

DEVELOPMENT OF VIDEO TUTORIAL LEARNING MEDIA FOR THE PROCEDURE OF CLEANING FOOD PROCESSING EQUIPMENT

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Abstract

Vocational education demands the implementation of safe learning according to standards, especially in high-risk skill areas such as culinary which desperately require the application of occupational health and safety elements. However, the learning of these elements in vocational high schools is currently still dominated by the lecture method using basic presentation media without direct practical demonstration. This causes a problem because many students experience difficulties in understanding the procedural stages of cleaning food processing equipment which requires accuracy and varied treatments. The absence of demonstrative media hinders the achievement of practical competencies. As a solution, this research aims to develop learning media in the form of a video tutorial on food processing equipment cleaning procedures using a specific development model. The developed product has gone through a series of feasibility tests by material, media, and language experts, and has been tested directly on students. The conclusion of this study indicates that the developed video tutorial learning media is proven to be highly feasible and effective to be used as a supporting learning resource, successfully helping students understand procedural material more clearly, systematically, and interestingly.

Keywords: Learning Media, Video Tutorial, Cleaning Procedures, Vocational Education, Culinary

INTRODUCTION

Vocational education is a part of the education system specifically designed to prepare individuals to have more specific skills in a certain group or field of work. In Law (UU) Number 20 of 2003 concerning the National Education System, it is explained that Vocational High Schools (SMK) aim to produce graduates who have the competencies and skills needed to carry out work according to a certain field of expertise. As an institution that emphasizes practical skills, SMKs are required to ensure that the learning process is safe and meets standards, especially in areas of expertise that have high risks. The implementation of health and safety at work is an aspect that needs special attention because it is related to accident risks that can cause both material and non-material losses, and even threaten life, especially in kitchen environments that have a high level of danger, such as exposure to gas, high

temperatures, sharp tools, and the potential for fires. According to Law Number 1 of 1970, the implementation of Occupational Health and Safety (K3) aims to prevent work accidents and work-related illnesses so that work processes can run effectively and efficiently. Along the same lines, Wahyuningsih et al. (2021), as cited in (Salfarini et al., 2024), explain that K3 functions to maintain the health and safety of workers, protect everyone in the work area, and ensure that production resources are preserved and used optimally. Considering the significant impact caused by work accidents, the application of occupational health and safety needs to be established starting from the school environment.

SMK Negeri 24 Jakarta is one of the vocational high schools that provides practice-based learning, including in the Culinary Expertise Program. In the Basic Culinary course at SMK Negeri 24 Jakarta, the implementation of K3 elements includes learning about food safety, cleanliness, health, workplace safety, as well as efforts to preserve the environment through waste management in the culinary field (Sulistryorini et al., 2025). Based on interviews with the teacher in charge, it was found that teaching the Occupational Health and Safety (K3) elements at SMK Negeri 24 Jakarta is still mostly dominated by lecture methods without any demonstrations or hands-on practice. This situation is influenced by the limited learning media and the availability of practical materials. In addition, the media used in the learning process is still limited to PowerPoint presentations and PDF documents displayed through a projector. Based on the results of distributing a learning media needs questionnaire to students, it was found that in the K3 element, 55% of students reported having difficulty understanding the material on cleaning food processing equipment due to the complexity of the procedural and hierarchical material. This material involves many steps that must be carried out sequentially, requires high precision, and involves various types of equipment with different materials, so it requires varied cleaning treatments. Additionally, the many technical terms and types of cleaning agents that must be understood also make it difficult for students to remember and correctly apply the procedures. Students also stated that learning the K3 element requires additional media to help them in studying by showing work steps with real-life examples. Among the many students who experienced difficulties with this material, 72.73% of students stated that they need learning media in the form of tutorial videos to support the process of learning and understanding the material on cleaning food processing equipment. Considering that the material on cleaning food processing equipment is procedural, students' understanding heavily depends on their ability to observe and imitate the work steps correctly. Therefore, learning media is needed that not only can convey information but also provide visual demonstrations, is easily accessible to students, and gives a real view of the work procedures in the kitchen.

