Development of learning instruments based on the strengthening of vocational life skills

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Abstract. This study aims to (1) develop a garment production textbook that is suitable according to the IQF based on vocational life skills, and (2) produce a textbook for the Garment Production course that meets the feasibility criteria in the content, presentation, language, and graphics elements and is ready to attain ISBN. This study is a research and development referring to the 4-D (four-D) model, namely the stages of defining, designing, developing, and distributing (disseminating). Observations and an in-depth study were conducted to obtain data on the needs for a Garment Production course textbook, while questionnaires were used to determine the appropriateness of material content, presentation, language, graphics, and student responses. The data analysis technique used was descriptive analysis in percentages. The findings of the study include a textbook on Garment Production for the Garment Production course consisting of two chapters and 12 learning activities developed through a four-D model (4-D) procedure. The content of the material, the presentation, language, and graphics of the textbook are found to be very feasible by three experts in their respective field. Therefore, the textbook on Garment Production that has been successfully developed is very feasible to use in learning the Garment Production course according to Level 6 of the IQF and the National Competency Standards in the Garment field as it applies vocational life skills.

1. Introduction
The Garment Production course in the Fashion Engineering Education Study Program aims to produce teaching staff for vocational high school as well as competitive, skilled human resources according to the demands of the working world and the industry. According to the Ministry of Industry, the industry sector requires 600,000 workers each year. As the target of national industry growth is about 5-6\%, there is a demand to ensure that competencies of those workers. This is in line with the government’s demands on the competencies that graduates of the Bachelor’s level must possess, as stated in the Indonesian Qualifications Framework (IQF), i.e. (1) being able to apply their expertise and use science and technology in solving problems, as well as adaptable in any situations in their respective field, (2) having an in-depth mastery of the general and specific theoretical concepts of a particular field of science, as well as being able to formulate procedural problem solving, (3) being able to make accurate decisions based on information and data analysis, as well as providing directions in selecting various alternatives to the solution whether independently or in a group, (4) being responsible for their own work and accountable for the achievement of the organization’s work results. On the other hand, according to the hierarchy of job functions in the National Competency Standards in the Garment field, the map of competencies involves (1) developing the product, (2) managing material provision, (3) managing the production’s operation, (4) managing marketing, (5) maintaining work safety and environment, (6) running the functions of company management [1].
One of the obstacles in the Garment Production course is related to the fact that 60% of Fashion Engineering Education Study Program students come from the Social Sciences background in high school. This means that they have never done a direct observation on the work procedure in the garment industry and have no understanding on the production process nor the quality standards for marketable products in the garment industry. In summary, they have no vocational life skills required in the society, especially for the garment industry. The learning materials taught in the face-to-face meetings and references from various sources are evidently insufficient to help students understand the materials comprehensively. It was found that 60% of students are not competent in developing markers, 30% are incompetent in using industrial scissors, 20% are having troubles in numbering and bundling, 30% are struggling in assembling, while 10% are not competent in packing.

Due to this lack of competence among students, there is a need to develop a textbook for a reference in delivering the tasks in the garment industry. The textbook development is meant to describe the vocational competences in the garment industry in a comprehensive and integrated manner. It is expected that the book be used as the main reference for independent learning, while other sources may serve as additional learning enrichment.

1.1. The Essence of Vocational Life Skills

One of the efforts in realizing meaningful learning for both lecturers and students is by adjusting learning to address the working world, or in other words learning by focusing on the strengthening of vocational life skills. The notion of life skills can be grouped into two main domains, namely generic life skills (GLS) and specific life skills (SLS). Each domain is further divided into sub-skills. Generic life skills consist of personal skills, such as self-awareness and thinking skills, and social skills, such as communication and collaboration skills [3][4]. On the other hand, specific life skills refer to the abilities to deal with a particular job or condition. It includes academic or intellectual skills, which are related to occupations requiring thinking or intellectual work, and vocational skills, which deal with jobs with more motor skills. The term is usually related to a certain job in society or the student’s surrounding. This type of skill is suitable for students who intend to work by relying on their psychomotor abilities as opposed to scientific thinking.

Vocational skills can be further grouped into basic and occupational skills. The first one relates to how students use basic equipment such as a sewing machine, while the latter is needed by those who commit to their choice of work in a particular field. In the context of the garment industry, this type of skills include cutting, sewing, packing, etc. The concept of life skills is incorporated in the Law of National Education System No. 20 Year 2003 and Government Regulation No. 19 Year 2005.

