

## The Development of an Integrative Botanical Textbook Based on Islamic Values and Medicinal Herbs Studies of Central Kalimantan

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### Abstract

Learning outcomes have not been achieved, there is no textbook that fits the distinction of the study program under the term medicinal herbs and integrated learning of Islamic values. So it is necessary to develop textbooks that are valid, effective, and practically used in learning. The research method used is Research and Development, in its development using the ADDIE model. The results derived from experts' validation has shown that the validity of the textbook materials is in excellent or highly valid category (96.32%), the design is in authentic category (87.62%) and from the aspect of Islamic integration is in excellent or highly valid category (98.14%). The control class effectiveness was 52.3 which is classified into a considerable success category and the experimental class effectiveness was 81.6 with an excellent category. The gain control class was 0.21 with low criteria and the experimental gain class value 0.71 with high criteria. The practicality of the textbook developed received a positive response from students on the large scale of the experimental class was 98.75% with very practical criteria. The textbooks developed are valid, effective and practical so that they are appropriate to be used in botanical course learning.

**Abstrak**

Hasil pembelajaran belum tercapai, belum ada buku ajar yang sesuai distingsi program studi yaitu tentang tumbuhan obat dan pembelajaran terintegrasi nilai keislaman. Sehingga perlu adanya pengembangan buku ajar yang valid, efektif, dan praktis digunakan dalam pembelajaran. Metode penelitian yang digunakan adalah Research and Development, dalam pengembangannya menggunakan model ADDIE. Hasil penelitian diperoleh nilai kevalidan ahli materi 96,32% dengan kriteria sangat valid, ahli desain diperoleh 87,62% dengan kriteria valid, ahli integrasi keislaman diperoleh 98,14% dengan kriteria sangat valid. Efektivitas kelas kontrol sebesar 52,3 dengan kategori cukup baik dan kelas eksperimen sebesar 81,6 dengan kategori sangat baik. Nilai Gain kelas kontrol sebesar 0,21 dengan kriteria rendah dan N-Gain kelas eksperimen sebesar 0,71 dengan kriteria tinggi. Kepraktisan buku ajar yang dikembangkan mendapatkan respon positif dari mahasiswa pada skala besar kelas eksperimen 98,75% dengan kriteria sangat praktis. Buku ajar yang dikembangkan valid, efektif dan praktis sehingga layak digunakan dalam pembelajaran botani tumbuhan.

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## A. Introduction

Learning in the botanical subject has not been supported by any appropriate textbooks and semester lesson plan (RPS). The learning outcomes are reached by only 40.20% students. Based on the observation results, not all students are actively involved in lectures. The students' access to information on their own themes and references are limited, and they don't engage in other groups' discussion. As the distinction and mission of the Biology Study Program, the students are required to master the concept of herbal or bioherbal biotechnology by upholding Islamic bioethics and to be able to uphold interdisciplinary collaboration. Thus the learning outcome of the course is expected to be implemented and integrate the course with Islamic values.

Some major problems have been described so that it is necessary to develop botanical textbooks which are integrated with islamic values and the studies of medicinal herbs of Central Kalimantan. In solving educational problems with an Islamic perspective approach in dealing with student problems (Ismail *et al.*, 2013). The developed textbooks should consider the aspect of validity, practicality, and are effective for use in the learning process. The developed textbooks are designed systematically, efficiently and effectively to support the learning process. Textbooks are developed and can be implemented to achieve the goals (Sadikin *et al.*, 2018). The curriculum and learning process in Biology study program of IAIN Palangka Raya were prepared by integrating Islamic values, although not all courses use Islamic integrated teaching materials (Lestariningsih and Mulyono, 2017). As well as organizations in Malaysia integrate Islamic values into their policies (Wahab *et al.*, 2016). In universities, integrating Islamic values is highly recommended and obeyed (Ahmad *et al.*, 2018). In the implementation of the botanical plant course, teaching materials are needed in the form of a textbook.

