

Meta-Analysis' Validity of Booklet on the Human Reproductive System as a Supplementary Biology Teaching Material for High School

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Abstract

Reproductive system disorders or diseases threaten Indonesia's young generation, so prevention is necessary before they occur. One way that can be done is by adding preventive value information to learning. Booklet learning media can help convey preventive information. The research aims to analyze the level of validity of booklet media using the meta-analysis method, namely a systematic and quantitative assessment of previous research. Data collection was carried out by searching for articles from previous researchers in the thesis database of the UNP Biology Department and by accessing several journals on the internet. The population in this study were all documents related to booklets, and the sample used in this study consisted of 15 articles and theses. The research results show that the average validity value of booklet media development in the content component is 90.93%, linguistics 89.43%, presentation 85.38%, and graphics 90.89%. Overall, the average validity of the booklet is 89.19% in the very valid category. From these results, the booklet media can be developed and is suitable for use in the biology learning process on reproductive system material.

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INTRODUCTION

Increasingly promiscuous behavior poses a threat of reproductive system disorders or diseases to the younger generation in Indonesia, making it necessary to implement preventive measures beforehand. One way to address this is by incorporating preventive value information into the education curriculum. In line with this, Sulistin and Widajadnya (2015) stated that knowledge is related to health issues and a lack of knowledge about health leads to a reduced awareness of how to properly prevent diseases. Learning can take place anywhere and can be done independently or with the help of a teacher. Agustina and Adesti (2019) stated that the learning process essentially involves interaction between educators and learners, either directly or indirectly.

Biology is a field of study that encompasses the examination of disorders and damages occurring in living organisms, including humans and their environment. These disorders and damages often stem from human actions or negligence, making biology a discipline that necessitates the inclusion of preventive values to avoid such issues. To instill these preventive values, clear, engaging, and appropriate educational media are needed to meet the needs of learners. This aligns with the opinion of Lufri and Yunus et al. (2007), who stated that educators must play a role in creating educational media that cater to the needs of learners, thereby facilitating their understanding of the material.

According to Lufri and Yunus et al. (2007), biology education is filled with facts, concepts, principles, and theories. Furthermore, Yogica et al. (2014) noted that biology education is generally presented using specialized terminology. This often leads learners to memorize rather than understand the content. Research by Lestari and Mellisa (2023) indicated that low interest in learning hinders education and results in poor academic performance, whereas high interest in

learning boosts academic achievement. Media can increase students' interest in learning and aid in their comprehension of the subject matter, thereby requiring educators to be creative and vary their use of media and tools in teaching.

Educators must select media that suit the needs of their students to help them understand the lessons better. One medium with numerous advantages in conveying information is the booklet. Pralisaputri et al. (2016) stated that booklets contain important information presented in an attractive, clear, and concise design, making them easy to understand. Booklets are categorized as thin, small print media (half of an A4 paper). Wijayanti et al. (2016) pointed out that booklets are small and portable, allowing them to be studied repeatedly. Sukmawati et al. (2018) added that booklets are small books with a minimum of five pages and a maximum of forty-eight pages.

Previous research indicates that the majority of high school students prefer learning media that include images. This is evidenced by 81% of students agreeing that media with clear and attractive images are preferable. This aligns with Fitri et al. (2014), who stated that students' interest in learning is partly dependent on the availability of images in the media. Images serve not only as decorations but also contain information and illustrations.

