

English For Chemistry Book As A Learning Resource In University

Siska Oktapianti

Chemistry Education Program, Universitas Islam Negeri Antasari Banjarmasin,
South Kalimantan, Indonesia

Correspondence author: siskaoktapianti21@gmail.com

DOI: <http://dx.doi.org/10.18592/tarbiyah.v11i1.5885>

Key Words:

chemistry book
learning resource
english

Abstract:

This study is a specified inspection of the development of the chemistry educational sources. The purposes of this study are: (1) to develop a book “English for Chemistry”, (2) to assess the quality of the book based on appraisalment of lecturers and students. The type of the research is R & D. There many stages carried out in this investigation developed by Borg & Gall. The instrument used to assess the quality of this book is a set of quality having some aspects and criteria. The evaluations included 6 aspects with 33 criteria for lecturers and 4 aspects with 25 criteria for students. The evaluation result is in qualitative data and then the result is analyzed by the ideal evaluation criteria category guide to determine the quality of the book. Based on lecturers’ assessments, the book has a good quality, going to the score of 116 out of 165 and ideal percentage 70.3%. Meanwhile, in students’ side, the book is also classified as a good quality, whose score is 103 out of 125 and ideal percentage 82.4%. Development english for chemistry book, helping student understand scientific words of chemistry in english.

Received : 17 September 2021

Accepted : 30 June 2022

Published : 3 July 2022

To cite this article: Oktapianti, S. (2022). English For Chemistry Book As A Learning Resource In University *Tarbiyah: Jurnal Ilmiah Kependidikan*. 11(1), 8-17.

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Introduction

There are several universities, both private and state, that have opened Chemistry Education major, one of which is UIN (State Islamic University) Antasari. In 2016, the Chemistry Education of UIN Antasari is one of the majors recently opened and begin accepting students in 2017. Today, it has been having five batches of students namely in 2017, in 2018, in 2019, in 2020 and in 2021.

English for Chemistry is one of the compulsory subjects taught in Chemistry Education of UIN Antasari. Seeing the wide coverage of the subject matter in English for Chemistry, of course, it takes a long time to learn to achieve complete learning. English is an international language which is considered difficult moreover english for chemistry course having more intricate vocabulary (Sintadewi, 2020).

Understanding foreign language, especially english, is very important in this era of globalization. To improve this language skill, the development of teaching materials must be carried out continuously (Sugiharto, 2018). English is one of the skills that must be possessed by students to get scholarships abroad and compete in the world of work. This skill is still very difficult for students to learn because english is not their mother tongue (Setyowati, 2019).

Apart from being an international language used to communicate among countries, english is also used to deepen and develop knowledge. Many books have been written in this language especially in chemistry. Therefore, students must understand more

vocabulary to understand the meaning of the sentences in the book.

Based on interview with students in chemistry department of UIN Antasari, researcher found that generally students were less motivated in class especially in this theme. They thought that english and chemistry were hard. Therefore, lecturer is expected to maximize studying that motivates them.

According to Rahmawati (2015), the matter deals with comprehending reading text is the lack of knowledge of a substance and not knowing how to link the thought. Therefore, lecturer is required to maximize learning so that it is interesting and in accordance with the concept of integration of islam and science in UIN Antasari that is an islamic campus. To overcome these limitations, the lecturer must be able to compile an effective teaching material for learning.

Teaching material is something that can be used to facilitate educators in the learning process. Textbook is a part of visual teaching materials. The level of student understanding can be strengthened by teaching materials (Astuti, 2018). These results are corroborated by Faizah's (2019) thinking explaining that the thematic module with the integration of islam and science is very good and strengthens students' understanding in the learning process. The same thing is also explained by Prajawinanti (2020) that teaching materials can help students and teachers in the learning process.

Books give a lot information that can be used to support academic activities and improve student achievement (Muklim, 2019). In addition, teaching materials based on the

integration of knowledge are also able to improve critical thinking skills (Suparni, 2018). Carolina (2017) also says that the use of textbooks has a significant effect on students' critical thinking skills. Textbooks make students feel easy in learning. In addition, books containing islamic values can attract students' attention and make it easier to understand the subject matter (Firmansyah, 2019).

