Development of Learning Modules for Prevention Sub-Sector for Level 1 Firefighter Education and Training

Triyono M. Eng, Dr. Imam Mahir M. Pd, Fatimah Asiyah

State University of Jakarta
E-mail : fatimahasiyah471@gmail.com, triyono.fttm@yahoo.com, Imam-Mahir@unj.ac.id

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ABSTRACT

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The Fire Fighting and Rescue Education and Training Center is an institution that provides educational programs for firefighters specifically related to fire prevention and rescue. To achieve the right standard of competence in accordance with the qualifications and classification of level 1 firefighters which have been regulated in the Regulation of the Minister of Reform and Bureaucracy of the Republic of Indonesia No. 16 of 2019. According to the Regulation of the Minister of Home Affairs No. 86 of 2022 the implementation of the decree has 3 stages, namely planning, implementation and monitoring or evaluation. At the planning stage, the main components that influence the continuity of the implementation of education and training are full support for training management tools which include education and training organizers, curriculum, syllabus, modules, materials, instructors and facilities which include training facilities and infrastructure. Therefore, a device for organizing education and training was created at the planning stage which included curriculum, syllabus, modules and training teaching materials that would be delivered in the implementation of education and training. The modules and materials incorporated in the tools for administering the training determine the success of the teaching and learning process and the realization of a goal in a training activity. In this study, the researchers formulated the problem of developing learning tools in the form of syllabus, lesson plans and prevention sub-sector modules for firefighter training level 1 whose competency standards refer to the Regulation of the Minister of Administrative Reform and Bureaucratic Reform of the Republic of Indonesia No. 16 of 2019 concerning Functional Positions of Firefighters. This research was conducted using the Research and Development (R&D) research method and the ADDIE development model. The results of this study obtained development products, namely syllabus, lesson plans and modules that had been declared feasible through validation from experts and the media as well as having passed the one-to-one trial phase and small group training participants.
Keywords: Fire Fighting, Education and Training, Development, ADDIE, Module.

INTRODUCTION

Introduction

According to the results of observations made by researchers with education and training objects for fire prevention and firefighter rescue level 1 which were carried out for 4 months, problems were found related to the absence of updates to the format and components of learning tools which included GBPP and SAP into syllabus and learning implementation plans (RPP) which referred to the 1994 curriculum with KTSP in education as well as modules that were not well structured, the contents of the module were in the form of power point slides which were recorded and had not developed material for modules which referred to several regulations namely; Regulation of the Minister of Home Affairs No. 16 of 2009 concerning Qualification Standards for Firefighters in the Regions and Regulation of the Minister of Administrative Reform and Bureaucratic Reform of the Republic of Indonesia Number 16 of 2019 concerning Functional Positions of Firefighters.

Even though there were no significant obstacles in the implementation process, it is hoped that the education and training for fire prevention and rescue in Ciracas will be able to prepare a design that supports the teaching and learning process, especially for level 1 firefighter education and training, namely by updating the Syllabus and Learning Implementation Plan (RPP) as well as modules that keep up with the times and are structured so that it is easy for participants in firefighter education and training 1 to understand.

This research was carried out with reference to previous research entitled "Pembuatan Modul Pencegahan Kebakaran Untuk Satuan Pengendalian Kebakaran di Universitas Negeri Jakarta" made by Ria Angesti in 2022. This research uses the R&D development method and uses Sadiman's development model which consists of 8 stages, namely identification of needs, formulation of objectives, material development, development of evaluation tools, production, validation, revision and ready-to-use media. The products produced in this study have passed the validation stage by experts so that it is said that the module can be used. The strength of this research is the creation

of a new learning module for the development of human resources in charge of inspecting tall buildings in the Jakarta State University area in fire prevention. Meanwhile, the disadvantage of this research is that this module has not been declared feasible because it has not passed the trial to the participants or product targets because at the time of this research it was in a covid pandemic situation, making it an obstacle in completing the feasibility test by going through the trial stage to the product target.

