

# Development of audiovisual media to improve OSH knowledge among construction workers of PT Sasmito at the construction project of FMIPA building at UGM Yogyakarta

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## ABSTRACT

**Background:** Work accidents with a high rate of fatality are dominated by the ones in construction work. Accidents could be caused by a number of factors, one of them is workers' behavior. Knowledge and audiovisual media are the supporting factors and predispositions that influence workers' behavior. Some workers have not understood the function of Personal Protective Equipment (PPE) and the standard application of PPE. This study is aimed at finding out the feasibility of audiovisual media and the average level of OSH knowledge among the workers before and after intervention.

**Method:** This is a Level 4 Research and Development (RnD) study consisting of Product Design, Product Validation, Product Revision, and Limited Trial. The sample were the workers of PT Sasmito at the construction project of FMIPA building in UGM Yogyakarta consisting of 40 people. Validity test of the media was conducted by distributing questionnaires to material and media experts. Limited trial was conducted by distributing the questionnaire before and after intervention. Data analysis was carried out using univariate and bivariate analysis, i.e. Wilcoxon sign rank.

**Results:** The total scores resulting from the validity tests were 76% by the material experts and 85% by the media experts, meaning that the audiovisual media was categorized as "feasible" and "highly feasible". Hence, the audiovisual media was feasible or appropriate to be presented to the construction workers. The average rates of OSH knowledge among the workers were 11.20 for the pre-test and 13.8 for the post-test, respectively. The Wilcoxon Sign Rank test resulted in the p-value of 0.000 (<0.05), meaning that there was a difference in the average rate of OSH knowledge between the conditions of before and after the provision of audiovisual media to the construction workers of PT Sasmito at the construction project of FMIPA building at UGM.

**Conclusion:** Audiovisual media is feasible to be presented and there is a difference in average rate of the workers' knowledge on the PPE application between the conditions before and after the intervention. Companies are expected to use audiovisual media as a means to promote OSH.



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## 1. Introduction

Construction is one of the sectors with highest rate of work accidents. This is due the numerous construction jobs with high level of hazards. There are 340 million of work accidents and 160 million people suffering from work-related diseases every year. Drastic increase in work accidents especially in the construction sector is also experienced by developing countries such as Indonesia ([International Labor Organization, 2018](#)).

Based on the data from Social Security Agency on Employment (BPJS Ketenagakerjaan), there were 123,041 cases of work accidents in 2017. In 2018, the number of work accidents in Indonesia reached 13,105. The average number of work accidents in Indonesia is 130,000 per year. Work accidents with the highest fatality rates are dominated by the accidents in construction and transportation sectors ([BPJS, 2019](#)).

Work accidents might be caused by numerous factors, one of them is workers' behavior. Positive safety behavior is considered to help workers in avoiding hazards from the surroundings. In addition, such behavior could prevent others from experiencing work accidents when there is a hazard around. Workers' behavior can be influenced by a number of factors, one of them is workers' knowledge ([Agiviana & Djastuti, 2015](#), [Kementerian PUPR, 2018](#)).

Workers' knowledge can be improved with the provision of effective campaign media. Audiovisual media is considered to be more effective in improving knowledge than written media such as leaflets. Audiovisual media is thought to be better and more attractive since it has two types of presentation, i.e, audio and visual. Audiovisual media involves two senses, sight and hearing, so that it becomes more effective than other media ([Srimulyani, 2015](#); [Alini & Indrawati, 2018](#)).

Audiovisual media is the type of media whose presentation focuses on hearing and sighting senses. Using mechanical and electronic devices, audiovisual media produces and present both audio and visual materials. In general, there are two types of audiovisual media. The first one is still (motionless) media which only presents sound and still images such as sound slides. The second one is the media which can present sound and moving images such as movies ([Wibawanto, 2017](#); [Dewi & Budiana, 2018](#)).