This need aligns with various studies that emphasize the influence of learning media in vocational education. It is suggested that the effectiveness of learning can be increased by presenting information that combines text, images, and sound. This combination allows learners to process information simultaneously through verbal and visual channels. In line with this, audiovisual media is one of the learning media that presents material in an engaging and creative way by utilizing both hearing and sight. Ragazou & Karrasavvidis (2022), cited in Putri et al. (2024), state that presenting information through a combination of text, images, and sound can enhance learning effectiveness because learners are able to process information through two channels, verbal and visual, at the same time. This learning media has the

potential to optimize the achievement of learning objectives more efficiently because it can increase students' interest in learning while also encouraging their independence in the learning process. In addition, various previous studies have also shown that developing tutorial video media in vocational education, especially in vocational high schools (SMK), has proven effective in improving students' learning outcomes and skills (including practical/mechanism aspects) that are difficult to explain through theory alone. Syahputra (2022), in his study titled "Development of Tutorial Video Learning Media to Improve the Learning Outcomes of 10th Grade Students in Basic Automotive Subjects," showed that tutorial videos can optimize the learning process and increase students' learning outcomes. After using the tutorial videos, students' learning results showed a significant improvement. Previously, only 56% of students achieved scores above the standard.

Through tutorial videos, students can observe each step of the procedure in a concrete way, repeat certain parts as needed, and study each step or movement in more detail without relying on the teacher's presence or class time. Therefore, developing learning media based on tutorial videos is a potential alternative to improve the quality of Occupational Health and Safety (K3) learning, especially on the topic of cleaning food processing equipment. This media development is also driven by the conditions in the field, which show that until now, there has been no tutorial video-based learning media specifically developed for the material on cleaning food processing equipment in Vocational High School Culinary Program classes. Media that visually and repeatedly shows the work steps will help students enhance their cognitive understanding (knowing the procedures) and skills psychomotor (performing actions correctly) (Subekti & Siswandari, 2024). Through the development of tutorial video-based learning media, it is hoped that students will be able to apply food processing equipment cleaning procedures according to industry standards. On the other hand, teachers also gain an alternative, more effective and efficient learning resource to support the learning process, making lessons more engaging, interactive, and focused on student activity..

Based on this background, several problems can be identified, primarily that K3 element learning on food processing equipment cleaning material in the Culinary Basics subject at SMK Negeri 24 Jakarta has not run optimally because the media used is still limited to PowerPoint and PDF, so it has not been able to provide a clear visualization of work steps to students. The lecture method which is still dominant without direct demonstration becomes an additional obstacle due to the limited learning media and practical materials available, causing students to experience difficulties in understanding the food processing equipment cleaning stages and not having media that can be studied repeatedly outside the classroom. Consequently, the absence of demonstrative video tutorial-based learning media is the main problem hindering the achievement of practical-based learning outcomes in this material. Based on the identified problems, this research restricts the problem to the development and feasibility of video tutorial learning media for food processing equipment cleaning procedures. Therefore, the formulated problems in this research are how the development process of the video tutorial learning media for food processing equipment cleaning procedures is conducted and how its feasibility is measured as an educational tool for K3 elements. Ultimately, this research aims to develop a video tutorial learning media for food processing equipment cleaning procedures and to analyze its feasibility as a learning media for K3 elements.

IMPLEMENTATION METHOD

This research was conducted at SMK Negeri 24 Jakarta, Cipayung, East Jakarta, starting from November 2025. The research trial was conducted on tenth-grade students of the Culinary skills program. This study uses the Research and Development (R&D) method. The development of the food processing equipment cleaning material video tutorial learning media was carried out using the DDD-E development model which includes the decide, design, develop, and evaluate stages. This model is used as a reference for developing the video tutorial media because it is suitable for its designation in the development of video and multimedia media. By following the structured stages in this model, it allows researchers to produce video tutorial learning media that is feasible to use as a supporting learning resource for students of the culinary skills program. The target of the developed product is the tenth-grade students of the Culinary Skills Program, where this video tutorial media is expected to help students understand the steps for cleaning food processing equipment according to catering industry standards which can be accessed via the YouTube platform using supporting devices such as laptops and mobile phones.

The instruments used in this study consisted of product feasibility validation instruments given to material experts, media experts, and language experts, as well as product trial instruments given to students. The instruments used in this study were adopted from previous research that had gone through a validation process by experts and were declared feasible to be used as data collection tools, therefore, the researcher did not compile or modify the instrument, but rather used the instrument as it was developed and validated in previous research. The adjustments made in this study were limited to the material context, namely adjusting the wording of the statements or question items with the material for the food processing equipment cleaning procedure video tutorial media, without changing the meaning in the assessment aspects, indicators, statements, or the assessment scale used in the original instruments adopted from Aulia (2025) and Farizi (2025). Data in this study were collected through data collection techniques in the form of questionnaires given to experts and students to determine responses and acceptance levels of the developed media. According to Romdona et al. (2025), a questionnaire is a data collection technique carried out by giving a set of questions or statements to respondents to answer. The data collection was carried out face-to-face, by the researcher providing a questionnaire sheet to the respondents to be filled out after they watched the video tutorial until the end. The instrument used is an assessment sheet with a Likert scale in the form of a checklist to make it easier for respondents to assess each aspect.