In this case, the researcher decided to develop modules with a focus on the prevention sub-sector for level 1 firefighter education and training which included material on Minimum Service Standards (SPM), Building Fire Protection, Building Fire Safety Management (MKKG) and Consignus Keeps. The results of this study are in the form of a book that contains a collection of education and training materials for firefighters level 1 in the prevention sub-sector so that in training activities this development module can be used easily and precisely regarding the target audience, most of whom are the elderly who experience difficulties in using technology.

MATERIALS AND METHODS

Methods

Material design, literature review collection and learning device design in this study were carried out from November 2022 to March 2023. The location of this research was carried out at the DKI Jakarta Province Fire and Rescue Education and Training Center which is located at Jl. Raya Ciracas 113, Ciracas District, East Jakarta

Flowchart

In the research flow, it is presented in the form of a research diagram that explains the steps to be taken in the research. In this study the flow used is shown in Figure 1:

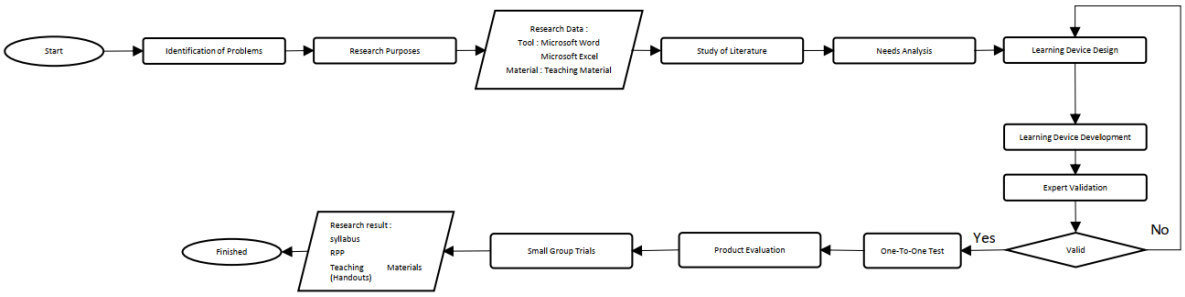

Figure 1 Flow Chart

The development of this learning media uses the ADDIE development method, namely: 1) Analysis, 2) Design, 3) Development, 4) Implementation and 5) Evaluation. The following below is a description of the steps taken by researchers according to the ADDIE development model:

Analysis Phase (Analyze)

At this stage of the analysis, the researcher conducted observations and interviews at level 1 firefighter training activities. Observations were carried out with 6 participants present. Based on the results of interviews with the head of development and the head of the education and training implementing unit regarding the needs of the participants, the constraints were obtained from a set of learning media whose composition and material had not been updated. As for the obstacles experienced when teaching training participants, training participants are often not focused and do not pay attention to what the instructor conveys when the material giving activity is in progress. The modules that are handled and distributed to the training participants are also in the form of a collection of material that is printed and made into a book, so the lack of editorial in the form of an explanation of the material to be delivered causes the module to have deficiencies and cannot be studied independently by the training participants. Based on this analysis, the researcher intends to develop learning media in the form of modules for level 1 firefighter education and training activities at the fire prevention and rescue education and training center for DKI Jakarta province.

Design Stage (Design)

At this stage, the researcher designs the design concept of learning media devices starting from the syllabus, lesson plans and modules as a whole by making syllabus and lesson plans identity frameworks, preparing material, making material summaries per unit of material, making practice questions and answer keys, selecting designs starting from the background, images, tables and charts that are adjusted in each material. There are 4 units of material that will be contained in this module, namely Minimum Service Standards (SPM), Fire Protection in Buildings, Building Fire Safety Management (MKKG) and Consignus Watch which are combined in one module with the theme of the fire prevention sub-sector.

Development Stage (Development)

At this development stage, the researcher carried out design specifications that had been designed in the previous stage and realized into a product in the form of a learning media device. In this stage a set of learning media products is obtained which includes syllabus, lesson plans and modules.