Textbooks are part of printed teaching materials used to support the learning process for students and lecturers. The textbook is presented with an attractive design and is equipped with an integration of Islamic values and the studies of medicinal herbs of Central Kalimantan. The values contained in science are religious values that can be developed by inserting verses from the al-qur'an (kauniyah) and hadiths that are relevant to the discussion of materials (Djudin, 2012) and (Aqil, 2018). The students are expected not only to study intellectually, but it is also hoped that the religious values included in the material will have additional value and become a distinction between developed textbooks and other commercial textbooks. Biology

learning integrated with Islamic values provides an opportunity to connect conceptual knowledge with their experiences in life as a Muslim, so that learning becomes meaningful (Purwati *et al.*, 2018) and the importance of using traditional medicine in modern times (El-Seedi *et al.*, 2019). The process of teaching and learning that examines local wisdom expected to be able to increase love and as an effort to maintain existence in the midst of the swift currents of globalization (Shufa, 2018), local wisdom is the intelligence of local wealth (Utari, 2016). Local wisdom in learning by promoting medicinal herbs of Central Kalimantan is expected to be able to explore the potential of a region that has a wealth of people consuming medicinal herbs found nearby, but there is still a lack of knowledge about the identification of these medicinal herbs, so this study needs to be included in a botanical textbook.

## B. Materials and Method

A textbook was developed based on a needs analysis of 36 students taking botanical courses and lecturers who taught Biology studies at IAIN Palangka Raya. This type of research and development uses the ADDIE model (Analyze, Design, Develop, Implement, and Evaluate). The products developed by using the ADDIE have become one of the most effective tools to date (Branch, 2009).

The research instruments used include measuring the effectiveness of integrated Islamic textbook products and the study of medicinal herbs in Central Kalimantan using tests, test questions that contain understanding of material concepts, Islamic integration, and attitudes. To measure the validity of the product using an experts' validation consists of material validation, validation of Islamic integration, and validation of media/design. To measure the practicality of the product using two types of questionnaires, namely the applied observation questionnaire and the student response questionnaire.

The data were analyzed using qualitative and quantitative descriptive analysis techniques using percentages and average values. Textbook validation analysis calculates the average score with the following formula:

$$\bar{x} = \frac{(\sum x)}{(n)}$$

Explanation:

$\bar{x}$  = Average Score

$(\sum x)$  = Total Score

(n) = Total Number

The quantitative average scores are converted into qualitative values based on the assessment aspect criteria (Widoyoko, 2009). The qualitative value conversion can be seen in table 1.

**Table 1 Guidelines for textbook assessment classification**

Range of scores	Classification	Validity	Practicality
$\bar{X} > 4,2$	Excellent	Very valid	Very Practical
$3,4 < \bar{X} \leq 4,2$	Good	Valid	Practical
$2,6 < \bar{X} \leq 3,4$	Moderate	Quite Valid	Quite Practical
$1,8 < \bar{X} \leq 2,6$	Poor	Less Valid	Less Practical
$\bar{X} \leq 1,8$	Inappropriate	Invalid	Impractical

Product implementation on a large scale uses the experimental group design and the control group (Nonequivalent Control Group Design), that is, in this design the experimental group and the control group are not randomly selected (Sugiyono, 2019). The control group was given treatment using developed textbook products and the control group was subjected to learning as usual without any textbook.

Textbook practicality sheets in the form of a learning implementation questionnaire were analyzed based on the observer's assessment and student responses to the textbook developed. The analysis uses a Likert scale in which each item is provided with 5 categories of answers; strongly agree (5), agree (4), quite agree (3), disagree (2), and disagree (1). Then add up the total score as well as calculate the validation score and make a percentage. Determining the criteria for the observation results of the implementation of learning using textbooks is shown in table 2.

**Table 2 Criteria of Learning Implementation**

Range of Score	Criteria
<40%	Fail
40% - 55%	Insignificant
56% - 79%	Considerable Success
80% - 89%	Success
>90%	Highly Successful

Determine the criteria for practicality as in table 1, if it has a practical or high score range of  $\bar{X}$ . If the achievement of  $\bar{X}$  is below practical or high, it is necessary to revise it based on recommendations from the users. Furthermore, the practicality assessment was reconducted until the practicality aspect of the textbook was obtained. To calculate the increase in student learning outcomes the Gain formula (N-Gain) was used.

