Development of Teaching Materials for Magister Study Program of Science Education Postgraduate in Indonesia

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Abstract. The purpose of this study was to determine the validity of the teaching materials of the Chemistry Science Study (CSS) course using cooperative learning models on "Stereochemistry" matter. The data collection technique used research instruments, namely the validated teaching material validation sheet. Data were analyzed using quantitative methods and their results were expressed in qualitative narrative. Validation analysis toward the research instruments for each teaching material of SLP, SB, SW, QST, and CMT gave total avarages was 3.88; 4.00; 3.94; 3.88; and 4.00 with very valid category. Meanwhile, the validation analysis of the teaching materials each gave an assessment aspect with a total avarage for SLP-01, SLP-02, and SLP-03 which are 3.95; 3.95; and 3.95 with very valid categories. Then, the total average for SB is 3.84; then for SW-01, -02, and -03 are 3.95; 3.70; and 3.70 with very valid categories, respectively. Validation analysis for CMT obtained a total average of 3.88 with very valid criteria. Finally, the results of the feasibility test of SB both in terms of content feasibility and presentation feasibility obtained a total average of 3.77 with a very valid category. Thus, as a whole, the teaching materials of CSS is stated to be very valid and ready to be tested for practicality and effectiveness of the teaching materials in the next learning process.

Keywords: Cooperative Learning Model, Stereochemistry, Teaching Materials

INTRODUCTION

Since 2007 until now (2018) there have been various learning innovation efforts (lectures) in the course of Chemistry Science Study (CSS) with the aim of the learning becomes fun and interesting and certainly can improve student learning outcomes. Learning innovations for CSS courses have been carried out starting from the previous conventional method (lecture), then persentating by group until independently after they have studied the chapter and/or sub-section of the CSS matter. In fact, in the last five years they were also tasked with carrying out the translation of primer books from English to Indonesia language. This way had been done to assist students compile presentation materials to enhance the enrichment of their conceptual abilities. However, the learning outcomes (conceptual understanding) have not been fully achieved for all chapters because they are still under the Minimum Completion Criteria (MCC) of $70 \leq B < 75$ (value B = 3.00) either classically or individually, especially for "Stereochemistry" matter. One possible reason is that there are no teaching materials including Semester Learning Plans (SLP), Student Books (SB), Student Worksheets (SW), Question Specifications Tables (QST), and Concept Mastery Tests (CMT) that help accompany them to learn and facilitate their conceptual understanding. The development of teaching materials for this CSS course using both learning and media-based models and learning approaches/strategies has never been done.

Problem of Research

At present, there are no teaching materials in the course of Chemistry Science Study (CSS) in Magister Study Program of Science Education, Postgraduate in Indonesia, especially for Stereochemistry matter. Of course, this provides a huge challenge and opportunity for learning innovations to be carried out by developing these materials. Based on these descriptions and thoughts, the formulation of the problem in this research are: "What is the validity of the teaching materials of CSS in Stereochemistry that is compiled and developed using a modified 4-D model?.

Research Focus

The development of the teaching materials in this study used a modified 4-D development model by Thiagarajan, Semmel & Semmel. Through the development process, teaching materials of "stereochemistry" and their research instruments have been produced. The results of the valid teaching materials of the CSS course will help students gain learning experience in understanding concepts of stereochemistry. The results of the valid teaching materials of the CSS will help students gain learning experience in understanding concepts especially on Stereochemistry. For these reasons, this research is urgent and important to do immediately.

METHODOLOGY OF RESEARCH

General Background of Research

By referring to the 4-D Model of Thiagarajan *et al*. (Ibrahim, 2002), the development of the CSS teaching materials was carried out by following the stages or phases as follows: 1) Defining phase. This stage consists of five steps, namely curriculum analysis, student analysis, concept analysis, task analysis, and setting learning objectives, 2) Design phase. The purpose of this stage is to design teaching materials based on the results of the analysis at the defining stage including SLP, SB, SW, QST and CMT on Stereochemistry, and 3) Development Phase (Develop). This stage aims to perfect the CSS teaching materials that has been designed (as draft 1).