The solution to these existing problems is to develop printed teaching

material in the form of book that is integrated with islamic values providing new knowledge for students, and can increase student testing in learning. In addition, the existence of a book that is integrated with Islamic values can increase piety to Allah SWT. Based on these reviews, it is necessary to conduct development research with the title above. Meanwhile, the book development plan form can be seen in the figure 1.

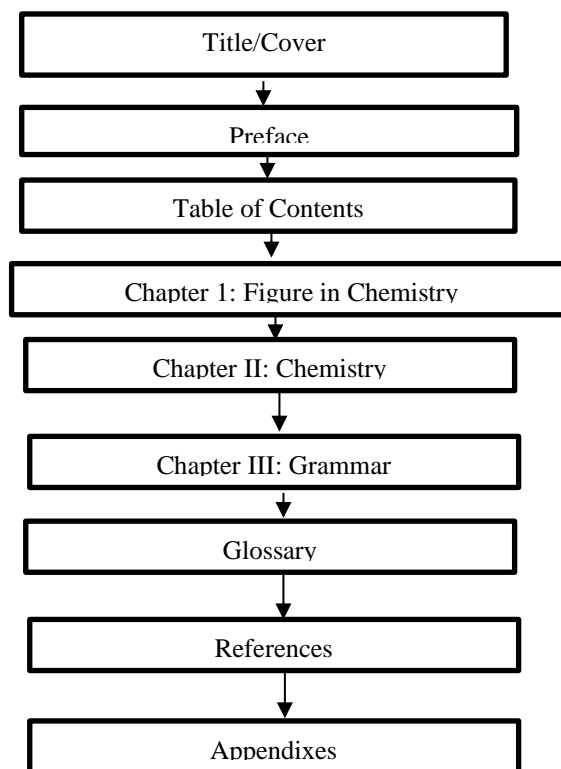


Figure 1. Book Development Plan Form

Research Method

The type of the research is Research & Development (R & D). This is a research method to yield particular output besides to verify its efficacy. This study has many step that we have to follow. The stages are adjusted from Borg & Gall's step with restriction. Borg & Gall explain that it is probable to restrict study on a small scope, holding

restricting the stages because of limited time and funds.

The researcher uses Borg and Gall model because it contains a systematic guide to the steps taken by the researcher so that the product designed has a feasibility standard and the steps can be adapted to the researcher's circumstances, such as limited time and funds.

There are four stages carried out in this investigation namely research and information collecting, planning, developing preliminary form of product, and preliminary field testing.

The subjects of this study are students and lecturers of UIN Antasari. Interview lists, questionnaires and observations are instruments in this

research. This also uses qualitative and quantitative data.

The data analysis technique on the expert validator sheet uses the likert scale interpretation. Quantitative value of ideal criteria for assessment uses the following criteria by Ekawati (2009) in Table 1.

Table 1. Evaluation criteria category

No	Quantitative score ranges	Qualitative category
1	$\bar{X} > (M_i + 1.5 SB_i)$	Very Good
2	$(M_i + 0.5 SB_i) < \bar{X} \leq (M_i + 1.5 SB_i)$	Good
3	$(M_i - 0.5 SB_i) < \bar{X} \leq (M_i + 0.5 SB_i)$	Enough
4	$(M_i - 1.5 SB_i) < \bar{X} \leq (M_i - 0.5 SB_i)$	Poor
5	$\bar{X} \leq (M_i - 1.5 SB_i)$	Very Poor

where:

M_i = Ideal mean score

$M_i = \frac{1}{2} \times (\text{ideal maximum score} + \text{ideal minimum score})$

SB_i = Ideal standard deviation score

$SB_i = (\frac{1}{2} \times \frac{1}{3}) \times (\text{ideal maximum score} - \text{ideal minimum score})$

The ideal maximum score = \sum criteria item \times the highest score

The ideal minimum score = \sum criteria item \times the lowest score

Result and Discussion

1. Research and information collecting

The data aggregation stage is done to specify the learning demand by doing field and literature research. Field research is carried out by elucidating curriculum and deciding existence of learning media in the scope. The investigator gathers supporting document in the form of a syllabus of english for chemistry subject from the of Department of Chemistry Education. Literature research is carried out to know the theories in learning media of chemistry. Journals, books and thesis are used in making this product.

2. Planning

Researcher chooses a topic in this stage namely english for chemistry. This

results that mostly learner are less encouragement in studying. They think that english and chemistry are hard. English book integrated with islam is not used yet. This integration is important because they are students from islamic university. Therefore researcher is interested in producing this book.

