Designing A Safety Induction Video For The Graphic Materials Testing Laboratory at Politeknik Negeri Media Kreatif As An Effort To Prevent Work Accidents

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Abstract. Laboratories play a critical role in education but are often accompanied by potential hazards and risks of work-related accidents. This study focuses on designing a safety induction video for the Graphic Materials Testing Laboratory at Politeknik Negeri Media Kreatif to enhance safety awareness and prevent accidents. This research qualitative descriptive method, involving data collection through FGDs, observations, and questionnaires distributed to 32 students. The study identified common hazards, such as mechanical and chemical risks, and emphasized the need for personal protective equipment (PPE) and adherence to standard operating procedures (SOPs). Based on user needs, a demonstration video format with a duration of 5-10 minutes was preferred, integrating visuals, text, and audio to effectively communicate safety practices. The video was designed to be accessible on platforms like YouTube, aiming to foster a safer laboratory environment and minimize work-related accidents.

Keywords: Laboratories, safety induction, video, hazard

1 Introduction

The laboratory is a place where the practicum process is carried out by students, lecturers and laboratory technicians. Various practicum activities are carried out through procedures and the use of practicum tools and materials. The laboratory and practicum process itself is inseparable from the potential for hazards and risks of accidents and or occupational diseases. Various cases of accidents have been recorded including in 2015 an accident in the Chemistry laboratory of the Faculty of Pharmacy UI which caused 14 students injured due to the explosion of the distillation flask [1] A work accident case also occurred in the laboratory which resulted in an IPB student being burned to death [2].

The material testing laboratory of the Polimedia Graphics Engineering Study Program is one of the laboratories that also has potential hazards and poses risks. Based on the observations of researchers, several potential sources of danger come from various tools and chemicals used in testing. The risks that can be caused by hazards in the materials testing laboratory include injuries or injuries from the use of sharp tools, and chemicals when in contact with the skin can irritate the skin, respiratory problems, and can cause explosions that have the potential to cause fires.

In order to prevent work accidents in the practicum process in the materials testing laboratory, it is important to design a promotional and preventive effort. One of the efforts that

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can be done is to provide information through Occupational Safety and Health induction or safety induction. Safety induction is an effort to display information to individuals who carry out an activity in a place about hazards and risks and provide guidelines for steps in maintaining safety that must be followed by individuals in that place [3].

The application of safety induction can use various types of media such as printed media leaflets, booklets, posters and digital media through videos. However, several studies have concluded that promotional media using video is able to provide a more complex and easy to understand understanding due to the combination of audio combined with images and motion which makes the show more interesting so that the recipient is not bored and easy to digest the information conveyed [4] [5] [6]

Based on the exposure that has been conveyed related to the hazards and risks that can arise in the materials testing laboratory and the importance of providing OHS induction or safety induction to provide OHS information for laboratory users to prevent work accidents through effective media, it is important to design a Safety Induction Video in the Materials Testing Laboratory as an effort to implement occupational safety and security as an effort to prevent work accidents during practicum activities. .

2 Methods

This research uses a qualitative descriptive method. This research consists of 3 stages, namely pre-production, production and post-production stages. Data collection methods include FGDs were conducted between the K3 teaching team, lecturers teaching material testing courses and media experts to determine the concepts and materials to be applied to the video. Observations were conducted in the laboratory to better understand the condition of the laboratory environment as well as the tools and materials used to assess hazards and risks and the existing emergency response facilities. The needs analysis was also carried out to users, namely Graphic Engineering students using a questionnaire. The questionnaire was given to 32 student samples to find out the needs of safety induction videos from material to media. Literature study data search is carried out to find reading materials and reference sources that support and are related to the theme that has been determined in order to get the right theoretical basis.

In the pre-production stage, a needs analysis is carried out based on the conditions of the laboratory environment and analysis of user needs in this case are students of graphic engineering semesters 1, 3 and 5. This stage is carried out by coordinating between research members consisting of K3 lecturers, material testing lecturers, and advertising lecturers. The production stage will produce material content and storyline design. The design stage is the process of designing a real action-based safety induction video. The output of this activity is video design including, story board and script. This activity will collaborate with a video design team from the Broadcasting study program.