The forms of evaluation carried out include reviews at each stage, validation by material experts, media experts, and language experts, as well as trials to students through one-to-one tests involving 3 students, small group tests involving 9 students, and field tests involving 35 students. Data analysis in this study used quantitative descriptive analysis (Sugiyono, 2013). This analysis is used to process data from the feasibility assessment of the video tutorial learning media obtained through a questionnaire structured using a Likert scale with alternative answers strongly agree, agree, undecided, disagree, and strongly disagree. The questionnaire data in the form of numbers are then added up to determine the feasibility percentage using a specific formula by Tegeh et al. (2014). The percentage value obtained is then converted into a feasibility category to determine media quality based on standard criteria, ranging from very feasible and not needing revision for scores between 90% to 100%,

down to not feasible and needing total revision for scores between 0% to 54%.

RESULTS

The development of video tutorial-based learning media on the material of food processing equipment cleaning procedures in this research uses the DDD-E model (Decide, Design, Develop, and Evaluate). The stages of developing the video tutorial learning media in this study are explained as follows. The decide stage is the initial stage of developing the video tutorial media. The activities carried out during this phase are summarized in the following table.

Table 1. Decide Stage Activities

Decide Stage Activities	Data Retrieval	Instrument	Results
Conducting initial research	Subject teacher interview	Interview Guide	Obtained information regarding aspects that became obstacles for students, previously used media and methods of delivering material, as well as determining the material that is the focus of media development.
	Student needs analysis	Questionnaire (Google Form)	Obtained information regarding learning experiences, students' difficulties in understanding procedural material, the need for more interesting and appropriate learning media, and preferences for using video tutorial media.
Determining learning objectives	CP ATP analysis and consultation with subject teachers	CP ATP Document	Formulated learning objectives to be achieved through video tutorial media.
Determining the scope of the material	Learning material analysis and consultation with subject teachers	Previous teaching materials and learning modules	Determined the boundaries of the material to be included in the video tutorial media according to the stated learning objectives.

At this stage, initial research was carried out through interviews and analysis of student needs. The interview results showed that although students' academic achievement was relatively good, students' practical skills, especially in the hygiene aspect of food processing equipment, were not fully in accordance with the expected standards. Based on these interview results, it was determined that the food processing equipment cleaning procedure material became the focus in developing the video tutorial learning media because the material requires a clear demonstration of procedures. Based on the results of the needs analysis questionnaire, as many as 55% of students experienced difficulty understanding the food processing equipment cleaning material using PowerPoint or PDF media because the material is procedural. From the students who experienced these difficulties, as many as 72.73% stated they needed learning media in the form of video tutorials. Therefore, the video tutorial media was developed and disseminated via the YouTube platform so that it can be easily accessed

by students through their devices. Next, an analysis of the Learning Outcomes (CP) and Learning Objective Flow (ATP) was carried out to formulate learning objectives to be achieved through the video tutorial media. This process was also carried out simultaneously with consultations and discussions with the subject teacher, to ensure that the formulation of learning objectives and the set material boundaries are in line with the applicable curriculum and relevant to the learning conditions in the classroom.

The design stage focuses on designing the video tutorial media as a reference in the product development process. At this stage, a media outline containing the Broad Guidelines of Media Content (GBIM) was prepared which functions as a general guide to the content and structure of the media. Furthermore, a linear (one-way) structured video presentation flow was designed in the form of a flowchart, chosen because it is suitable for presenting video tutorials so that it makes it easier for students to follow each food processing equipment cleaning step sequentially. At this stage, the video interface was also designed, then the Material Details (JM) were compiled containing material details and the sequence of material presentation in the video tutorial. The JM is used to ensure that all material presented is in accordance with the learning objectives and delivered clearly. In addition, a storyboard and video script were developed depicting the sequence of scenes, visual appearance, narration, and activities to be shown in the video. This storyboard and script became the main guidelines in the media production process so that the presentation of the food processing equipment cleaning material runs coherently, easily understood, and interesting for students.