Booklets are a type of media that contain many images. In addition to featuring numerous images, Octiana et al. (2020) noted that booklets offer many advantages, such as their small, attractive, practical, and simple design, making them easy to carry anywhere. These advantages motivate students to enhance their knowledge by understanding the information presented in the booklet. This is consistent with Emda's (2011) assertion that booklets can increase students' interest, motivation, and concentration, ultimately improving their academic performance. Booklets are equipped with images to clarify the material discussed. This is in line with Sari et al. (2018), who stated that booklets are simple learning media that include pictures, colors, and illustrations to attract students' interest and increase their desire to learn. Booklets are systematically arranged using proper Indonesian and have several advantages. Imaniar (2017) stated that booklets have the advantage of providing information supplemented with clear and representative images, being informative, and having an attractive design that stimulates curiosity. Booklets can be used as supplements or complements in the learning process. According to the Indonesian Dictionary (KBBI, 2016), a supplement is something added to complete, an extra part, or an appendix. Therefore, a booklet as a supplement is defined as something that complements pre-existing material to present learning content in more detail. The presence of this booklet is expected to enable students to learn independently, understand the material well, and apply preventive values from the human reproductive system material.

Interviews with teachers revealed that there are no supplements integrated with preventive values in the human reproductive system material. Additionally, there are no booklet media supplements for teaching this material. The primary learning resource used in teaching the human reproductive system is the textbook. Some textbooks only feature black-and-white images, and some images in these textbooks are incomplete. Furthermore, the integration of preventive values in these textbooks is minimal, with some textbooks not including preventive values at all. About 52% of students prefer to read independently to gain more comprehensive information about the reproductive system without feeling embarrassed or awkward. In the past six months, 62% of students have read articles or journals on reproductive health, including the human reproductive system, sexually transmitted diseases, sexually transmitted infections, and sex education. It can be concluded that the majority of students tend to be visual learners. Based on these issues, the researcher is interested in conducting a meta-analysis of journals and theses on the validity of booklets. The results of this meta-analysis are expected to provide a unified perspective on the overall validity of booklets as supplementary teaching materials.

RESEARCH METHODS

The research was conducted in December 2023 at Universitas Negeri Padang by searching for articles from previous researchers in the UNP Department of Biology thesis database and accessing journals on the internet. The type of research used was descriptive survey research. This study employed the meta-analysis research method conducted by reviewing several online journals and theses related to booklet media. Mansyur and Iskandar (2017) described meta-analysis as a type of ex post facto survey research and literature analysis of previous studies, utilizing secondary data from research findings that have been conducted. According to Utami and Indriani (2021), meta-analysis is a statistical technique that combines quantitative results of similar studies, two or more, based on empirical knowledge on a specific topic, indicating it is a quantitative research method.

Data collection techniques utilized statistical methods to combine several studies related to the development of biology learning booklets gathered through internet sources to obtain quantitative data. The research aims to determine the level of validity of biology learning booklet development from the data collected. The population of this study encompassed all documents related to booklets, and the sample documents used included journal articles published between 2019 and 2023, as well as theses discussing booklets on biological topics.

Steps for tabulating data included: 1) Identifying research variables, 2) Identifying average content validity rates, 3) Identifying average language validity rates, 4) Identifying average presentation validity rates, 5) Identifying average graphic validity rates, 6) Calculating final average validity scores for content, language, presentation, and graphics using the following formula:

$$\text{Percentage} = \frac{X}{Y}$$

Information:

X= Amounts of percentage

Y= Amounts of data

The validity assessment criteria are as follows:

Table 1. Valid Product Categories

Percentage (%)	Validity Categories
81%-100%	Highly Valid
61%-80%	Valid
41%-60%	Invalid
≥21%-40%	Highly in Valid

(Arikunto and Jabar, 2010).

RESULTS AND DISCUSSION

The research discusses the validity of booklets as supplementary teaching materials, thus examining and analyzing several journals and theses related to the development of teaching supplements in the form of booklets. In this analysis, all journal articles and theses must adhere to four consistent assessment aspects: content, language, presentation, and graphics. The following are the 15 journals and theses from the years 2019-2023 that are discussed in this study.