PT Sasmito is a construction service company. *PT Sasmito Proyek Pembangunan Gedung FMIPA UGM* (or PT Sasmito Construction Project of FMIPA UGM Building) was known to conduct safety talks only on Fridays. In addition, it was found that some workers were undisciplined in wearing PPE on the work site. It was also found that there were training programs which were not routinely executed and not attended by all the workers. Neither pretest or posttest was carried out before and after a training. They only appointed participant representatives to practice the training materials so that no data was available regarding the change in the level of knowledge among the workers. The OSH campaign media used by *PT Sasmito Proyek Pembangunan Gedung FMIPA UGM* were posters and banners placed on the wall of the office and the gate into the project site. No OSH campaign media was found on the construction work area. Based on the preliminary study by the researchers, the workers of *PT Sasmito Proyek Pembangunan Gedung FMIPA UGM* still had insufficient knowledge regarding the functions of some PPEs such as vest, boots, and gloves. In addition, a number of workers did not know the minimum height standards for the wearing of Full Body Harness. Campaign programs in the form of audiovisual media could be presented on television sets placed in the office or workers canteen. With regards to such issues, the researchers were interested in developing audiovisual media on occupational health and safety to improve OSH knowledge among the construction workers of *PT Sasmito Proyek Pembangunan Gedung FMIPA UGM*.

## 2. Method

This study applied the Research and Development (RnD) method. The RnD method is a scientific technique to study, design, produce, and conduct validity tests on the created products (Sugiyono, 2018). The research and development is divided into 4 levels. In this study, research and development level 4 was executed with 4 steps, i.e. product design, product validity test, product revision, and limited trial. This study was aimed at developing an audiovisual media product and testing the effectiveness of the media. The media would undergo limited trials with the Quasi Experimental model. Limited trials were conducted by distributing questionnaires to the construction workers before and after the audiovisual media was presented. The study took place at the site of *PT Sasmito Proyek Pembangunan Gedung FMIPA UGM* during May-July 2021.

Subjects for the audiovisual media validity tests were university lecturers. The audiovisual media validators were 2 lecturers who were experts in their fields. The material expert was selected among those possessing expertise in occupational safety and health, i.e. Mr. Muchamad Rifai SKM, MSc. The media expert was selected among the lecturers who had expertise in audiovisual media, i.e. Ms. Septian Emma Dwi Jatmika, MKes. Target population to measure the level of workers' knowledge in this study were all the employees of *PT Sasmito Proyek Pembangunan Gedung FMIPA UGM*, as many as 40 people. The sample to measure the level of workers' knowledge were all the target population who met the inclusion and exclusion criteria. The inclusion criteria to be considered in selecting the sample for the measurement of workers' knowledge level were the ability to read and write, minimum employment service of 1 year, and attendance in PPE application training. The workers who did not take the pretest or posttest were put in the exclusion criteria. Based on the inclusion and exclusion criteria, there were 40 workers as the sample of this study. The analyses implemented to process the data in this study were univariate and bivariate analyses.

## 3. Results

### 3.1. Media Development

The development of audiovisual media in this study was started with the organization (collection and composition) of materials to be presented, i.e. various kinds of personal protective equipment in construction works. Once the materials were organized, animations to support the materials were collected. The collected animations were then uploaded onto the *web exp/lee* and further organized and edited to suit the prepared materials. The development of audiovisual media using *web exp/lee* resulted in animation video without voice. *Voice over* to support material presentation was recorded separately.

*Voice over* recording was done by Rahmi Dewi Utami. The *voice over* was then edited using VN application. The result of *voice over* was then combined with the previously produced animation video using *Inshot* application.

The final result of the development of audiovisual media was a video containing moving animation. The resulting audiovisual media could be accessed via Youtube with the following link: <https://youtu.be/He1Lfc92r2k>. In the video, an object might be described with movement combined with suitable voices. The video could also present information regarding various kinds of personal protective equipment in a relatively short time and simultaneously influence workers' attitudes (Kustandi & Sutjipto, 2013).

### 3.2. Workers' Characteristics Based on Level of Education

The workers characteristics based on their acquired levels of education is presented in the following table:

**Table 1.** Education level of the workers of PT Sasmito Proyek Pembangunan Gedung FMIPA UGM

Education Level	Frequency	Percentage
Primary	7	17,5%
Junior High	15	37,5%
Senior High	17	42,5%
Tertiary	1	2,5%

Total	40	100%
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The frequency distribution among the respondents based on their level of education as seen in Table 1 showed that the majority of the workers at *PT Sasmito Proyek Pembangunan Gedung FMIPA UGM* were graduated from senior high schools with as many as 17 people or 42.5%. Out of the 40 workers, only 1 has graduated from tertiary education or as few as 2.5%.