Instrument and Procedures

Furthermore, this draft 1 is ready to be reviewed and validated by experts (lecturers) followed by revisions in accordance with the suggestions and inputs provided (as draft 2). Validation is carried out by experts, namely lecturers who have a minimum master qualification and head chancellor. Teaching materials stated to be valid are then used in trials with limited students, namely 7 people. Data collection techniques in research using a number of instruments such as teaching material validation sheets including SLP, SB, SW, QST and CMT validation sheets, in addition to research instrument validation sheet.

Data Analysis

Meanwhile, data analysis techniques carried out are processing, analyzing and interpreting the data obtained including: 1) Analysis of research instrument validation results, 2) Analysis of validation results of teaching material validation sheets, and 3) Analysis of the feasibility of SB.

Results of Research

This study aims to determine the validity of teaching materials of CSS on "Stereochemistry" matter developed. The teaching materials that have been developed are reviewed and validated by two validators. The validity of the materials that was wanted to be known included SLP validity, SB validity, SW validity, QST validity, and CMT validity. Besides that, also wanted to find out the feasibility of SB including the feasibility of the content and presentation of SB through limited trials for Postgraduate students, Unesa Surabaya, Indonesia. However, it needs to be reported in advance about the validity of the research instruments used as described in Table 1.

Table 1. Analysis of the Validation Results of Research Instruments

No	Teaching Materials		Score		Score average	Criteria
			V-1	V-2		
1.	SLP	Validation of Content	4.00	4.00	4.00	Very valid
		Validation of Construction	3.75	3.75	3.75	Very valid
2.	SB	Validation of Content	4.00	4.00	4.00	Very valid
		Validation of Construction	4.00	4.00	4.00	Very valid
3.	SW	Validation of Content	4.00	4.00	4.00	Very valid
		Validation of Construction	3.75	4.00	3.88	Very valid
4.	QST		3.75	4.00	3.88	Very valid
5.	CMT		4.00	4.00	4.00	Very valid
	Saran: 1. SLP → Some sentences need to be adjusted to the level of thinking of students and need a little revision to the sentences 2. SB → Already complete for assessment aspects of SB 3. SW → Some sentences in the instrument need to be adjusted to the level of thinking of students 4. QST → Some sentences in the instrument need to be adjusted to the level of thinking of students 5. CMT → Already complete					

Note: V1 = Validator 1; V2 = Validator 2

Furthermore, it is reported on the results of data analysis on the validation of teaching materials including suggestions and input from each of these materials. The results of the data analysis by two validators against SLPs (SLP-01, -02, and -03) can be seen in each of Table 2, Table 3, and Table 4.

Table 2. Data Analysis from Validation Results of SLP-01 (Meeting 1)

No	Assessment Aspects	Score		Score average	Criteria
		V-1	V-2		
1.	Identity	3.91	4.00	3.96	Very Valid
2.	Introduction	3.80	4.00	3.90	Very Valid
3.	Main Activity	4.00	4.00	4.00	Very Valid
4.	Closure	3.86	4.00	3.93	Very Valid
	Total average	3.89	4.00	**3.95**	**Very Valid**

Note: V1 = Validator 1; V2 = Validator 2

Table 3. Data Analysis from Validation Results of SLP-02 (Meeting 2)

No	Assessment Aspects	Score		Score average	Criteria
		V-1	V-2		
1.	Identity	3.91	4.00	3.96	Very Valid
2.	Introduction	3.80	4.00	3.90	Very Valid
3.	Main Activity	4.00	4.00	4.00	Very Valid
4.	Closure	3.86	4.00	3.93	Very Valid
	Total average	3.89	4.00	**3.95**	**Very Valid**

Note: V1 = Validator 1; V2 = Validator 2

Table 4. Data Analysis from Validation Results of SLP-03 (Meeting 3)

No	Assessment Aspects	Score		Score average	Criteria
		V-1	V-2		
1.	Identity	3.91	4.00	3.96	Very Valid
2.	Introduction	3.80	4.00	3.90	Very Valid
3.	Main Activity	4.00	4.00	4.00	Very Valid
4.	Closure	3.86	4.00	3.93	Very Valid
	Total average	3.89	4.00	**3.95**	**Very Valid**

Note: V1 = Validator 1; V2 = Validator 2

As shown in each table 2, 3, and 4, the average total of validation results for all SLPs (SLP-01, -02, and -03) are **3.95** with very valid categories. That is, the developed SLPs is very valid and ready to be used in the learning process with minor revisions. Some suggestions and inputs from the validator used by researchers to revise SLPs can be seen in Table 5.