### C. Results and Discussions

The textbook was entitled "Islamic botanical integrated high plants and the study of medicinal plants in Central Kalimantan". The prototype sample containing Islamic integration is shown in Figure 1 and the study of medicinal herbs is shown in the picture 2.

dapat bereaksi dengan radikal bebas sehingga mengurangi kapasitas radikal bebas untuk menimbulkan kerusakan pada sel, jaringan, dan atau organ.

Integrasi Islam

Banyak ayat Allah ﷻ yang menerangkan tentang tumbuh-tumbuhan beserta manfaat dan khasiatnya. Salah satunya seperti yang terdapat dalam Q5. Al-Baqarah ayat 22 berikut.

الَّذِي خَلَقَ لَكُمْ مِنْ أَنْفُسِهِمْ أَزْوَاجًا لِتَسْكُنُوا فِيهَا وَلِتُمَكِّنَنَّكُمْ فِيهَا وَيُنزِلَنَّ عَلَيْكُمْ مِنْ السَّمَاءِ مَاءً فَتُخْرَجَ بِهِ مِنَ الثَّمَرَاتِ رِزْقًا لَكُمْ ۗ إِنَّكُمْ لَخَالِفُونَ  
 ۝۲۲

Artinya : "Dia lah yang menjadikan bumi sebagai hamparan bagimu dan langit sebagai atap, dan Dia menurunkan air (hujan) dari langit, lalu Dia menghasilkan dengan hujan itu segala buah-buahan sebagai rezeki untukmu; karena itu janganlah kamu mengadakan sekutu-sekutu bagi Allah, padahal kamu mengetahui" (Q5. Al-Baqarah 2:22).

Ayat di atas menjelaskan tentang keesaan Allah ﷻ bahwa Dia yang memberikan nikmat kepada hamba-hambanya dengan mengeluarkan mereka dari tiada kepada ada serta menyempurnakan bagi mereka nikmat lahiriah dan batiniah, yaitu Dia menjadikan bagi mereka bumi sebagai hamparan seperti tikar yang dapat ditempati dan Dia telah menurunkan air hujan dari langit bagi mereka. Yang dimaksud (dengan langit) di sini adalah awan yang turun pada saat dibutuhkan oleh mereka (Katsu, 1994) Lalu Dia menumbuhkan beranekaragam buah-buahan di bumi sebagai rezeki dan untuk dimanfaatkan oleh umat manusia. Selain untuk dikonsumsi biasa, beberapa buah dipercaya dapat bermanfaat bagi kesehatan, dapat mengobati penyakit dan dapat menambah daya tahan tubuh.

Figure 1 Sample of Islamic Integration

merupakan daun tunggal, dengan bentuk daun lempeng, ramping memanjang dan berujung lancip. Ujung dan pangkal daun meruncing, peridangan dan menyempit dengan permukaan daun licin dan tidak berbulu dan memiliki warna hijau tua. Tangkai daun sekitar 7-10 cm dan lebarnya sekitar 2-5 cm. Daun makhkota lepuh, berbentuk silindris memanjang dengan panjang 4-5 cm melengkung ke belakang (MORFO) dan berwarna putih atau kuning. Benang sari banyak dalam berkas berjumlah 5 berbentuk lepuh, kepala sari beruang 2, dan membentol. Buah bulat memanjang tertutup rapat oleh dua tempel yang kasar, membuka mulai dari ujung dengan 5 ketup dan berbuah tajam. Selaput biji berwarna putih atau kuning pucat.

Famili	1   Simulaneae
Genus	1   Phaleria
Spesies	1   Phaleria macrocarpa Makluta Davis

**Makhkota**

Gambar 44  
Phaleria macrocarpa  
Sumber: Dikemasari

Gambar 45  
Phaleria macrocarpa  
Sumber: Sinarpustaka.com

**Manfaat Makluta Davis dalam Rupa Tumbuhan Kalimantan Tengah**

Tanaman ini digunakan sebagai obat penyakit kulit dan demam berdarah. Bagian tanaman yang dimanfaatkan adalah buahnya direbus dengan air kemudian diminum sehari-hari.