Production process

This process is divided into 3 parts, namely the pre-manufacturing process, the manufacturing process and the post-manufacturing process. The following below is a description of each step of the module production process:

- Process before manufacture

  This process is carried out by preparing all needs starting from tools and supporting materials in the manufacture and development of learning devices. The learning device in question is in the form of a syllabus, lesson plans and modules. Some of the requirements needed in the production process of this learning device are kaptop, Microsoft Word 2016 and the learning device which is the reference for this development.

- Making process

  Make a draft for the learning tools to be developed, namely in the form of a syllabus, lesson plans and sub-sector modules in the prevention of fire fighting education and training level 1. As for the development of the module, the manufacturing process includes making the front and back covers of the module and covers per section of the module. The draft module content includes an introduction, objectives, steps for making the module, material descriptions, practice questions and answer keys, summaries and bibliography for further learning. Below is an example of the cover display per section of the module:

Figure 2 a

- Process after manufactur

  This last production process is a process that is carried out by printing modules and re-checking the condition of the modules, both in terms of paper, writing, images and design appearance.

Expert Validation Process

This stage goes through several procedures, namely validation from experts, both material experts and media experts. Furthermore, there will be revisions from material experts and media experts who are given to refine the modules that have been developed by researchers. So that this session will be maximized in order to get modules that match the criteria and their use. If this module has been declared valid and ready for further trials. The following below are the results of the validation of material experts and media experts:

Table 1

Validation	***Average***	***Category***
Material Expert	3.46	Perfect fit
Media Expert	3.58	Perfect fit
Recapitulation	3.52	Perfect fit

From the results of the validation recapitulation of material experts and media experts above, they obtained an average of 3.52 in the **"Very Appropriate" category** . This validation was carried out in 2 stages and was validated by 2 experts respectively.

Implementation

This stage is carried out when the results and validity have been obtained from material experts and media experts. At this feasibility trial stage, training participants will be involved by going through a questionnaire that must be filled in by the training participants. At this trial stage, the researcher took one to one and small group samples. This trial was carried out in order to obtain the results of the feasibility analysis of the training participants either one to one or small group as the sample.

Table 2 Results of the participant feasibility test (one *to one*)

Trials	***Aspect***			***Average of all aspects***
	Design	**Fill**	**Quality**	
One to One	3.45	3,18	2.75	**3,12**

Based on the table above, the average number of all aspects of the One to One feasibility trial for training participants is obtained, a score of 3.12 is obtained from an ideal score equal to 4. If quantitative data is converted into qualitative data categories, the results of this One to One trial stated that the **Interesting module**.

Table 3 Results of due diligence on participants (*small group*)

Module	***Aspect***			***Average of all aspects***
	Design	**Fill**	**Quality**	
Respondent 1	3.50	3.75	3.00	-
Respondent 2	3.50	3.00	3.00	
Respondent 3	4.00	3.75	3.50	
Respondent 4	3.50	3.75	3,25	
Respondent 5	4.00	4.00	4.00	
Average per aspect	3.70	3.65	3.35	**3.56**

Based on the table above, the average number of all aspects of the Small Group feasibility trial for 5 training participants is obtained, a score of 3.56 is obtained from an ideal score of 4. If quantitative data is converted into qualitative data categories, the results of this Small Group trial states that the module **is Very Interesting** .

From the description above, it can be concluded that the results of the recapitulation of development learning tools in this study as a whole are as follows:

Table 4 Recapitulation of development learning tools

No.	*Product Rating*	*Average*	*Information*
1.	Syllabus	3,23	In accordance
2.	RPP	3,26	In accordance
3.	Module	3,43	In accordance

Evaluation

This evaluation stage is carried out by comparing the results of the assessment in each stage.

Syllabus

The syllabus was declared "Appropriate" because it obtained an average of 3.23 from an ideal score of 4 with a percentage of 80.75% . The syllabus that has been made by the author has passed the validity test stage by experts by going through 2 validation stages.

