest of students in participating in learning. The developed human digestive system digital booklet presents pictures and videos that are interactive, which means that if you want to view a photo or video, you have to click on the icon that is presented first.

The graphical aspect of the digital booklet gets a score of 91.88% in a very valid category. Digital booklets have an attractive cover display. The layout of the contents, images and videos presented in the digital booklet is attractive and interactive. Overall, the use of color and design in digital booklets is interesting. The choice of nude color in the material presentation background is in accordance with the advice of the validator, because using orange will interfere with vision or be less suitable for digital learning media. according to Ramadhani et al. (2021), choosing the appropriate font type and size makes readers not easily bored, and the pictures and videos that are presented are interesting and in accordance with the material raises students' interest in reading. Goes along with it Utami et al. (2022), revealed that writing that has proper legibility will increase reading interest, memory, time efficiency in reading.

Overall the results of the validation questionnaire analysis obtained an average value of 90.94% with a very valid category. From the results of the questionnaire analysis it was concluded that the digital booklet that had been developed could be used as a learning medium during the teaching and learning process on the material of the human digestive system. The developed digital booklet is expected to be able to make it easier for students to understand the material and increase students interest in reading so that the test results are expected to increase.

## D. Conclusion

The research that has been carried out produces learning media in the form of digital booklets on human digestive system material for SMA/MA with a very valid category. This category is seen from the average value of the overall validity of the human digestive system digital booklet of 90.94%, from the assessment of four aspects, namely, aspects of content feasibility, language, presentation and graphics. Therefore, the developed digital booklet is suitable for use in the learning process by students at SMA/MA.

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