Figure 2 Sample of Medicinal Herbs Study

The integration of Islam in textbooks explains the diversity and benefits of plants that are sourced from the Al-quran and hadith. Showing interpretations from various sources such as Ibn Kathir, Quraish Shihab, Jalalain and fii dzilalil quran which discusses plants. In the study of herbal plants based on the results of interviews with people who use herbal concoctions as well as from herbal concoctions (Batra) in Central Kalimantan. Provides information on parts of plants used and the process of concocting herbal medicines and adding phytochemical content based on literature. After the product design, the development is then validated by experts. Criteria in determining expert subjects, namely: (1) experience in their field, (2) status as a lecturer. The validation instrument uses a Likert scale.

The appropriateness of a product developed can be measured by the applicability and the benefits for the users. The resulting textbook development fulfills the characteristics of a good textbook (Pratama *et al.*, 2016) and (Kurschus, 2014). Creating textbook designs, compiling, implementing small-scale trials, revisions and

large-scale trials then final revisions. As with the research phase carried out by (Plomp and Nieveen, 2010), small-scale application was then made improvements and to get a better understanding so that development was carried out, then applied in a wider context. Textbooks developed are appropriate for use in learning if they meet valid, practical, and effective requirements (Yulastri *et al.*, 2017). The characteristics of a good textbook includes opinions or citing relevant research results (Gunawan, C. I and Utama, AN B, 2015). This study includes the results of research on the use of medicinal herbs in Central Kalimantan. Each page of the textbook developed contains text, graphs/diagrams, tables, pictures (in the form of photos of original documentation of medicinal herbs in Central Kalimantan), insert reminders, insert histories of these plants. The textbooks developed in this study have gone through the expert validation process, where there are 2 experts for material validation, 2 experts for media validation, and 2 experts for religious integration. The results of the material validation data in phase 1 and 2 are briefly shown in table 3.

**Table 3 Material Validation Result on Phase 1 and 2**

Material Validator	Phase			
	1		2	
	Recommendation	Revision	Recommendation	Revision
1	Connecting pictures and sentences	pictures and sentences are connected	The textbook are ready to be tested	Revision is no longer needed
	Adjusting learning objectives to learning activities, discussion activities and evaluation questions.	Learning objectives in learning activities, discussions and evaluation questions are appropriate	-	-
2	Improve textbook page editorial	Editors of textbook pages are appropriate	The textbook are ready to be tried-out	Revision is no longer needed
	Kegiatan belajar dibagi sesuai dengan RPS	Menyesuaikan kegiatan belajar		
<b>Percentage Average Score</b>	<b>96,32%</b>			
<b>Criteria</b>	<b>Excellent/Highly Valid</b>			

Learning innovation products through research and development (RandD) go through a validation stage before the product is used (Iriti *et al.*, 2016). Validation of media or design experts aims to test the presentation/appearance of textbooks. The expert validator of textbook design is a lecturer who mastered the IT media and Biology learning techniques. The detailed validation results by media experts are briefly shown in table 4.

The validation of the value of Islamic integration or religious validation aims to examine the suitability of the relationship between the subject matter with the verses of the Qur'an and the hadiths that have been published in the material of textbooks. The main sources used are from the Qur'an and Hadith to show evidence of these values based on Islam (Wahab *et al.*, 2016). Botanical botanical material contains theoretical and literary foundations in the Al-Qur'an and Hadith as a form

of integration with Islamic values. Based on input from the validator, religious experts provide input on the source of the interpretation of the verses of the Al-Qur'an from Ibn Katsir and the selection of verses related to plants material. As for the

validator of the value of Islamic integration is a lecturer who teaches the interpretation of the Quran course. The results of the validation data from the Islamic integration expert are briefly shown in table 5.