RPP

At the lesson plan validation stage this was carried out 4 times because the material to be discussed in this development was 4 units of material. The validation was carried out with 2 validators per unit of material and also carried out 2 validation stages. Furthermore, it can be concluded that the results of the RPP validation of these four materials are in the form of the table below:

Table 5 Final Results of RPP Assessment

Material	*Average*	*Category*	*Information*
SPM	3.30	In accordance	No Revision
Fire Protection	3,23	In accordance	No Revision
MKKG	3,31	In accordance	No Revision
Consignus Jaga	3,23	In accordance	No Revision
Overall Average	3,29	In accordance	No Revision

Based on the overall assessment for the validity of the lesson plan, an average score of 3.29 is obtained which is in the range $2.9 < X \leq 3.4$ with a percentage of 82.25% so that it gets the "Appropriate" category.

Module

This module has been declared ready for use because it has passed the validity and feasibility test stage which was carried out directly at the education and training center for firefighters and rescue in the province of DKI Jakarta. The validity test was carried out with 2 groups of experts, namely material experts and media experts. Meanwhile, the feasibility test was carried out directly to level 1 firefighter training participants at the fire and rescue education and training center, Ciracas, East Jakarta. Below is the result of the recapitulation of the validity and feasibility tests conducted by researchers for the modules that have been developed.

- Validity Test

Table 6 Final Results of the Module Validity Test

Assessment Stage	***Average***	***Category***	***Information***
Material Expert	3.46	Perfect fit	No Revision
Media Expert	3.58	Perfect fit	No Revision
Overall average	3.52	Perfect fit	No Revision

Based on the assessment of all experts, an average score of 3.52 is obtained which is in the range $\bar{x} > 3.4$ with a percentage of 88% so that it gets the "Very Appropriate" category.

- Student Eligibility Test

Table 7 Final Student Due Diligence Results

Trials	***Average***	***Category***	***Information***
One to One	3,12	Interesting	No Revision
Small Group	3.56	Very interesting	No Revision
Overall average	3,34	Interesting	No Revision

the one to one and *small group* field trials, an average score of 3.34 is obtained which is in the range $2.9 < X \leq 3.4$ with a percentage of 83.5% so that the module category is "Interesting" as a new learning medium and ready to use.

Discussion

This research produced learning tools in the form of syllabus, lesson plans and modules for level 1 firefighter education and training Center for Fire and Rescue Education and Training Center for DKI Jakarta Province. This research was conducted from November 2022 to March 2023. The subjects in this study were participants in level 1 fire training training in DKI Jakarta Province. The process of making this learning tool follows the ADDIE development model, which means starting with the needs analysis stage, designing the product to be developed, making the product and validating it by experts, then it is tested on level 1 firefighter training participants through *one to one* and *small* trials. *group* while conducting product evaluations.

Syllabus

In this study the syllabus was developed in accordance with syllabus writing conventions which contained information related to syllabus identity, SK, KD, success indicators, materials, methods, media tools/materials, learning activities, time allocation, assessment techniques and learning resources (Niron, Maria Diminika: 2009)

The syllabus for level 1 firefighter training before being developed had 6JP with 3 units of material while the syllabus that had been developed in this study had 9JP with an additional 1 unit of material for a total of 4 existing material units. Additions were made to the guard's consignus material.

RPP

In this study, lesson plans were developed in accordance with the rules for writing lesson plans which contain information related to lesson plans material, KD, indicators of success, learning objectives, subject matter, sub-topics, learning activities (introduction, presentation, closing), assessment techniques and learning resources (Niron, Maria Diminika : 2009). In the development of the RPP it is not too significant because the implementation in the education and training center for firefighters and rescue in the province of DKI Jakarta is quite good. However, due to the addition of material to the guard consignus material unit, the latest RPP was made on related material. The difference also lies in the name of the product, which is applied to the place of research implementing the lesson plan product called learning program unit (SAP). In addition, in the product being implemented there were no learning objectives, assessment techniques and learning resources/references as developed in this study.