### 3.3. Validity Test of Audiovisual Media

Prior to presentation to the workers, validity tests were conducted to the audiovisual media by material and media experts. The results of the validity tests are presented in the table as follows:

**Table 2.** Results of Validity Tests by Material Expert

Aspect	Frequency					$\Sigma$ Score	$\Sigma$ Item	Weigh Max	%
	1	2	3	4	5				
Language				2		8	2	10	80%
Content Standard				5		20	5	25	80%
Learning			2	2		14	4	20	70%
Total						42	11	55	76%

Based on Table 2 regarding the results of the audiovisual media evaluation by the expert, from the language perspective, it got the score of 80%. From the aspect of content standard, it was scored 80%. Whereas, from the learning aspect, it was scored 70%. In total, the final score was 76%, meaning that it suited the “feasible” criterion.

In spite of being categorized as feasible, a number of notes were made by the material expert so that some revisions were required. The audiovisual media was allowed to be presented to the workers of *PT Sasmito Proyek Pembangunan Gedung FMIPA UGM* upon the completion of some revisions. The followings are some inputs from the material expert lecturer:

1. Provide illustration of the incidents or the effects
2. In the description regarding masks, the word “paparan” (exposure) should be replaced with “pajanan”. To describe the types of masks, the word “yaitu/adalah/antara lain” (is/among others) should be used
3. Explain the type of mask to wear to avoid Covid-19
4. Explain foreign materials which could be inhaled
5. Regarding respiratory protection, explain the exposure which could be avoided according to the type of mask
6. Explain eye and face protection which were commonly used in construction sector
7. Consider the context aspect whether it is interesting or not

In addition to the results of the validity tests by the material expert, the results of the validity tests by the media expert are also presented in the form of a table as follows:

**Table 3.** Validity Test Result by Media Expert Before and After Revisions

Aspect	$\Sigma$ Score		$\Sigma$ Item	Weigh Max	%	
	Before	After			Before	After
Language	6	7	2	10	60	70
Media Quality	24	29	6	30	80	96
Audio and visual appearance	15	25	5	65	69	76
Total					69	85

Based on Table 3 regarding the results of audiovisual media evaluation by the media expert, the language aspect was scored 60%. The media quality was scored 80%, while the audio and visual appearance aspect was scored 60%. Overall, the total score was 69%, meaning that the media fit into the “feasible” criterion.

In spite of being categorized as feasible, a number of insights were provided by the media expert so that some revisions were required. The audiovisual media was allowed to be presented to the workers of *PT Sasmito Proyek Pembangunan Gedung FMIPA UGM* upon the completion of some revisions and evaluations by the media expert. The followings are some inputs from the media expert lecturer:

1. Material presentation was too fast
2. Transition between the materials should be given more time
3. At the end of the presentation, it was suggested to add information of the video production team, supervisors, and expert lecturers
4. Sound of music was too loud and quite disturbing during the listening of the material presentation. This could be solved by lowering the volume when the materials were explained and increasing it (background) during the material transitions to show that there were transitions between materials.
5. *Explee* watermark to be deleted
6. In the section explaining respiratory protection equipment, adjustment (synchronization) should be made between the image and the voice
7. The cover should be suited to the beginning section of the video

Based on [Table 3](#) regarding the results of audiovisual media evaluation by the media expert after revisions were completed, the language aspect was scored 70%. The media quality was scored 96%, while the audio and visual appearance was scored 76%. Overall, the total score was 85%, meaning that the media fit into the “highly feasible” criterion”.

Although being categorized as highly feasible, there were still some inputs from the media expert so that some revisions were required. The audiovisual media was allowed to be presented to the workers of *PT Sasmito Proyek Pembangunan Gedung FMIPA UGM* upon the completion of some revisions. The input from the media expert lecturer was the improvement in the accompanying music in the video.