**Table 4 Media Validation Result on Phase 1 and 2**

Validator	Phase			
	1		2	
	Recommendation	Revision	Recommendation	Revision
	Add a variety of pictures/documentation of local plants	a variety of pictures/documentation of local plants has been added	The textbook are ready to be tried out	Revision no longer needed
	Adjust the fonts of the letters	the fonts of the letters has been adjusted into <i>Time New Roman</i>		
<b>Score Percentage</b>	<b>87,62%</b>			
<b>Criteria</b>	<b>Valid</b>			

**Table 5 The results of the validation of Islamic integration in Phase 1 and 2**

Validator	Phase	
	Recommendation	Revision
	Adjust verses and hadiths with the discussion	Verses and hadiths has been adjusted with discussion
	Add hadith	Hadith has been added
	Use the interpretation of the book of Ibn Kathir	Changing the interpretation of Jalalail to the interpretation of the book of Ibn Kathir
	Textbooks has been ready to be tried-out	-
<b>Score Percentage</b>	<b>98,14%</b>	
<b>Criteria</b>	<b>Excellent/Highly Valid</b>	

The developed textbooks are declared valid by material expert validators with a validity value of 96.32% in the very good/valid category because they contain material that is in accordance with learning outcomes. Textbooks were declared valid by media/design experts and obtained a validity value of 87.62% in the good/valid category because the textbook contained media aspects including clarity of instructions for using textbooks, text/letter legibility, image display quality, use of attractive images, and selection. the right color. Textbooks are considered valid/good by Islamic integration experts with a validity value of 98.14% in the good/valid category because textbooks contain the correspondence of the relationship between Al-Qur'an and Hadith verses with high plant botanical material. So that the developed textbook is declared valid based on the validation provided by the validator.

During the learning activities, the observer observed the implementation/application of learning using textbooks. Implementation of learning implementation data uses direct observation as is done by (Sudarmana *et al.*, 2017) and to see the implementation of learning services using field observation (Chien, 2017). There were 3 observers in this study, each observer observed the

applicability of the implementation of student learning who was in the experimental class during the learning process. Assessments made by observers on the applicability of learning using textbooks can be seen in Table 6.

**Table 6 The applicability of learning uses textbooks**

	Observer		
	1	2	3
	95,56	88,78	83,33
<b>Average</b>	<b>88,89</b>		
<b>Criteria</b>	<b>Highly Successfull</b>		

After studying the material in textbooks, students were asked to answer a questionnaire on student responses to the textbooks developed or referred to as textbook practicality. The product practicality test is needed as one of the requirements for developing quality learning tools (Putra *et al.*, 2021). The practicality of a developed teaching material can be measured by looking at the use of teaching materials by educators and students and the level of involvement (Budiningsih *et al.*, 2015). The developed textbooks are said to be practical, the practicality of textbooks can be seen from the student response questionnaire and

observer responses during field tests (Primiani, 2019). The results of small-scale student responses show an average score of 3.89 or 93% with practical criteria while the large-scale experimental class showed an average score of 4.10 or 98.75% with practical criteria.

The effectiveness of the developed textbooks can be seen from the effect of using textbooks on student learning outcomes and is effective in achieving learning goals (Bahtiar, 2015) and (Mustami *et al.*, 2019). Student learning outcomes data were obtained from cognitive learning outcomes using multiple choice questions and descriptions containing indicators of Islamic integration and medicinal herbs studies in Central Kalimantan, in the cognitive learning outcomes of the experimental class there was an increase in student learning outcomes after using developed textbooks. The learning outcome data shows an increase in the students' pretest and posttest scores shown in Figure 3. Graph of experimental class learning outcomes.