1.2. Garment Production Orientation according to the IQF based on the Strengthening of Vocational Life Skills

Competence is defined as the ability needed to conduct a job that is founded on knowledge, skills, and work attitude [5]. In other words, competence can be described as one’s observed ability which includes knowledge, skills, and work attitude in completing a task or a job according to the established standards of work performance. The Garment Production course aims to produce graduates who can work as vocational high school teachers or industrial workers. As a future teacher at vocational high school, one must master the competence in teaching students the subject of Industrial Clothing Production. Similarly, to work in the garment industry, prospective workers must possess the competence required by the industry, which refers to Article 11 [6] in which the Map of Competencies in a hierarchy of job functions is presented.

1.3. Textbook

One of the learning instruments that support the achievement of student competencies, especially those which address the IQF and the National Competency Standards in the garment industry [1] is textbook on the learning materials which address said demands. With a textbook, students will have a direction on what competencies they must possess and develop. A textbook is a teaching material in the form of a book[7] and consists of the learning material and knowledge that are derived from the basic competencies in the curriculum to be used by students for learning. Before
it can be used in learning, a textbook must undergo a series of validation. According to the National Professional Certification Agency, the feasibility aspects of a textbook include the aspects of content, language, presentation, and graphics. In regard to the content feasibility standards, a good textbook must contain materials which support the achievement of the graduate competency standards and the basic competencies of the course. The feasibility of the textbook content can be assessed from the comprehensiveness of the material, the scope, as well as the depth of the material. The comprehensiveness of the material implies that it contains material which helps the achievement of the comprehensive minimum basic competencies, while the depth refers to how the material is structured in the achievement of basic competencies in accordance to the outcomes in the higher education curriculum. Finally, the scope refers to how the material in the textbook reflect the description which aims to achieve all basic competencies. The next aspect assessed to ensure the textbook feasibility is the language. Based on the language feasibility standards, all language uses in the textbook must not only follow the rules of the Indonesian language and the correct and clear uses of terms, as well as the perfected spelling form, but also be communicative, structured, and have a unity of ideas. Finally, the graphics feasibility refers to the size, format, cover design, content design, paper quality, printing quality, and the binding quality of the textbook. The font size must be adjusted to the content so that there is a balanced composition between the images and the texts. The presentation of the layout, shape, and color must be designed as well as possible so that students feel excited to study using the textbook.

2. Research Method

2.1. Research Type
This study is a research and development referring to the 4-D (four-D) model proposed by Thiagarajan (1974). The 4-D stands for the four stages of define, design, develop, and disseminate. This research was conducted up to the develop stage. Nevertheless, this study has addressed the principles of an R&D research as the essence of this type of research is the validation and revisions on the product, in this case the learning instrument developed [8]. The outline of the development stages and process of this study can be seen in Figure 1.
The research subjects were three lecturers who were experts in the garment production material, media, and language, respectively, who were asked to validate the textbook. The data collection techniques were observations and in-depth study to obtain the data on the needs of Garment Production course textbook. A survey was also conducted to obtain the feasibility data of the textbook with 4-point assessment criteria. A score of 1 means that the textbook is not Suitable with the item description criteria; a score of 2 means that it is Less Suitable with the item description criteria; a score of 3 means that it is Suitable with item description criteria; and a score of 4 means that it is Very Suitable with item description criteria.
Table 1. Sub-components of the Textbook Feasibility Instruments [7]

| Sub-components of the Material Content Feasibility Instrument | Sub-components of the Language Feasibility Instrument |
|---------------------------------------------------------------|------------------------------------------------------|
| No. Sub-components                                           | No. Sub-components                                   |
| A. Coverage (Conformity with course learning outcomes)       | A. Conformity with Student Development                |
| B. Accuracy                                                  | B. Communicative                                    |
| C. Novelty                                                   | C. Dialogic and Interactive                          |
| D. Stimulating Curiosity                                     | D. Clear                                             |
| E. Developing Life Skills                                    | E. Conformity with the principles of the Indonesian Language |
|                                                               | F. Consistency in using terms and symbols             |

| Sub-components of the Presentation Feasibility Instrument | Sub-components of the Graphics Feasibility Instrument |
|----------------------------------------------------------|--------------------------------------------------------|
| A. Presentation Technique                               | A. Book size (complies with the ISO standards)          |
| B. Supporting Elements of Content Presentation           | B. Book cover layout                                    |
| C. Learning Presentation                                 | C. Attractive and easy-to-read typeface                 |
|                                                          | D. Communicative and modest typeface                    |
|                                                          | E. Well-designed layout elements                        |
|                                                          | F. Placement and appearance of layout elements           |
|                                                          | G. Layout accelerates comprehension                     |
|                                                          | H. Simple typography                                    |
|                                                          | I. Clear and comprehensible content                     |
|                                                          | J. Content illustration incites attraction              |