3. Developing preliminary form of product

Producing prelusive phase of product contains arrangement of instructional subject and evaluation of plan. It has 3 scopes namely material accumulation, material organizing, and output. After editing, the book is produced. Sample of the book can be seen in the Figure 2.



<div style="background-color: #333; color: white; padding: 5px; display: flex; align-items: center;"> <h2 style="margin: 0;">KATA PENGANTAR</h2> </div> <p style="margin-top: 20px;">Alhamdulillahirobbil'alamin, segala puji dan syukur kepada ALLAH SWT. Berkat rahmat dan hidayah-Nya penulis mampu menyelesaikan buku "Bahasa Inggris untuk Kimia" ini dengan baik. Shalawat dan salam semoga selalu terlimpah curahkan kepada junjungan kita, nabi besar Muhammad SAW. yang telah membawa umatnya dari alam kegelapan menuju alam yang terang benderang dari alam kebodohan kealam yang diberkahi ilmu pengetahuan. Buku ini bertujuan untuk membantu pendidik maupun pelajar untuk memahami bahasa inggris terutama yang bertemakan sains khususnya kimia. Buku ini mengandung 3 bab yaitu: tokoh kimia, materi kimia dan tata bahasa.</p> <p>Terakhir, penulis berharap buku ini bisa dipergunakan sebagaimana mestinya.</p> <p style="text-align: right; margin-right: 50px;">Kampung baru, 20 Agustus 2021</p> <p style="text-align: right; margin-right: 50px;">Penulis</p>	<h3 style="margin-top: 0;">1.1 JABIR IBN HAYYAN</h3>  <p style="text-align: center; margin-top: 10px;">Picture 1. Jabir ibn Hayyan <i>(Source: https://www.britannica.com/biography/Abu-Musa-Jabir-ibn-Hayyan)</i></p>
<div style="background-color: #333; color: white; padding: 5px; display: flex; align-items: center;"> <h2 style="margin: 0;">DAFTAR ISI</h2> </div> <p style="margin-top: 20px;">Halaman Sampul</p> <p>Kata Pengantar iii</p> <p>Daftar Isi V</p> <p>BAB I TOKOH KIMIA 1</p> <p style="padding-left: 20px;">1.1 Jabir ibn Hayyan 1</p> <p style="padding-left: 20px;">1.2 Marie Curie 4</p> <p style="padding-left: 20px;">1.3 Pierre Curie 6</p> <p style="padding-left: 20px;">1.4 Alessandro Volta 8</p> <p style="padding-left: 20px;">1.5 Sir Humphry Davi 10</p> <p style="padding-left: 20px;">1.6 Michael Faraday 12</p>	<h3 style="margin-top: 0;">E</h3>  <p style="text-align: center; margin-top: 10px;">Picture 2. Marie Curie <i>ps://www.biography.com/scientist/marie-curie)</i></p>

Figure 2. Part of Output

4. Preliminary Field Testing

Validation is conducted by material and media experts by giving a questionnaire. Via this step, researcher gets input and advice from them. FGD (Focus Group Discussion) is held before validating. The participants of this FGD are chemistry lecturers and students in

chemistry education department of UIN Antasari. The recommendations are then used for the product. The maximum evaluations include 6 aspects with 33 indications. The quality of the book is explained in the Table 2 and 3.

Table 2. Quality of The Book based on Lecturers' Assessment

No	Aspects	Criteria	Mean Score	Ideal Mean Score	Ideal Percentage	Quality
1	A	4	12	20	60 %	G
2	B	2	9	10	90 %	VG
3	C	2	8	10	80 %	G
4	D	5	17	25	68 %	G
5	E	10	40	50	80 %	G
6	F	10	40	50	80 %	G

Table 3. Quality of the book based on students' assessment

No	Aspects	Criteria	Mean Score	Ideal Mean Score	Ideal Percentage	Quality
1	A	6	21	30	70 %	G
2	E	8	31	40	78 %	G
3	G	5	19	25	76 %	G
4	H	6	23	30	77 %	G

Whereas:

- A = Material coverage
- B = Material accuracy
- C = Depth of concept
- D = Feasibility
- E = Linguistic
- F = Graphics
- G = Comprehensive appearance
- H = Benefits of teaching material
- VG = Very good
- G = Good