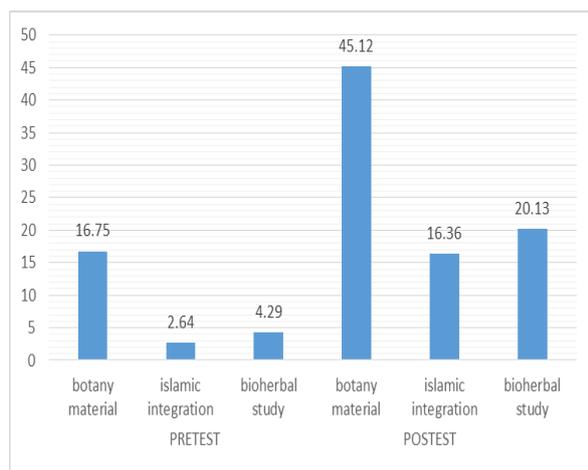


Figure 3 Graph of experimental class learning outcomes

Learning outcome test questions include questions about botanical material, Islamic integration and the study of medicinal herbs (bioherbal) in Central Kalimantan. The average pretest score for the experimental class was 23.68 and the posttest score was 81.61. Obtained an increase in learning outcomes after using textbooks with an experimental class N-Gain value of 0.71. The resulting textbooks have an influence on students, are able to provide benefits and master learning objectives or activities in textbooks (Sadikin *et al.*, 2018) and (Mahon and Manuselis, 2018). Student learning outcomes improved after using Islamic integrated botanical textbooks and studies of Central Kalimantan medicinal herbs. The increase in learning outcomes is shown in the acquisition of the N-Gain value. So, that the

developed textbooks are effectively used in lectures. The difference between the N-Gain of the control class and the experimental class can be seen in Figure 4. N-Gain Graph for control and experimental class.

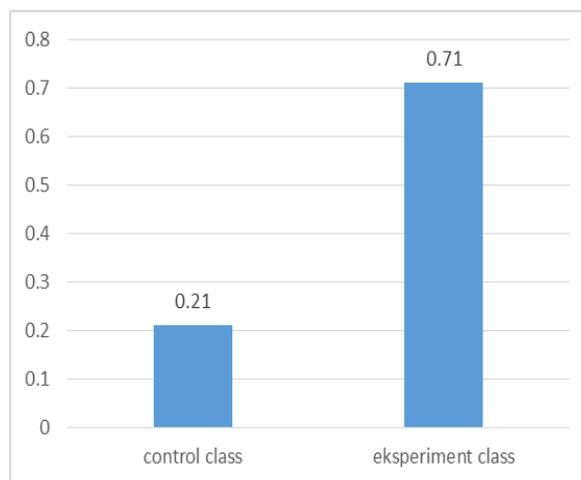


Figure 4 N-Gain Graph for control and experimental class

The difference in the N-Gain value shows that there is a significant increase in learning outcomes in the experimental class using integrated Islamic textbooks and medicinal herbs. N-Gain value of the control class obtained a value of 0.21 which is said to be in the low category. N-Gain in the experimental class obtained a value of 0.71, including in the high category. Thus, it can be concluded that the use of textbooks is effective in improving learning outcomes in botany courses. Meanwhile, without textbooks it is not effective to improve learning outcomes.

## D. Conclusion

Based on the results of the research “the development of an integrative botanical textbook based on Islamic values and medicinal herbs studies of Kalimantan Tengah”, it can be concluded that:

1. Textbooks are declared valid by material expert validators with a validity value of 96.32% in the excellent/highly valid category. The textbooks were declared valid by media/design experts and obtained a validity value of 87.62% in the good/valid category. Textbooks are considered valid by Islamic integration experts with a validity value of 98.14% in the good/valid category. So that the developed textbook is declared valid based on the validation provided by the validator.
2. The applicability of textbooks based on the assessment of the three observers obtained an average of 88.89 with a very successful criterion, namely that it was carried out well because students seemed active in learning.

- Textbooks are stated to be practical based on a student response questionnaire to the implementation of learning with a percentage of the experimental class being 98.75%. This means that textbooks are declared practical based on the positive responses of students in terms of the level of ease of use for students.
- Textbooks are declared effective from the acquisition of learning outcomes after using textbooks. Learning outcome test questions include botanical material, Islamic integration and medicinal herbs studies. There was an increase in learning outcomes after using textbooks, namely the N-Gain value was obtained in the experimental class, namely 0.71 in the high category and in the control class the N-Gain value was 0.21 in the low category. So that the developed textbook is declared effective.

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