Figure 1. Interface/Display of the Food Processing Equipment Cleaning Procedure Video Tutorial

The developed storyboard has a total duration of 6 minutes 40 seconds and is divided into four main segments. The first segment is an opening segment with a duration of 49 seconds containing the display of the State University of Jakarta (UNJ) logo, learning objectives, and a cinematic video accompanied by narration to build students' interest and attention. Next, the second segment lasts 85 seconds containing the presentation of supporting material as an introduction before entering the main demonstration stage in the video tutorial. The third segment is the core of the video with a duration of 236 seconds showing the tutorial process of cleaning food processing equipment systematically and step by step. In this segment, a visualization of the procedure is shown accompanied by a narrative explanation so that students can understand each stage clearly. Finally, the fourth segment is the closing section which contains expressions of gratitude and credit titles as a form of appreciation for the parties involved in developing the video.

The develop stage is the stage of making the video tutorial media based on the design that has been prepared in the design stage. Before recording was done, a production team was formed consisting of a producer, director, cameraman, editor, talent, and narrator. Discussions were first held regarding the technicalities of taking video, audio, and making images before the editing process was carried out, as well as discussing the GBIM, JM, script, and storyboard which had previously gone through a revision stage by media experts. At this stage, a kitchen borrowing letter was also submitted for the video shooting process before the learning media production was carried out. The permit was in the form of a letter to borrow the kitchen at SMK Negeri 24 Jakarta addressed to the principal of SMK Negeri 24 Jakarta. Next, the media production process was carried out which included recording the food processing equipment cleaning procedure video using an iPhone 14. The use of this device aims to produce good and stable image quality so as to support optimal material delivery. The recording process was carried out based on the prepared storyboard, starting from scene 3 which shows the talent taking a bread tray from the oven as an introduction to the main material, up to scene 28 which shows the talent delivering the closing of the learning video.



Figure 2. Examples of Video Elements in the Video Tutorial Learning Media

At this stage, audio narration was also recorded using a Samsung A05s mobile phone, and the Canva application was used to create image designs for the State University of Jakarta (UNJ) logo, learning objectives, and credit titles. After all the materials were collected, the editing process and merging of elements were carried out using editing software, namely CapCut, to combine video, audio, and images into a complete tutorial video. Furthermore, the prototype of the food processing equipment cleaning procedure video tutorial was uploaded to the YouTube platform and can be accessed via a link or QR code.



Figure 3. QR Code for the Food Processing Equipment Cleaning Procedure Video

The evaluate stage in the DDD-E model is carried out continuously at each stage of development to obtain input and improvements for the product. After the video tutorial media was successfully developed, the evaluation stage continued through an expert judgment assessment (theoretical feasibility) and user trials (empirical feasibility) to determine the feasibility level of the media and obtain input for improvement.

The theoretical feasibility test involved assessments from a material expert, a media expert, and a language expert to ensure the quality of the developed product. The assessment by the material expert resulted in a feasibility percentage of 93.33%, which is included in the very feasible category. This result indicates that the material presented in the video tutorial is in accordance with learning outcomes, conceptually accurate, and capable of supporting the student learning process. The media expert validation obtained a perfect feasibility percentage of 100%, which also falls into the very feasible category. This indicates that the developed learning media has met the criteria for good media quality in terms of visual appearance, audio quality, ease of use, presentation consistency, and usefulness. Furthermore, the language expert assessment resulted in a feasibility percentage of 98.18%, meaning the use of language in the video tutorial has met the feasibility criteria from the aspects of straightforwardness, communicativeness, suitability for students' development, and adherence to standard Indonesian language rules.

Table 2. Summary of Theoretical Feasibility Test Results

Expert Validator	Feasibility Percentage	Category
Material Expert	93.33%	Very Feasible, No Revision Needed
Media Expert	100%	Very Feasible, No Revision Needed
Language Expert	98.18%	Very Feasible, No Revision Needed

Following the expert validations, the empirical feasibility test was conducted to determine the product's feasibility based on user responses and experiences during the learning process. The one-to-one trial involved 3 students with varying academic abilities and obtained a feasibility percentage of 91.39%, categorizing it as very feasible. The small group trial involved 9 students and obtained a feasibility percentage of 98.15%, which is also included in the very feasible category. Finally, the field test was conducted with 35 students representing a full class in an actual learning condition, yielding a feasibility percentage of 95.40%. These empirical results indicate that the developed video tutorial learning media has met the feasibility criteria and is highly accepted by the students as an engaging and easy-to-understand educational tool.

Table 3. Summary of Empirical Feasibility Test Results

Trial Stage	Number of Respondents	Feasibility Percentage	Category
One-to-One Trial	3 Students	91.39%	Very Feasible
Small Group Trial	9 Students	98.15%	Very Feasible
Field Test	35 Students	95.40%	Very Feasible

During the evaluation phase, several product revisions were systematically implemented based on the constructive feedback and suggestions provided by the experts and students to perfect the media. Based on the media expert's advice, improvements were made regarding the text color contrast, specifically changing the text color in the title scene so it is more clearly visible, alongside adding text boxes consistently throughout the video to increase information readability and help students understand the delivered material.