3 Result And Discussion

3.1 Result

3.1.1 Pre Production Stage

In the pre-production stage, a needs analysis for video content is conducted by identifying hazards and risks in the laboratory. Based on the identification results, several hazards were

found that have the potential to cause occupational safety and health risks in the testing process which are summarized in Table 1.

Table 1. Hazards and Risks of the Laboratory Materials Testing Process in the Materials Testing Laboratory.

No	Test Name	Test Process	Hazards	Risks
1	Printability tester	Cut the paper using a paper cutter for the test sample.	Finger/palm contact with the knife on the paper cutter.	scratched/ cut finger
		Operate the IGT machine by pulling the lever to rotate the disk so that it sticks to the printing disk.	IGT machines have fast rotational movement	Pinched finger
2	Fiber test on paper	Making Sulfuric acid solution for paper testing	Skin and respiratory exposure to sulfuric acid solution. Sulfuric acid solution is corrosive so it is dangerous especially if it comes into contact with the skin.	Sunburn
3	Tear resistance test	paper is cut using a paper cutter with a long, sharp blade, positioning the cut paper on the tear test machine	Finger/palm contact with the knife on the paper cutter.	scratched/ cut finger
4	Paper ash content test	the paper is heated using an oven with a temperature of up to 900 drajac celsius	Heat exposure to the skin	sunburn
5		The process of turning on the electricity of some testing machines	Skin contact with electrical outlets	Electricity

Based on Table 1, it can be seen that the material testing process has various sources of danger that pose a risk to the safety and security of students. Efforts that can be made to avoid risks are by using PPE that is appropriate to the conditions and work process. The PPE used are masks, gloves, and lab coats / wearpacks. In addition, the control that can be done is to comply with existing SOPs and work with focus.

In addition to sources of danger and risk, analysis is also carried out regarding laboratory environmental conditions and emergency facilities in the laboratory. Environmental conditions

that need to be considered are the cleanliness of the equipment, disposing of garbage in its place, and smoke-free in the laboratory**.**

Analysis of emergency facilities that support needs to be emphasized to anticipate emergencies such as fires, so it is necessary to provide information to find out the location of APAR. In additional to the disaster, first aid facilities, namely first aid kits, are also a focus in delivering information so that students better understand that the lab is equipped with first aid facilities so that in the event of a work accident students can perform first aid with the facilities provided.

User needs analysis is also conducted during the pre-production stage to determine laboratory users' preferences in selecting safety induction videos.The results of the user needs analysis related to the type and concept of the video can be seen in table 2 User analysis is carried out on students who use the materials testing laboratory in each semester in the graphic engineering and packaging engineering technology study programs. The analysis was carried out to see the experience of occupational safety training and video preferences to be broadcasted both video format, duration of viewing, broadcast channel. The analysis was carried out using a questionnaire instrument with answer choices. The results of the needs analysis questionnaire can be seen in table 2.

Table 2. The results of the user needs analysis related to the type and concept of the video

No	Element	Percentage
1	Format considered most helpful in understanding safety information (respondents can choose more than 1 answer)	
	Animation video	53,8%
	Demonstration video	73%
	Text and image presentations	34,6%
	Group discussion	50%
2	Length of video duration	
	Less than 5 minutes	23,1%
	5-10 minutes	69,2%
	10 -15 minutes	3,9%
	More than 15 minutes	3,8%
3	Prefer video accompanied by (can choose more than 1)	
	Text only	50%
	Audio only	11,5%
	Combination of text and audio	84,6%
4	Video access is preferred through	
	Learning Management System	11,5%
	YouTube	84,6%
	Instagram	65,4%
	Website	15,4%
5	safety videos need to include information on common safety-related mistakes new students make.	
	Indispensable	57,7%
	Required	42,3%
	Not required	0
6	Have conducted OHS training before	
	Yes	42,3%