Table 5. Suggestions and Inputs of SLPs (SLP-01, -02, and -03)

No	Suggestions and Inputs	Revised Results
1.	Phase 1. Cooperative is replaced by motivating students and conveying learning objectives	Already repaired
2.	Apperception activities are carried out afterwards the delivery of learning objectives	Already repaired
3.	The presentation of the results of group discussions is part of checking understanding (evaluation)	Already repaired
4.	There is a writing system that needs to be corrected	Already sought, found and repaired according to the input
5.	There is no information when SB is shared (in the learning syntax)	It has been added together with the SW.

Furthermore, SB CSS which contains a description of the learning material used as a guide or learning resource for learning activities in classroom has 40 aspects of assessment. Data Analysis from Validation Results of SB CSS can be presented in Table 6.

Table 6. Data Analysis from Validation Results of SB CSS

No	Assessment Aspects	Score		Score average	Criteria
		V1	V2		
1.	Material breadth	4.00	4.00	4.00	Very Valid
2.	Material depth	4.00	4.00	4.00	Very Valid
3.	The truth of the concept presented	4.00	4.00	4.00	Very Valid
4.	Ease of understanding concepts	3.00	4.00	3.50	Valid
5.	Conformity to the example questions with the concept	4.00	4.00	4.00	Very Valid
6.	Conformity about understanding concepts with matter	3.00	4.00	3.50	Valid
7.	Conformity with the development of science	4.00	4.00	4.00	Very Valid
8.	Suitability of pictures, diagrams and	3.00	4.00	3.50	Valid

No	Assessment Aspects	Score		Score average	Criteria
		V1	V2		
	illustrations displayed				
9.	Recommended features (concept examples)	4.00	4.00	4.00	Very Valid
10.	Indicators are in accordance with the competencies to be achieved	4.00	4.00	4.00	Very Valid
11.	Encourage analytical thinking skills	4.00	4.00	4.00	Very Valid
12.	Encourage evaluation thinking skills	3.00	4.00	3.50	Valid
13.	Encourage synthesis thinking skills	3.00	4.00	3.50	Valid
14.	Encourage seeking further information/ ability to find solutions to problems	4.00	4.00	4.00	Very Valid
15.	Presenting concrete examples in life	3.00	4.00	3.50	Valid
16.	Conformity with the level of development of students' thinking	4.00	4.00	4.00	Very Valid
17.	Conformity with the level of social-emotional development of students	4.00	4.00	4.00	Very Valid
18.	Understanding of students about the message	4.00	4.00	4.00	Very Valid
19.	Suitability of illustration with substance of message	4.00	4.00	4.00	Very Valid
20.	The ability to motivate students in reading to find / identify concepts	3.00	4.00	3.50	Valid
21.	Encourage students to answer questions / discuss / brainstorm	4.00	4.00	4.00	Very Valid
22.	Conformity of sentence structure	4.00	4.00	4.00	Very Valid
23.	Stiffness of terms	3.00	4.00	3.50	Valid
24.	Effectiveness of sentences	4.00	4.00	4.00	Very Valid
25.	Integrity of meaning in the chapter/section/ paragraph	4.00	4.00	4.00	Very Valid
26.	Linkages between chapters/sections/paragraphs/sentences	4.00	4.00	4.00	Very Valid
27.	Language accuracy	3.00	4.00	3.50	Valid
28.	Spelling accuracy	3.00	4.00	3.50	Valid
29.	Consistency in the use of terms	3.00	4.00	3.50	Valid
30.	Relationship between facts, concepts, principles, theories and among themselves	4.00	4.00	4.00	Very Valid
31.	Balance the substance between the sub chapters in the chapter	4.00	4.00	4.00	Very Valid
32.	The accuracy of the illustration with the subjects	4.00	4.00	4.00	Very Valid
33.	Presentation of text, tables, and pictures accompanied by references/sources	3.00	4.00	3.50	Valid
34.	Identity of tables and pictures	3.00	4.00	3.50	Valid
35.	Summary	4.00	4,00	4.00	Very Valid
36.	References	4.00	4.00	4.00	Very Valid