The research data analysis technique was the descriptive analysis in percentages based on the expert judgment in a scale of 1 to 4. The data were then converted into descriptive quantitative data using the validity criteria in Table 2, as follows.

Table 2. The textbook quality criteria

| No | Score             | Qualification  | Verdict                                           |
|----|-------------------|----------------|---------------------------------------------------|
| 1. | $80 \leq P < 100$ | Very Valid     | Textbook is feasible for use in the Garment Production learning with minor revision. |
3. Result and Discussion

3.1. Result of the Textbook Development
This study has successfully produced a textbook for the Garment Production course according to the IQF based on vocational life skills. The textbook for the Garment Production course uses Thiagarajan’s 4D development model. The development process is described as follows.

3.1.1. The Define Stage
In this stage, a review was conducted on the Level 6 of the IQF and the National Competency Standards in the Garment field. The review results on the National Competency Standards in the Garment field [4] suggest that graduates of Fashion Engineering Education Study Program who have studied the competencies in the garment industry through the Garment Production course should be able to work in the garment industry with the main functions of (1) designing the product, (2) making product samples, (3) preparing the material, (4) developing markers, (5) cutting the material, (6) managing sewing production, (7) finishing the product, (8) conducting quality control, (9) offering a price, (10) promoting the product, and (11) applying work safety and health procedure. The second review was conducted on the graduate competency standards and the learning outcomes of the Garment Production course. The results showed that based on the existing semester lesson plan, there needed to be a revision in regard to the review results of the Level 6 of IQF and the National Competency Standards in the Garment field. Revisions were done by considering the 11 main functions of workers in the garment industry. The third stage review was done on the learning materials/resources used in the course. The analysis results show that various sources and references were used in the class as explained during the class introduction and class contract sessions. Based on the revised semester lesson plan, as well as the result of the study through interviews with the students, it was determined that the research would focus on strengthening vocational life skills. Vocational life skills are skills related to certain field of occupation. In this context, it was the field of garment. Based on the competency map of the National Competency Standards in the garment field and the semester lesson plan, vocational life skills were incorporated in the Garment Production course learning.

3.1.2. The Design Stage
The textbook developed consisted of two chapters with 12 learning activities and illustrations to help increase the material comprehension. Each learning activity was equipped with exercises or tasks to enrich the experience in garment industry jobs as a part of strengthening vocational life skills. The following are the chapters and content of the finished textbook.

Table 3. Chapters and materials in the textbook

| Instruments Developed | Sub-chapters and materials |
|-----------------------|----------------------------|
| Teaching Material for the Garment Production Course According to the IQF based on Strengthening Vocational | CHAPTER 1 Introduction |
|                       | CHAPTER 2 Learning |
|                       | KB 1 Basic Principles of Garment Production |
The teaching material for the Garment Production course based on Strengthening Vocational Life Skills consists of 12 materials that are adjusted to the National Competency Standards[1]. The 12 materials involve key functions, i.e., (1) developing the product, (2) managing material provision, (3) managing the production’s operation, (4) managing marketing, (5) maintaining work safety and environment, (6) running the functions of company management [1].

3.1.3. The Develop Stage
In this stage, the textbook draft for the Garment Production course was validated by three validators consisting of experts in the material, the development, and learning. Based on their judgment, the material was considered appropriate as it addresses Level 6 of the IQF and the National Competency Standards in the field of Garment, as well as includes the strengthening of vocational life skills as seen in how the material includes elements of real jobs in the garment industry. From the presentation aspect, the suggestion was to complete the glossary as there are terms that have not been incorporated. There was no correction in the language aspect, which means that the language was appropriate, comprehensible, and clearly describing the concepts in the textbook. From the graphics aspect, it was suggested to refine the font size in the cover to be bigger so that it appeared more focused. Suggestions from the experts were then used as the basis to revise and improve the textbook until no further revisions were needed.