No	57,7%

Based on Table 2, the majority of respondents (73%) consider demonstration videos the most helpful format for understanding safety information, followed by animation videos (53.8%) and group discussions (50%). Text and image presentations were less favored (34.6%). Most respondents (69.2%) prefer videos lasting 5–10 minutes, while shorter videos (less than 5 minutes) are favored by 23.1%. Videos exceeding 10 minutes are the least preferred (7.7% in total). A significant majority (84.6%) prefer videos that combine text and audio, compared to text only (50%) or audio only (11.5%). YouTube is the most preferred platform for accessing safety videos (84.6%), followed by Instagram (65.4%). Websites (15.4%) and Learning Management Systems (11.5%) are less popular. Most respondents agree that safety videos should include information on common safety-related mistakes new students make, with 57.7% considering this aspect indispensable and 42.3% marking it as required. A majority of respondents (57.7%) have not attended any Occupational Health and Safety (OHS) training before, while 42.3% have prior training experience. The analysis highlights the importance of using demonstration videos with a combination of text and audio to effectively convey safety information. Videos should ideally be 5–10 minutes long and easily accessible through platforms like YouTube and Instagram. Including practical examples of common safety mistakes is crucial, especially given that many respondents lack prior OHS training. These insights can guide the development of engaging and informative safety video materials.

Video design is based on the needs analysis that has been done. The next step is to prepare a video concept that is outlined in the story board. The story board that will organize the storyline is equipped with a sequential narration that is complemented by visuals. The story board tells the flow of the safety induction video in the laboratory from start to finish and contains several scenes that focus on tools that have a source of danger and have the potential to cause risk, emergency facilities and first aid in accidents, and rules during the practicum process. This story board will be a reference in making the video shooting implementation.

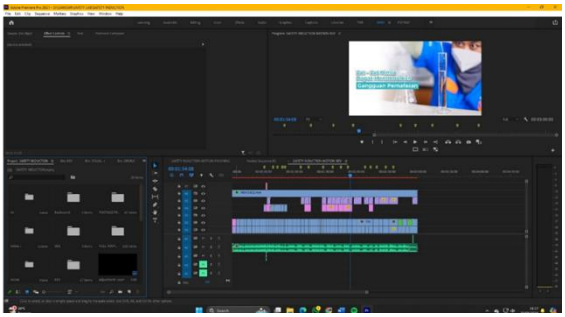
3.1.2 Production Stage

The production stage is carried out based on the needs analysis, which is then detailed into the video through the storyboard that has been created. Video recording or shooting was carried out for 1 day in the materials testing laboratory environment and the Polimedia area.

Fig. 1. The recording process in the materials testing laboratory begins with a group coordination session (a), followed by a brief orientation on the use of equipment for the talent (b), preparation, and camera checks (c), the video recording takes place (d) (e) (f).

The video recording process is carried out by the director and cameramen with lighting assistance. The video features real footage using five student talents from the Graphic Engineering program who have previously conducted material testing practicums in the laboratory. Before the video recording, a laboratory orientation and equipment usage briefing were conducted to ensure that the techniques and equipment usage align with correct and safe

practices. The video recording focuses on the use of equipment that poses various hazards and potential risks, in accordance with the hazard and risk identification conducted earlier.



(a)

(b)

Fig.2. Process edditing (a) and voice over (b)

After the recording process is complete, After the recording stage is completed, the production process continues with video editing and adding a voice-over. Editing is done to combine video clips, enhance graphics, add text, and include the voice-over. Video editing is done based on the user needs analysis that has been conducted, such as adding text and audio to the video. Editing is also done to ensure the video duration is less than 5 minutes. The final editing results, based on the needs analysis outlined in the storyboard, can be seen in Table 3.

Table 3. Final result video Safety Induction at Materials Testing Laboratory

No	Visual	Audio/narration text
1		Politeknik Negeri Media Kreatif is a vocational college that has 15 study programs, one of which is the Graphic Engineering Study Program.