Based on lecturers' assessments, the book has already had a good quality, going to the score of 116 from the maximum point 165 and ideal percentage 70.3%. Meanwhile, based on students' assessment, the book also categorized as a good quality book, whose score is 103 from the maximum point 125 and ideal percentage 82.4%

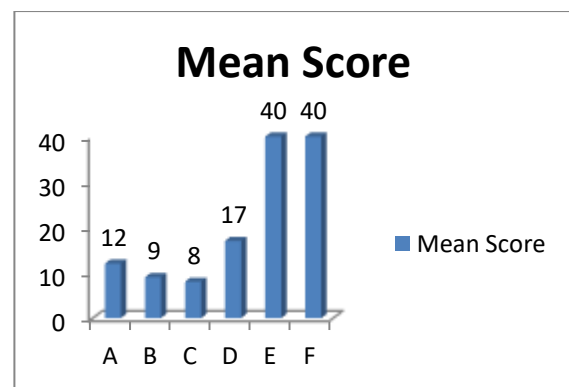


Figure 3. Mean score of The Book for Each Aspect based on Lecturers' Assessment

In figure 3, the maximum mean scores based on lecturers' assessment were linguistic (E) and graphics aspect (F), and the minimum mean score was depth of concept (C).

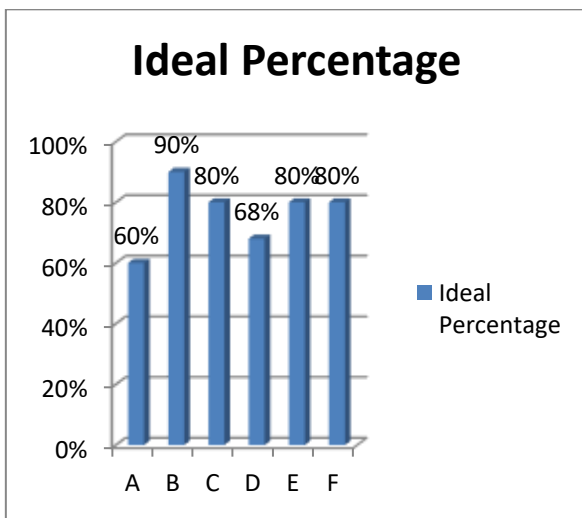


Figure 4. Ideal Percentage of The Book for Each Aspect based on Lecturers' Assessment

In figure 4, the maximum ideal percentage based on lecturers' assessment was material accuracy (B), and the minimum ideal percentage was material coverage (A).

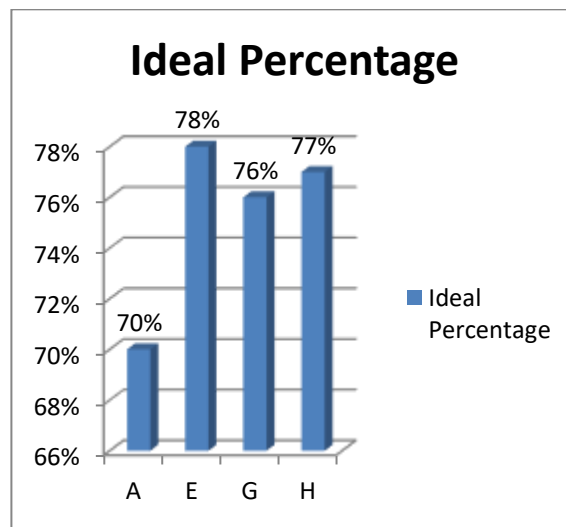


Figure 6. Ideal Percentage of The Book for Each Aspect based on Students' Assessment

In figure 6, the maximum ideal percentage based on students' assessment was linguistic (E) and the minimum ideal percentage was material coverage (A).