No	Assessment Aspects	Score		Score average	Criteria
		V1	V2		
37.	Involvement of students in learning	4.00	4.00	4.00	Very Valid
38.	Student-centered	4.00	4.00	4.00	Very Valid
39.	Conformity of the material presented with the characteristics of the subject matter	4.00	4.00	4.00	Very Valid
40.	The ability to stimulate the depth of thinking of students through illustrations and exercises	4.00	4.00	4.00	Very Valid
	Average total	3.68	4.00	**3.84**	Very Valid

Note: V1 = Validator 1; V2 = Validator 2

The average results of data analysis from validation results of SB CSS were 3.84 with very valid categories. This means that the SB CSS which was developed is very valid and ready to be used in the learning process with small revisions. Some suggestions and input from the validator used by researchers to improve SB CSS can be seen in Table 7.

Table 7. Suggestions and Inputs for SB CSS

No	Suggestions and Inputs	Revised Results
1	Some incorrect writing of terms needs to be corrected	Already repaired
2	The name of the compound in English should be replaced with an Indonesian name	It has been replaced according to suggestions and input
3	Some words need to be replaced with more precise ones and some sentences need to be reorganized to make them clearer	It has been attempted to be a clearer sentence according to suggestions and input
4	Linkages to daily life need to be added	Indeed, not every concept of "stereochemistry" can be associated with everyday life, except for example chairs, palms, shoes, etc. to describe chirality.
5	References / readings are placed after the Index List	It is already done

The Student Worksheet (SW) is a sheet that contains guidelines for students to conduct programmed and structured learning activities. The SWs developed by the researcher contains the final abilities, indicators, learning objectives, short material (summary), and exercises. Data analysis from validation results of SWs (SW-01, -02, and -03) can be presented in Tables 8, 9 and 10.

Table 8. Data Analysis from Validation Results of SW-01 (Meeting-1)

No	Assessment Aspects	Score		Score average	Criteria
		V-1	V-2		
1.	Didactive Terms	3.75	4.00	3.88	Very valid
2.	Construction Terms	3.80	4.00	3.90	Very valid
3.	Writing	4.00	4.00	4.00	Very valid

4.	Picture	4.00	4.00	4.00	Very valid
	Average total	3.89	4.00	**3.95**	**Very valid**

Note: V1 = Validator 1; V2 = Validator 2

Table 9. Data Analysis from Validation Results of SW-02 (Meeting-2)

No	Assessment Aspects	Score		Score average	Criteria
		V-1	V-2		
1.	Didactive Terms	3.75	4.00	3.88	Very valid
2.	Construction Terms	3.80	4.00	3.90	Very valid
3.	Writing	3.00	4.00	3.50	Valid
4.	Picture	3.00	4.00	3.50	Valid
	Average total	3.39	4.00	**3.70**	Very valid

Note: V1 = Validator 1; V2 = Validator 2

Table 10. Data Analysis from Validation Results of SW-03 (Meeting-3)

No	Assessment Aspects	Score		Score average	Criteria
		V-1	V-2		
1.	Didactive Terms	3.75	4.00	3.88	Very valid
2.	Construction Terms	3.80	4.00	3.90	Very valid
3.	Writing	3.00	4.00	3.50	Valid
4.	Picture	3.00	4.00	3.50	Valid
	Average total	3.39	4.00	**3.70**	Very valid

Note: V1 = Validator 1; V2 = Validator 2

The average total of data analysis from validation results of the respect SWs (SW-01, -02, and -03) are 3.95; 3.70; and 3.70 (> 3.60) with very valid categories. That is, all SWs developed are very valid and ready to be used in the learning process with minor revisions. Some suggestions and revision for the validator that need to be corrected as seen in Table 11.