2		Material Testing Laboratory Is a learning support laboratory in the graphical material testing course of the Graphics Engineering Study Program. The materials testing laboratory is used for practicum testing of printing materials such as ink and paper testing which is located on the 3rd floor of the B Polimedia building.
3		Before entering the laboratory, students must wear personal protective equipment such as masks, wearpacks / practical suits, and gloves, make sure that their hair or veils do not dangle so as not to interfere during the practicum process, this aims to protect themselves from sources of danger and potential risks in practicum activities.
4		Before doing the practicum, make sure you have read the practicum procedure that will be carried out
5		Always pay attention when in contact with electricity make sure your hands are dry
6		Be careful when using materials testing equipment because it has several sources of danger and potential risks such as

		
7		IGT and Cobbtester tools may pose a risk of pinched fingers
8		Paper cutting tools have sharp blades which may pose a risk of cutting fingers/hands.
9		Furnace machine with temperatures of nearly 1000 degrees Celsius may pose a risk of burns.
10		chemical substances cause irritating respiratory used may cause skin and

11		Perform practicum activities with Seriously, concentrate and do not joke to prevent accidents
12		After completing the practicum, clean and return the equipment used.
13		No smoking during practicum activities
14		Dispose of garbage in the bins provided
15		Understand the location of safety equipment in the laboratory such as fire extinguishers to prevent fire disasters in the laboratory.

16		And understand the location of the first aid kit so that first aid can be immediately given to those who need it. in need
17		Thus the safety induction in the Materials Testing laboratory of the Polimedia Graphics Engineering Study Program, always be aware of potential hazards that exist to minimize accidents. Greetings safety

Source: All photos are taken from the video that has been created.

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3.1.3 Pasca Production Stage

To assess the reception of the video, a qualitative test was conducted involving 10 first-semester Graphic Engineering students who had not previously conducted practicums in the material testing laboratory. Based on the interview results, it was found that the video was well understood, and everything presented was effectively conveyed to the students. From the video, the students stated that they gained a better understanding of Occupational Health and Safety (OHS) and its application in the laboratory. They also understood what needs to be prepared and done before, during, and after the practicum

4 Discussion

The design of the safety induction video is based on the results of the needs analysis both in content and video format. The observation results show that various potential hazards have been found in the materials testing laboratory, many of which are mechanical hazards and chemical hazards. Both all come from materials and tools used in the process of practicum testing materials. The emergence of mechanical and chemical hazards can not only come from the source of materials and tools but also human negligence when carrying out practicum using existing tools and materials [7]. Various potentials that exist need to be described in detail, especially the potential hazards of using tools and materials in the laboratory. The practice of using tools along with the potential that can be caused is an important point in designing video content. In addition to the use of safety induction video tools, it also contains matters related to the prevention of work accidents such as the use of personal protective equipment which is also an important requirement before doing work in the laboratory, it is important to convey because negligence in the use of PPE can cause occupational diseases, work accidents to death [8]. Warnings about the importance of being careful when working to minimize human error are also important to emphasize because various work accidents occur mostly due to unsafe behavior both before, during and after work [9]. As reinforcement and a reminder to act safely,

safety signs are installed in several locations. These signs aim to deliver written messages to ensure safe actions are maintained in all activities [10]. Based on the results of the needs analysis to users, it is found that most users want a video format in the form of a demonstration that is displayed in less than 5 minutes equipped with audio and text to clarify the purpose and purpose of the demonstration. Most respondents prefer YouTube in the video display channel. Seeing these results, the safety induction video is designed with a demonstration video format related to the use of tools and shows the dangers and risks that can occur in their use, demonstrates the use of PPE, and demonstrates things that must be done during practicum work delivered through visuals, audio and text. The duration of the video is designed to be less than 5 minutes but already covers all aspects that must be conveyed clearly. The designed video can be accessed through the YouTube channel.

5 Conclusion

The safety induction video was designed based on field observations related to laboratory conditions and also identification of potential hazards and risks. In addition, the design is also based on an analysis of user needs, namely graphic engineering students. The results of the identification of hazards and risks found that the potential that is found is physical or mechanical hazards and chemical hazards. As for the results of the safety induction video needs analysis, it is found that users prefer demonstration videos that are presented in about 5 minutes where the video is accompanied by audio and text where videos prefer to be accessed on YouTube. The results of the identification and analysis of user needs are used as the basis for making videos that are expected to be understood and well received by all laboratory users. The existence of safety induction videos is also expected to increase safe behavior for users so as to minimize the occurrence of accidents due to work in the materials testing laboratory.

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