Table 2. Results of Research on the Validity of Teaching Materials in the Form of Booklets from Several Studies

No	Researcher	Article's Title	Validation Aspects (%)			
			C	L	P	G
1	Harahap, etc. (2020)	Validitas <i>Booklet</i> Sistem Pernapasan Manusia Sebagai suplemen Bahan Ajar IPA Kelas VIII SMP/MTs	91,25	88,00	84,00	95,00

No	Researcher	Article's Title	Validation Aspects (%)			
			C	L	P	G
2	Ramadhani, etc. (2020)	Validitas <i>Booklet</i> Sistem Peredaran Darah Manusia Sebagai Bahan Ajar Mandiri IPA Kelas VIII SMP	92,85	86,00	85,00	86,66
3	Gusmar, etc. (2022)	Validitas Pengembangan <i>Booklet</i> Terintegrasi Potensi Lokal Kabupaten Pesisir Selatan pada Materi <i>Plantae</i> Kelas X SMA	89,25	88,33	90,38	87,12
4	Yunisa, etc. (2022)	Pengembangan <i>Booklet</i> Dilengkapi Ensiklopedia Terintegrasi Potensi Local Kabupaten Pasaman Barat pada Materi Keanekaragaman Hayati Kelas X SMA	94,53	94,79	97,12	94,64
5	Oktafia (2023)	Pengembangan <i>Booklet</i> Terintegrasi Potensi Lokal Di Solok Selatan Pada Materi Ekosistem Untuk Kelas X SMA	87,50	81,66	92,36	86,11
6	Purwaningrum (2023)	Validitas <i>Booklet</i> Terintegrasi Kearifan Local Suku Anak Dalam Kabupaten Merangin pada Materi <i>Plantae</i> Kelas X SMA	92,85	85,00	86,53	87,07
7	Arifah, etc. (2023)	Uji Validitas <i>Booklet</i> Digital Sistem Pencernaan Manusia Untuk Peserta Didik Kelas XI SMA/MA	89,00	91,25	91,67	91,88
8	Savira & Darussyamsu (2022)	Validitas <i>Booklet</i> Bernuansa Spiritual Tentang Materi Protista Sebagai Suplemen Bahan Ajar Biologi Kelas X SMA/MA	84,84	86,11	83,88	91,67
9	Putry (2022)	Validitas <i>Booklet</i> Bernuansa Konseptual Tentang Materi Struktur dan Fungsi Organel Sel Untuk Peserta Didik Kelas XI SMA	87,50	85,00	92,00	85,00
10	Yelviana, etc. (2020)	Pengembangan <i>Booklet</i> Edukasi Kesehatan Reproduksi Remaja Untuk Siswa SMA	92,71	89,29	86,11	91,67
11	Nurutami, etc. (2022)	Validitas <i>Booklet</i> Digital Bioteknologi Terintegrasi Eco-Enzyme Sebagai Bahan Ajar Digital Kelas XII SMA	95,00	95,23	94,16	97,97
12	Ulandari & Syamurizal (2021)	<i>Booklet</i> Suplemen Bahan Ajar pada Materi Protista Untuk Kelas X SMA/MA	87,50	87,87	98,33	91,66
13	Putri, etc. (2021)	<i>Booklet</i> Sistem Ekskresi Pada Manusia Sebagai Suplemen Bahan Ajar Biologi Kelas XI SMA	90,47	85,00	88,33	86,90
14	Novianti & Syamsurizal (2021)	<i>Booklet</i> Sebagai Suplemen Bahan Ajar Pada Materi Kingdom Animalia Untuk Peserta Didik Kelas X SMA/MA	94,80	100,0	95,83	100,0
15	Nurhasmayanti, etc. (2023)	Validitas <i>Booklet</i> Pada Materi Tumbuhan Paku Kelas X SMA	94,00	98,00	92,00	90,00
Average			90,93	89,43	85,38	90,89

*Keterangan: C=Content, L= Language, P= Presentation, G= Graphic Design

Based on the summary of booklet validity in biology education as seen in Table 2, all aspects meet highly valid criteria. In terms of content validity, booklets scored 90.93%. For language aspects, they achieved 89.43%, for presentation aspects, 90.89%, and for graphical aspects, 89.17%. The data's categorization as highly valid aligns with the findings of Syafrina et al. (2023), affirming that booklets are highly suitable for educational media.