Furthermore, based on comments and suggestions provided by students during the small group trial, improvements were heavily focused on the audio aspect, specifically adjusting the

background music volume and clarifying the narrator's voice. The background music volume was decreased, and the voice-over volume was adjusted to sound more balanced and comfortable to hear. This revision was carried out to increase the clarity of material delivery so that students can understand the information optimally without distraction.

DISCUSSION

Based on the results of the research and development that have been carried out, the analysis of the final product's validity confirms that the video tutorial learning media for food processing equipment cleaning procedures is categorized as highly feasible to be used in the learning process. The feasibility values obtained from both experts and students indicate that this media is capable of presenting material clearly, interestingly, and in accordance with learning needs. Through a combination of visual elements, audio, and a systematic demonstration of work steps, the developed video tutorial media can effectively help students understand the food processing equipment cleaning procedures better compared to if the material is only delivered verbally or through written explanations.

The successful development of this video tutorial learning media was driven by several supporting factors. The first factor is the urgent need for learning media capable of visualizing work procedures directly, as the needs analysis revealed that students struggle to understand procedural materials when delivered solely through conventional PowerPoint or PDF formats. The second supporting factor is the adequate availability of digital facilities, where most students have access to smartphones and laptops, allowing the media to be used flexibly inside and outside the classroom. Furthermore, the utilization of the YouTube platform enables students to re-access the material whenever needed according to their individual learning paces. Finally, comprehensive support from the school and the subject teacher, including permission to use school facilities and active participation during the validation and trial stages, greatly facilitated the development process and ensured the media aligned precisely with the school's educational needs.

Despite the successful development, several inhibiting factors were encountered during the research process. The first obstacle involved logistical challenges in production coordination, as shooting the video required careful synchronization between the production team, the talent, and the limited availability of the school kitchen facilities, thus demanding highly meticulous planning. The second inhibiting factor related to audio noise issues during recording, where the small group trial revealed that background noise disrupted the balance between the background music and the voice-over, leading to less optimal narration clarity in certain parts of the video. The third challenge was the differing learning paces and characteristics of the students, as evidenced during the field test where some students found the narration tempo too slow, while others found it clear and easy to grasp, demonstrating the difficulty of finding a universal delivery pacing that perfectly suits every user's preference.

An assessment of the developed media highlights several notable strengths. Primarily, the media excels in its systematic visualization of procedures, allowing students to observe each stage of cleaning food processing equipment chronologically through direct demonstration, which significantly eases the comprehension of both theoretical concepts and practical applications. Additionally, the media offers highly flexible accessibility, as

uploading the video to YouTube enables students to study independently without being bound by classroom time or location constraints. The media has also proven its ability to increase student engagement, which is evident from user feedback stating that the video is captivating, easy to understand, and provides an immersive learning experience that closely resembles real practical kitchen conditions.

Conversely, the assessment also identified certain weaknesses in the developed media that must be acknowledged. One primary limitation is its focus on a single specific topic, meaning the scope of the material is limited strictly to food processing equipment cleaning procedures, thus requiring students to rely on other resources to cover the broader K3 curriculum comprehensively. Another weakness is the lack of two-way interaction, as the one-way nature of the video prevents immediate feedback or automated responses if a student struggles to understand a specific instructional segment. Lastly, the media's heavy dependency on internet connectivity and digital devices means that students with network limitations or inadequate infrastructure may experience difficulties when trying to access the video tutorial online.

CONCLUSION

Based on the results of the research and development that have been carried out, it can be concluded that this research successfully produced a product in the form of a video tutorial learning media for food processing equipment cleaning procedures in the Occupational Health and Safety element of the Culinary Basics subject for tenth-grade students of SMK Negeri 24 Jakarta. The media development was carried out using the DDD-E model which consists of the Decide, Design, Develop, and Evaluate stages. The theoretical feasibility test results show that the developed media is included in the very feasible category, where the material expert assessment obtained a percentage of 93.33%, the media expert 100%, and the language expert 98.18%. Furthermore, the empirical feasibility test results also show that the media is included in the very feasible category, with the feasibility percentage in the one-to-one test at 91.39%, the small group test at 98.15%, and the field test at 95.40%. Based on these results, it can be concluded that the video tutorial learning media for food processing equipment cleaning procedures is highly feasible to be used as a learning media in the Culinary Basics subject and can help students understand procedural material more clearly, systematically, and interestingly

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