Module

The module used during learning at the fire fighting and rescue education and training center for the province of DKI Jakarta until now is a collection of material in PPT which is then printed. Few of the illustrations in the material have editorial or explanatory sentences for the illustrations. In this development, the researcher is developing modules that are in accordance with the writing rules for modules and there is a balance of portions between illustration and editorial in each unit of material in it

Based on the results of the recapitulation of the assessment of learning tools which include syllabus, lesson plans and modules, the following results can be obtained:

1. The syllabus obtained an overall average score of 3.23 and was categorized as "Appropriate". This syllabus specifically discusses the development of a level 1 fire extinguisher module in the prevention sub-sector at the DKI Jakarta province fire and rescue training and education center. The syllabus is validated by the head of on-site development.
2. RPP obtained an overall average score of 3.29 and was categorized as "Appropriate". This RPP is made for several material units in the fire department training module level 1 in the prevention sub-sector, namely SPM material, fire protection, MKKG and guard consignus. Each lesson plan is validated by 2 experts and goes through 2 validation stages.
3. The module obtains an average validity score of 3.52 and is categorized as "Very Appropriate". The validity assessment stage was carried out in 2 stages with experts for material content and experts for product media, namely modules.
4. The feasibility field trial phase module gets an overall average score of 3.34 and is categorized as an "Interesting" module. This trial was conducted for level 1 firefighter education and training participants at the DKI Jakarta Province fire and rescue education and training center and was attended by 6 students who were categorized as one to one trial of 1 person and *small* group *of* 5 people.

The difference between the collection of teaching material modules owned by the DKI Jakarta Province fire management education and training center and the modules that have been developed based on the theory of BPSitepu (2006) that the module has five characteristics will be described in the following table:

Table 8 module characteristics according to BP Sitepu theory

Characteristics	*Pusdiklat Module*	*Development Results Module*
-	A collection of teaching materials in the form of ppt which is recorded	Firefighter training module level 1 sub-field of prevention
Learn to be independent	The training module does not yet fulfill the element of independent learning which includes the following components: general or specific objectives, teaching material for the smallest and specific units, examples or picture illustrations, practice questions, material related to real conditions, language used is communicative and informative, material summary , self assessment, information related to learning resources	The characteristics of independent learning are complete
Intact	The material has not been packaged completely and completely	The material is well packaged and tailored to the needs
Stand-alone	Still need the help of other media to explain the material	The developed module meets the characteristics of a stand-alone that can be used without relying on other media because it has included a source or reference as enrichment material.
Adaptive	Not yet adjusting to developing science and technology, which is still referring to the standards of Permendagri No. 16 of 2009	The knowledge described in the material in the module has adjusted the knowledge that refers to the Minister of Administrative and Bureaucratic Reform No. 16 of 2019
Familiar with the wearer	The module is easy to use because it uses everyday language but the instructions given in the module are not clear	The use of sentences and terms has adjusted to everyday language and the instructions given have been made in sentences that are easy to understand

The advantages of this device compared to previous devices are also more recent because it refers to the latest regulations in implementation and competency standards. The products produced in this study are made more interesting and have an editorial of each description to make it easier for readers to study independently. This device has the following advantages:

1. The development of the latest competency standards refers to the regulation of the minister for the utilization of state apparatus and bureaucratic reform of the Republic of Indonesia (Permenpan RB) No. 16 of 2019 concerning functional positions of firefighters.
2. The depth of the material is adjusted to existing competency standards in accordance with the latest regulations used in this development.
3. The development of the syllabus and lesson plans is more structured and easier to understand. Can be used as a guide for instructors in the teaching and learning process for level 1 special firefighter education and training centers for firefighters and rescue in the province of DKI Jakarta.
4. Module development is adapted to the characteristics of its users. The editorial and case studies contained in the module are adapted to incidents that are often encountered daily in the handling of fire fighting and rescue.

5. The development of the module contains illustrations and explanations so that it is easy for users to understand and can be used for independent study by training participants during or after carrying out level 1 fire fighting training.
6. The development of this module has been declared valid by material experts and media experts. At the same time it has been declared feasible and interesting from the participants' responses.

The drawback of the product that has been developed is that this product can only be used by level 1 firefighters because it adjusts competency standards that refer to functional positions as level 1 firefighters. This module has these limitations and if the module is to be used for other types of training, can be supplemented again and pay attention to the depth of the material that is adjusted to the existing competency standards.