Regarding content validity, as stated by Al-Banna et al. (2023), evaluation encompasses material accuracy, relevance, media development goals, and alignment with facts and data. Language evaluation covers adherence to Indonesian Spelling Guidelines (EBI) or the Indonesian Dictionary (KBBI). Presentation evaluation includes presentation techniques, consistency, and completeness such as glossaries and bibliographies. Graphical evaluation assesses aspects like color harmony, image arrangement, and others.

Based on the data obtained, the average overall validity of the booklets is as follows:

Table 3. Average Results of the Validity Test Analysis for Booklet Teaching Materials

No	Aspects	Validity (%)	Categories
1	Content	90,93	Highly Valid
2	Language	89,43	Highly Valid
3	Presentation	85,38	Highly Valid
4	Graphic Design	90,89	Highly Valid
	Average	89,17	Highly Valid

Based on Table 3, the overall average validity of the booklet as a teaching medium across all components is 89.17%, with a criteria rating of highly valid. From the aspect of content feasibility, the booklet scored 90.93%, also rated as highly valid. This criterion indicates that the developed booklet aligns with the curriculum, contains accurate material, and meets the needs of students. According to the Ministry of National Education (Depdiknas, 2008), a highly valid criterion indicates that the media developed is by the curriculum, learning, and student development.

From the language aspect, the booklet scored 89.43%, rated as highly valid. This indicates that the booklet uses appropriate language rules according to the Indonesian Spelling Guidelines (EBI). Additionally, the booklet meets readability criteria, uses unambiguous language, and avoids causing multiple interpretations. This aligns with the research by Orkha et al. (2020), which states that students prefer media with clear, easily understandable language and not overly text-dense, but also accompanied by images.

In terms of presentation, the booklet was rated highly valid with a score of 85.38%. This criterion shows that the booklet is organized systematically, clearly, and simply. Moreover, the booklet includes comprehensive key points and details of the material, and the problems presented are relevant to everyday life phenomena. This is consistent with the opinion of Trissa et al. (2022), who states that valid media have a clear and systematic sequence and are relevant to the material.

Regarding the graphic aspect, the booklet was rated highly valid with a score of 90.89%. This criterion indicates that the booklet uses clear fonts, appropriate font combinations, and proper font size and line spacing. Additionally, the cover design of the booklet is attractive and reflective of the content. The images presented are contextually appropriate and accompanied by captions. The color combination used in the booklet is excellent, featuring an appealing style and color gradient. This is consistent with Wimudi et al. (2022), who state that one of the assessed aspects of graphics is the clarity of the font. Trissa et al. (2022) also state that valid media are those that are attractive in terms of cover design, layout, font use, font size, color use, and design, thereby making students more interested in using them.

The analysis of 15 articles on booklet teaching media generally shows that booklets are recommended for use in teaching. This is evidenced by the average validity results, which achieved a highly valid criterion in terms of content, language, presentation, and graphics, with an overall score of 89.17%. According to Zulaekah (2012), booklets are very effective in delivering information and increasing knowledge. This research finding is relevant to the research by Alencia and Syamsurizal (2021), which states that booklets meet the highly valid category and are suitable for practical use. Based on the analysis of journals on booklet media, the validity of the developed booklets is highly valid. Therefore, the author hopes that the human reproductive system booklet as a supplementary biology teaching material for high school will also achieve a highly valid criterion.

CONCLUSION

Validity tests for booklet learning media have been extensively conducted by researchers. Based on the results of the meta-analysis, it can be concluded that the validity score of the booklet learning media meets the highly valid criteria with a score of 89.17%. Therefore, it can be concluded that the developed booklet is suitable for use as a supplementary teaching material that includes preventive values in the learning process. The overall validity of the booklet media can be applied to the human reproductive system material as supplementary teaching material for high school/MA biology, with the expectation that it will meet the highly valid category and be suitable for practical implementation.

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