Table 11. Suggestions and Revision of SWs (SW-01, -02 dan -03)

No	Suggestions	Revised Results
1	The improper writing system is immediately corrected	It has been fixed according to suggestions and input in the SW script
2	The names of compounds that are still in English should be made in Indonesian	It has been repaired and reduced the use of repeated words, without reducing the intent and contents.
3	The connection of matter (subjects) in everyday student life needs to be more explicit	It may need to be developed again

Question Specification Table (QST) is a grid of questions arranged and used to measure students' abilities after they have acquired learning experience. The questions developed refer to the learning indicators that have been compiled in the SLP in terms of the aspects of content and

language and question writing. The number of items is as many as 20 objective questions. Data analysis from validation results of QST and suggestions and revision for the validator that need to be corrected as seen in Table 12 and Table 13, respectively.

Table 12. Data Analysis from Validation Results of QST

No	Form a Question	Validation of Content				Language and Question Writing			
		V1	V2	Average	Category	V1	V2	Average	Category
1	Objective	3.00	3.00	3.00	Valid	4.00	4.00	4.00	Very valid
2	Objective	4.00	3.00	3.50	Valid	4.00	4.00	4.00	Very valid
3	Objective	4.00	3.00	3.50	Valid	3.00	4.00	3.50	Valid
4	Objective	3.00	3.00	3.00	Valid	4.00	4.00	4.00	Very valid
5	Objective	4.00	3.00	3.50	Valid	3.00	4.00	3.50	Valid
6	Objective	4.00	3.00	3.50	Valid	3.00	4.00	3.50	Valid
7	Objective	4.00	3.00	3.50	Valid	4.00	4.00	4.00	Very valid
8	Objective	4.00	3.00	3.50	Valid	4.00	4.00	4.00	Very valid
9	Objective	4.00	3.00	3.50	Valid	4.00	4.00	4.00	Very valid
10	Objective	3.00	3.00	3.00	Valid	4.00	4.00	4.00	Very valid
11	Objective	3.00	3.00	3.00	Valid	3.00	4.00	3.50	Valid
12	Objective	4.00	3.00	3.50	Valid	4.00	4.00	4.00	Very valid
13	Objective	3.00	3.00	3.00	Valid	4.00	4.00	4.00	Very valid
14	Objective	4.00	3.00	3.50	Valid	4.00	4.00	4.00	Very valid
15	Objective	4.00	3.00	3.50	Valid	4.00	4.00	4.00	Very valid
16	Objective	4.00	3.00	3.50	Valid	4.00	4.00	4.00	Very valid
17	Objective	4.00	3.00	3.50	Valid	4.00	4.00	4.00	Very valid
18	Objective	3.00	3.00	3.00	Valid	4.00	4.00	4.00	Very valid
19	Objective	3.00	3.00	3.00	Valid	4.00	4.00	4.00	Very valid
20	Objective	4.00	3.00	3.50	Valid	3.00	4.00	3.50	Valid

No	Form a Question	Validation of Content				Language and Question Writing			
		V1	V2	Average	Category	V1	V2	Average	Category
Average		**3.65**	**3.00**	**3.33**	**Valid**	**3.75**	**4.00**	**3.88**	**Very valid**

Note: V1 = Validator 1; V2 = Validator 2

Table 13. Suggestions and Revision of QST

No	Suggestions	Revised Results
1	For MCQs (multiple choice Questions) at the high school level and above are made with 5 options (answer)	Already repaired
2	Option with the phrase "no answer" or the like should be replaced with another statement (avoided)	It has been repaired and developed
3	There are options that need to be fixed	It is already done
4	There are items that need to be reorganized so that they are clearer	It has been found that is meant and corrected.
5	Goals should measure one behavior change	Already adjusted

The feasibility test for SB CSS which includes the feasibility of content and presentation is given to 7 (seven) students of Study Program of Science Education, Postgraduate Unesa Surabaya. Analysis of the results of the feasibility assessment of SB CSS before this teaching materials is implemented in classes is shown in Table 14. A few notes and suggestions from students can be used by researchers to improve SB CSS as can be seen in Table 15.