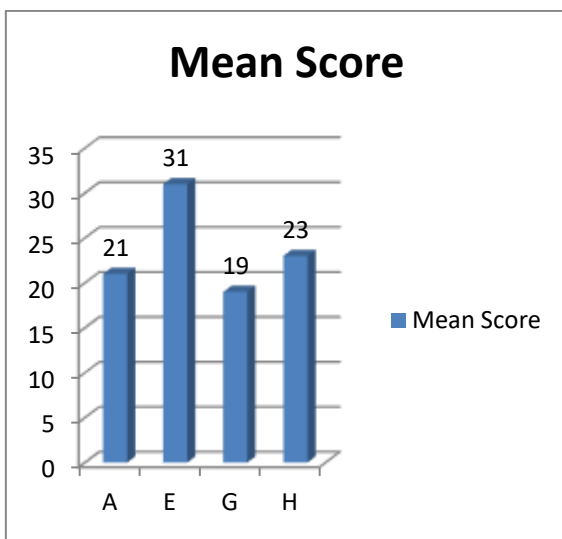


Figure 5. Mean Score of The Book for Each Aspect based on a Students' Assessment

In figure 5, the maximum mean score based on students' assessment was linguistic (E) and the minimum mean score was comprehensive appearance (G).

Based on these figures above, it could be concluded that the highest ideal percentage was material accuracy (B) and the lowest ideal percentage was material coverage (A). Meanwhile, based on students' assessment, the highest ideal percentage was linguistic (E). In the aspect of material accuracy (B) and linguistic (E), the book's quality is very good and good respectively. It means that materials of book has already had: (1) facts about chemistry in accordance with the reality, (2) conformity of the concepts described with the concepts put forward by chemists and english, (3) the language used in the textbook is easy to understand, (4) the language used in the textbook is interesting and does not cause multiple interpretations, (5) the illustrations used make students understand the material, (6) presentation of material encourages students to think critically, (7) the sentences used

represent the content to be delivered, (8) the book made uses good and correct grammar in Indonesian and English, (9) the terms used are in accordance with the KBBI (*kamus besar bahasa Indonesia*) or agreed science, (10) the delivery of messages in the material reflects the coherence and relevance of the content. Meanwhile, the lowest ideal percentage was material coverage (A) because the writer does not have enough capability to link the material with the cognitive, affective, and psychomotor domains demanded by graduate learning achievement.

Based on the data above, the quality of the book is good and can be applied as a supplementary way in studying chemistry and English that can motivate students. It is in line with Arsyad (2014), learning instrument including a book can provide an affective purpose to students. Reading illustrated text can stir emotions and student attitudes. By using a bilingual book, it can improve the English ability of students. The result indicated an improvement on students' vocabulary development with the score of 0.32 (Lestari, 2021).

Another study shows that choosing appropriate media is necessary in class. It can give positive or negative impact in studying (Aghni, 2018). Next, Rahmawati (2015) says that students' appraisal on language side of text books with student motivation for studying has a fair cluster. Therefore the educator has to develop a text book that can be used by students.

In this research, we find evidence that by using a book as a learning resource, it gives a positive effect in student motivation. Module and printed books positively influence students' learning achievement (Ningsih,

2015). This is also in line with Prajawinanti (2020) saying that there are still many learners selecting to use books to promote their studying. In addition to books, students also grab advantage of information sources from journals. Supriyo (2015) from his survey also finds that t count is 10.231 and t table with $n = 24$ is 2.064. Thus it can be inferred that there is an effect of textbook media on learning outcomes.

The first result of this research is making a book. This book contains many sub-materials, i.e. *tokoh kimia, materi kimia and tata bahasa*. To get constructive advice, validation from media and material experts is conducted.

The next result is in the quality of the book based on the appraisal of three lecturers and seventeen students in UIN Antasari. Based on lecturers' assessments, the book has a good quality, going to the score of 116 out of 165 and ideal percentage 70.3%. Meanwhile, in students' side, the book is also classified as a good quality, whose score is 103 out of 125 and ideal percentage 82.4%.

Conclusion

The inferences from this study are that the researcher makes "English for Chemistry book having 4 stages:" (1) research and information collecting, (2) planning, (3) developing preliminary form of product, and (4) preliminary field testing. The grade of this product is good taken from lecturers' and students' side. The book has a good quality, going to the score of 116 out of 165 and ideal percentage 70.3% for lecturers. Meanwhile, in students' side, the book is also classified as a good quality, whose score is 103 out of 125 and ideal percentage 82.4%.

It is recommended that lecturers use learning books that are more applicable and input Islamic values that can help students understand learning material. Moreover, it is necessary to use books associated with real life so that students can give better feedback. To get a more optimal result, it is necessary to carry out further research in next stages such as the main field testing, operational product revision, operational field testing, final product revision, as well as dissemination and implementation.

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