CONCLUSION

Based on the results of the research and development that has been carried out, the following conclusions can be drawn:

1. The structure and format of the syllabus and lesson plans for the prevention sub-sector at firefighter training level 1 Ciracas have been declared valid and competency standards have adjusted to the latest regulations, namely Permenpan RB No 16 of 2019 concerning functional positions of firefighters. The syllabus still uses the term Outline of the Learning Program (GBPP). Combining basic competencies and indicators of success. The syllabus contains information that should not be in the syllabus format, namely the subject matter and sub-topics, only the name of the material can be included in an outline. GBPP has not yet included information related to learning activities and assessment techniques for training participants. While the results of the development of the syllabus that has been developed in this study is the change in the term GBPP to syllabus. Does not combine basic competencies and indicators of success. Does not contain information that should not be there. The syllabus contains information that previously did not exist in the GBPP, namely learning activities and assessment techniques for training participants. In the development of the syllabus there are additional competency standards in accordance with the latest rules/regulations which are used as the latest reference. The SAP used in level 1 firefighter training activities does not contain learning objectives, assessment techniques consisting of practice questions and learning resources used. Meanwhile, in developing this lesson plan, the researcher developed a lesson plan from the term SAP (teaching program unit) to become a lesson plan (RPP). The RPP that has been developed in this study has completed some of the above information which did not exist in SAP before. As for the addition of guard consignus material that adjusts the competency standards from Permenpan RB No 16 of 2019 concerning functional positions of firefighters
2. Module development is carried out in accordance with the module development flow, namely needs analysis, design, development, validity trials and field trials to participants regarding the feasibility of the modules that have been developed by researchers. This module has been made to adjust aspects of independent learning, communicative and informative. In the proof, the validation value of the experts in the three aspects above is quite high with an ideal score of 4. In the independent learning aspect, the supporting points have been maximized in the form of deepening of the material, practice questions and answer keys that can be studied by training participants to measure the ability of learning outcomes the independent. Furthermore, in the informative and communicative aspects, namely the delivery of material in the module, it is always accompanied by illustrations and explanatory sentences for each illustration/picture listed. The sentences used are also effective and straightforward so that the training participants can easily understand when reading this development module. The deepening of the material has been adjusted to the competency standards that must be achieved and the learning resources listed in the module are reinforcements in deepening the material as well as being able to help explain further if participants find difficulties in understanding the material in the firefighting training module level 1 in the prevention sub-sector that has been developed by researchers this time.
3. The learning tools developed in this study include syllabus, lesson plans and modules. The product has been declared valid because it has passed the validation period with 2 validators and has gone through 2 stages. The syllabus in the validation stage gets a score of 3.23 out of an ideal score of 4 with a percentage of 80.75% and gets the "Appropriate" category. While the RPP gets an overall average score of 3.29 from an ideal score of 4 with a percentage of 82.25% and gets the "Appropriate" category. Furthermore, modules that have passed the validation stage from 2 experts, namely material experts and media experts,

get an average score of 3.52 from an ideal score of 4 with a percentage of 88% and get the "Very Appropriate" category.

4. The modules developed in this study have passed the feasibility test stage which is carried out one to one and small groups in terms of module design, module content and module quality. The aspects of module design that are considered are the attractiveness of the module design and the proportional color and image illustrations in an effort to help understand the material in the delivery of the module. Whereas in the aspect of the module content, what is considered is the suitability of the material content, easy-to-understand explanatory sentences, completeness of the module which includes procedures for using the module and practice questions as an effort to measure the ability of training participants after reading and studying the modules that have been developed. Furthermore, aspects of module quality are considered from the module format related to writing interesting and not boring modules and whether the language format used is effective or convoluted which makes it difficult for participants to understand the material discussed in this development module. From these three aspects and when tested, the results were obtained with an average score of 3.34 from an ideal score of 4 with a percentage of 83.5% and the module was declared "Interesting".

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