Table 14. Analysis of the results of the feasibility assessment of SB CSS

No	Assessment Aspects	Score							Score average	Crite-ria
		V-1	V-2	V-3	V-4	V-5	V-6	V-7		
1	Feasibility of content	3.73	3.80	3.67	3.93	3.47	3.80	3.93	3.76	Very Valid
2	Feasibility of presentation	3.86	3.88	3.50	3.50	3.81	3.88	4.00	3.78	Very Valid

Tabel 15. Notes and suggestions for SB CSS

No	Notes and Suggestions
A.	**Feasibility of Content**
1.	In general, the preparation of subject matter “stereochemistry” is very suitable and meets the competence standard (CS) and basic competence (BC) so that the component of the content feasibility has been fulfilled
2.	Preparation of subject matter “stereochemistry” is very suitable and meets the CS and BC so that it can be declared “feasible” in the aspects of conformity with the description of the matter with CS and BC
3.	The aspect of accuracy for the subject matter is very good and appropriate

No	Notes and Suggestions
4.	The subject matter presented in the SB is very up-to-date, but it is necessary to add the other resources so that it can be even better
5.	The description of subject matter is in accordance with the learning outcomes and learning objectives
6.	Subject matter and support are accurate. But the picture is not equipped with sources (references)
7.	Subject matter, examples and supporting pictures are appropriate and actual
8.	Given readings about chiral medicine encouraging readers to find out more information. Add applications in life
9.	The subject matter in the book is complete and good
10.	The pictures had included accurate sources, but there are some blurry pictures, so it needs repairs. The reference used is accurate and good
11.	There are a number of writings that are blocked, should (if necessary) be used bold just the word that is stressed
12.	In general, the accuracy of the subject matter “Stereochemistry” has met the criteria
13.	In general, the state of the art of the subject matter is good, but needs to be supplemented by a more recent reference book, and needs to be presented with more actual and contextual examples and cases in accordance with everyday life
14.	The presentation of exercises has been very good
B.	**Feasibility of Presentation**
1.	The technique of presenting concepts and systematics has been very good
2.	Presenting support in SB are very good and appropriate
3.	Students are actively involved in problem solving (SWs)
4.	Chapters, sub-chapters and paragraphs have a good relationship and regularity as well as presentation does not change meaning
5.	The presentation of each sub-section has been consistent and the concept has been arranged coherently. It would be better if the title of each sub-section was raised again so that the differences were more visible with the topics in the sub-section
6.	Motivation already exists but less arousing interest in learning. There are examples of questions but not placed in each sub-section, keywords are only bold
7.	The list of pictures looks less neat and some pictures are not given informations. Also, there is no any picture source
8.	Further information should be given a box so that the difference can be seen with the topics. Writing a chapter should be enlarged, for example, a reading list
9.	Students are involved with the existence of SWs
10.	Between chapters are linked to each other

DISCUSSION

The discussion here certainly is more focused in accordance with the purpose of the research, namely to determine the validity of teaching materials of CSS in "Stereochemistry". The validity of the materials compiled and developed using the 4-D Model which is viewed from the content and

construction validities in the form of appraisal data from experts and the results of feasibility tests of SB by students has been declared to be very valid, can be explained as follows.

Before all these materials were implemented in limited trials, the materials developed need to be validated first by experts. The materilas validated included SLP, SB, SW, QST, and CMT as well as other research instruments that accompany them. The validation of materials is carried out by experts who are competent in the subject matter of stereochemistry and the field of education. This is done so that the materials developed are feasible and can be used in the learning process. Before the materials are validated, the validation instruments of each must be validated first. As a result, all validation instruments as mentioned above are stated to be very valid.

SLP is a component of teaching materials which essentially contains final abilities, indicators, subject matter, approaches/methods/models/learning strategies, time allocation, and strategies/forms/instruments/assessment criteria. SLP is an outline of the teaching materials that will be delivered by lecturers in learning activities. The SLP (SLP-01, -02, and -03) compiled fulfills the elements/components of content validation (such as: clarity of aspects assessed on identity, indicators, suitability of subject matter, suitability of learning models, suitability of learning methods, suitability of learning syntax , introduction, core activities, and closure) and construction validation (such as: clarity of instructions for filling the instrument, clarity of standard language usage, sentence/language used in accordance with the level of thinking ability of students, and clarity of assessment in terms of several aspects) and declared **very valid** with each getting the same total average score of **3.95**. That is, the developed SLP is very valid category with a small revision. The small revisions that have been made regarding a number of sentences need to be adjusted to the level of thinking of the student and need a little revision to sentence structure.