3.2. Feasibility of the Garment Production Textbook
The textbook feasibility based on expert judgment can be seen in Table 4 and Table 5. The Garment Production textbook’s feasibility is tested by three experts in four feasibility aspects, namely material, presentation, language, and graphics. Table 4 presents the textbook feasibility from the material and graphics aspects.
Table 4. Frequency distribution of expert judgment on the product feasibility in the material and presentation aspects

| Textbook Feasibility Category | Material Aspect | | | Presentation Aspect | |
|-------------------------------|----------------|---|---|-----------------|---|
|                               | Interval       | Frequency Distribution (N) | Percent age (%) | Interval       | Frequency Distribution (N) | Percent age (%) |
| Very Valid                    | 80 ≤ P < 100   | 3 | 100% | 80 ≤ P < 100   | 3 | 100% |
| Valid                         | 60 ≤ P < 80    | 0 | 0%  | 60 ≤ P < 80    | 0 | 0%  |
| Less Valid                    | 40 ≤ P < 60    | 0 | 0%  | 40 ≤ P < 60    | 0 | 0%  |
| Not Valid                     | 0 ≤ P < 40     | 0 | 0%  | 0 ≤ P < 40     | 0 | 0%  |
| Total                         | 3              | 100 | | 3 | 100 |

The feasibility of the textbook in the material aspect can be categorized as very valid with 3 frequency distribution value and a percentage of 100%. The feasibility of the textbook in the presentation aspect is also found to be very valid with 3 frequency distribution value and a percentage of 100%. This means that the product is deemed feasible both in the material as well as the presentation. The book’s feasibility in the language and graphics aspects can be seen in Table 5.

Table 5. Frequency distribution of expert judgment on the product feasibility in the language and graphics aspects

| Textbook Feasibility Category | Language Aspect | | | Graphics Aspect | |
|-------------------------------|----------------|---|---|-----------------|---|
|                               | Interval       | Frequency Distribution (N) | Percent age (%) | Interval       | Frequency Distribution (N) | Percent age (%) |
| Very Valid                    | 80 ≤ P < 100   | 3 | 100% | 80 ≤ P < 100   | 3 | 100% |
| Valid                         | 60 ≤ P < 80    | 0 | 0%  | 60 ≤ P < 80    | 0 | 0%  |
| Less Valid                    | 40 ≤ P < 60    | 0 | 0%  | 40 ≤ P < 60    | 0 | 0%  |
| Not Valid                     | 0 ≤ P < 40     | 0 | 0%  | 0 ≤ P < 40     | 0 | 0%  |
| Total                         | 3              | 100 | | 3 | 100 |

The feasibility of the textbook in the language aspect can be categorized as very valid with 3 frequency distribution value and a percentage of 100%. The feasibility of the textbook in the graphics aspect is also found to be very valid with 3 frequency distribution value and a percentage of 100%.
3.3. Discussion
The Garment Production textbook has been successfully developed according to Level 6 of the IQF and the National Competency Standards in the Garment field based on vocational life skills. This study employs the first three stages of Thiagarajan’s 4D model consisting of: (1) define, in which preliminary study is done by reviewing Level 6 of the IQF and analyzing the graduate competency standards, the Garment Production course learning outcomes, as well as the learning materials and resources; (2) design, in which the goal is to produce a draft of the textbook; and (3) develop, in which validations or feasibility tests are conducted by three experts on the material, language, and layout design, respectively, on the textbook draft for Garment Production course according to the IQF based on vocational life skills. The feasibility of the textbook includes (1) material content feasibility, (2) presentation feasibility, (3) language feasibility, and (4) graphics feasibility. In all four aspects, all three experts consider the textbook to be very feasible. Therefore, the developed product or textbook is very feasible to be applied in the Garment Production course.

4. Conclusion
The Garment Production textbook for the Garment Production course has been successfully developed and deemed feasible for use in learning. The feasibility of the product is confirmed by (1) the material content feasibility; (2) the presentation feasibility; (3) the language feasibility; and (4) the graphics feasibility. All aspects are deemed very feasible by all experts, with a percentage frequency of 100%. A similar study entitled Pedagogy for a few: Book club discussion guides and the modern book industry as literature teacher [8] discussing textbooks was conducted. This research is supported by the Insitute for Research and Community Service Yogyakarta State University and the Department of Food and Fashion Engineering Yogyakarta State University.

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