According to Permenristekdikti No. 44 year 2015 states that semester learning plans (SLP) or other terms at least contain: 1) name of study program, name and course code, semester, credits, name of lecturer, 2) learning outcomes of graduates charged to courses, 3) final abilities planned at each stage of learning to meet the learning outcomes of graduates, 4) study materials related to abilities to be achieved, 5) learning methods, 6) time provided to achieve capabilities at each stage of learning, 7) student learning experiences that are manifested in the description of tasks that must be done by students for one semester, 8) criteria, indicators, and assessment weights; and 7) reference list used. This SLP CSS has been prepared at least following the Regulation of the Minister of Research, Technology and Higher Education above. With SLP, it is ready to be used as a reference to compile SB, SW, QST, and other CMT.

One component of the next teaching materials is the availability of student books (SB) for CSS courses. In CSS learning, SB has been developed based on Semester Learning Plans (SLP). Assessment aspects of SB CSS validated includes breadth of material, depth of material, correctness of concepts presented, ease of understanding concepts, suitability of examples of problems with concepts, suitability of understanding concepts with material, conformity with developments in science, suitability of images, diagrams and illustrations shown, the renewal of features (examples of concepts), indicators in accordance with the competencies to be achieved, encouraging the ability to think analysis, encouraging the ability to think evaluation, encouraging the ability to think synthesis, encouraging further information/ability to find solutions to problems, presenting examples concrete in life, conformity with the level of development of learners' thinking, conformity with the level of social-emotional development of students, understanding of students to messages, suitability of illustrations with the substance of the message, motivating ability of students in reading to find/identify concepts, encourage participants a student for questioning/discussion/brainstorming, conformity of sentence structure, standardity of terms, effectiveness of sentences, integrity of meaning in chapters/sub-sections/paragraphs, linkages between chapters/sub-sections/paragraphs/sentences, language accuracy, spelling accuracy,

consistent use of terms, relationships between facts, concepts, between principles, and between theories, the balance of substance between the sub-chapters in the chapter, the accuracy of the illustrations with the material, the presentation of text, tables, images accompanied by references/reference sources, table and picture identities, summaries, bibliography, participant involvement students in learning, centered on students, suitability of presentation materials with the characteristics of the subject matter, and ability to stimulate the depth of thinking of students through illustrations and exercises.

The SB CSS which contains a description of Stereochemistry has been compiled to be used as a guide or source of learning in the learning activities of Magister students of Science Education, Postgraduate, Unesa Surabaya. Analysis of the results of the validation on SB CSS (done by two validators) which can be more or less simplified becomes the feasibility of the content, language components, and the overall presentation component has been expressed as a mean of 3.84. That is, the SB developed has very valid category and can be used in learning with small revisions. Small revisions that have been done include: 1) the need to revise the writing of inaccurate terms, 2) change the name of the compound in English into the name of the Indonesian language, 3) replace a few sentences to make it clearer, 4) suggestions related to the relation of material to daily life days need to be added, the response is not every concept of "stereochemistry" can be associated with everyday life, except for a few examples of chairs, palms, shoes, etc. that we can present to illustrate chirality, and 5) references/reading is placed after Index List. Validation results have been declared appropriate as a student book and are suitable for use in CSS learning.

Learning and student books (SB) are two things that are complementary and cannot be separated as a teaching material. Learning will take place effectively if it is equipped with student books (Rachmawati, 2004). SB are one of the supporting factors in achieving learning objectives. SB are standard books that can be a reference for teachers (lecturers) and students to study a material (Hanifah, 2014). According to Bacon (Tarigan *et al*., 1986), SBs are books designed for use in the classroom carefully arranged and prepared by experts in a particular field and equipped with relevant and harmonious learning facilities. Greene and Petty (Tarigan *et al*., 1986) formulate the SB function as follows: 1) reflecting a strong and modern perspective on learning and demonstrating its application in the learning material presented, 2) presenting a main source of problems, easy to read and varied, according to the interests and needs of students, 3) adjusting a well-organized and gradual source of expressional skills that carry the main problem in communication, 4) presenting methods and learning media to motivate students, 5) presenting the initial fixation (deep feeling) that is necessary and also as a support for practical exercises and tasks, 6) presenting appropriate evaluation and remedial materials. Therefore, SB CSS had been prepared to fulfill the elements, rules and functions as mentioned by Bacon and Greene and Petty above.

Student Worksheet (SW) is sheets containing assignments or learning activities that must be done by students. The SW contains guidelines or instructions for students to conduct structured and programmed learning activities under the coordination and guided by lecturers. SWs (SW-01, -02, and -03) for the subject matter "Stereochemistry" developed by the researcher contains brief instructions, final abilities, indicators, learning objectives, summaries and exercises. The assessment aspects validated on SWs (SW-01, -02, and -03) include: 1) write down the identity of the SWs, 2) the clarity of the SW instructions, 3) fulfill the didactic requirements, such as the material referring to the curriculum (SLP), covering some main concepts, activities that support the understanding of concepts, and activities related to the real life of students and fulfill construction conditions, such as having clear learning goals, using simple, clear, and easily understood sentences, having clear instructions for students on the topics discussed, encouraging students to have learning experiences that include: developing thinking skills and reasoning in answering questions and discussions and develop the ability to make conclusions, 4) from the side of the writing (already) using the

appropriate sentence, and from the side of the picture, graph, table, diagram, and formula (if any) (already) presented clearly, interestingly, and can convey the message actively. The average total score of the analysis of the validation results for all SWs is 3.95 with a very valid category. That is, all SW developed are very valid (very good) to be used in CSS learning on Stereochemistry with small revisions. Small revisions that exist and have been carried out include: 1) improper writing system are immediately corrected, names of compounds that are still in foreign language should be made in Indonesian, and material links in everyday student life need to be more explicit.

The next component of the teaching materials is the Question Specification Table (QST). QST is a grid of questions arranged and used to measure students' abilities after they have acquired learning experience. The questions developed refer to the learning indicators that have been compiled in the SLP which are reviewed from the aspect of content and language and the writing of questions and successfully compiled as many as 20 objective questions. Analysis of the results of validation for QST is known to have 5 items that are declared valid and the rest are very valid with an average total score of 3.88 with a very valid category. That is, the QST developed is very valid to be used as a supporting component and accompaniment of CSS learning in Stereochemistry with small revisions.

Small revisions that exist and have been conducted include: 1) for multiple choice questions (MCQ) at the high school level and above (college) made with 5 options (answers) (not 4 options), 2) options with the phrase "no answer" or the like it should be replaced with another statement (avoided), 3) there are options that need to be corrected, 4) there are items that need to be reorganized so that they are clearer, and 5) objectives should measure one behavior change. From this QST, the valid and very valid items can be used as a basis and reference in compiling the concept mastery test.

The last development of teaching materials is the concept mastery test (CMT). CMT is developed based on the goals to be achieved. This is in accordance with the meaning of CMT, namely data collection activities to measure the extent to which indicators and learning objectives have been achieved, where in the preparation of evaluations refers to the objectives formulated (Arikunto, 2009). CMT can also be interpreted as an effort that must be done by students in recording and transferring back some information from a particular subject matter (for example Stereochemistry) that can be used in solving problems, analyzing, interpreting certain events (Silaban, 2014).

CONCLUSION

Based on the results of the research and discussion, it can be concluded that the teaching materials of Chemistry Science Study including SLP, SB, SW, QST and CMT and accompanying research instruments that have been declared are very valid and ready to be used in the next learning process to determine the practicality and effectiveness of these materials. Suggestions that can be put forward based on the research that has been carried out are the need to improve the materials specifically in compiling and selecting the options of each MCQ before being tested for effectiveness in the learning process, even though it has been declared very valid by validator.

ACKNOWLEDGEMENTS

This work was partially supported by our institution through State University Operational Assistance funds, for financial support to our project in the POLICY RESEARCH Schema-2018 (Grant Number: 963/UN38/HK/LT/2018, July 13, 2018).

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