### 3.4. Limited Trials

Limited trials were executed by distributing questionnaires to workers before and after the intervention. The results of limited trials were the information on the level of knowledge among the workers before and after the intervention. The level of knowledge among the workers before the intervention was executed is presented in the table as follows:

**Table 4.** Workers' Level of Knowledge Before and After Intervention

Level of Knowledge	Pre test		Mean	Post test		Mean	(-) rank	(+) rank	Ties rank
	Frek	%		Frek	%				
Low	3	7,5%	11,20	0	0%	13,18	1	30	9
High	37	92,5%		40	100%				

Based on [Table 4](#), it is known that, among the 40 respondent workers, 37 of them possessed high level of knowledge or as many as 92.5%, while 3 workers had low level of knowledge regarding PPE or as few as 7.5%. Even though most of the respondents possessed high level of knowledge, knowledge improvement measures were still carried out to achieve zero accident. The level of knowledge regarding PPE among these 40 workers after the intervention was categorized as high.

### 3.5. Analysis of Workers' Level of Knowledge Before and After Presentation of Audiovisual Media

The average difference in the workers' level of knowledge between before and after the presentation of the audiovisual media was examined using Wilcoxon Sign Rank Test and was presented in the table as follows:

**Table 5.** Difference in the Workers' Level of Knowledge Between Before and After the Presentation of the Audiovisual Media

Variable	Pre-Test Mean (SD)	Post-Test Mean(SD)	Average Difference	p-value
Level of Knowledge	11,20 (1,786)	13,18(1,551)	1,98	0,000

Based on [Table 5](#), it is known that the examination using Wilcoxon Sign Rank Test regarding the workers' level of knowledge before and after the intervention has resulted in the *p-value* of 0.000 or <0.05 which might be concluded that there was average difference in the levels of knowledge between the one before and the one after the intervention at the value of 1.9.

#### 4. Discussions

Learning media is a means to create learning process by delivering messages which can stimulate thinking, feeling, and willing of the audience. Several factors to consider in the selection and application of a media are the characteristics of the message receivers, message contents, and the method to explain the messages. These three factors need to be paid attention in order to achieve the objectives of applying the media, i.e. improvement in the learning outcomes. There have been various studies that show that the use of learning media brings positive effects. Some of the positive effects of the application of learning media are: less rigid and more interesting presentation of materials, more materials can be presented in relatively short time, improving knowledge and attitude of workers towards more positive conditions. There are various selections of media to support learning where audiovisual is one of them ([Kustandi & Sutjipto, 2013](#); [Kholid, 2017](#)).

Examples of audio-visual media that can be found in daily life are television, radio, movies, and commercials (advertisements). The type of audiovisual media developed in this study is categorized as movies since it contains voices and moving images in the form of animations. A movie can be regarded as a strong means of communication since it can deliver messages in a speedy and effective manner. A study shows that human beings memorize 20% of information that they hear and 30% of what they see. However, human beings can memorize 50% of the information which they see and hear ([Al-Tabany, 2017](#)).

Based on the research executed, a description of respondent characteristics based on their level of education was gained. The data on respondents' frequency distribution based on their level of education showed that the majority of the workers of *PT Sasmito Proyek Pembangunan Gedung FMIPA UGM* were senior high school graduates with as many as 17 people or 42.5%. Among the 40 respondents, only 1 person graduated from tertiary education (bachelor degree) or as few as 2.5%.

Before the audiovisual media was presented to the workers, feasibility tests were conducted by a material expert and a media expert. Upon the evaluations, a score of 76% was given by the material expert, and 69% before revisions and 85% after revisions by the media expert. Based on the score by the material expert, the audiovisual media in this study was categorized as "feasible" with some revisions. Meanwhile, based on the score by the media expert, the media was initially categorized as "feasible" with some revisions. Upon the completion of some revisions, the media was categorized as "highly feasible".

Based on the evaluation by the material expert, the language aspect of the audiovisual media was scored 80%, while the content standard was scored 80%, and learning aspect was scored 70%. The audiovisual media still required improvement in the choice of vocabularies or terminologies. In the explanation of respiratory protective equipment, further explanation was still required regarding the type of mask which could be used to avoid the exposure to Covid-19 virus. In addition, further explanation was required regarding foreign materials which might be inhaled and the types of exposure which could be avoided based on the types of masks. With regard to the description of personal protective equipment for eyes and face, an explanation was required regarding the type of eye and face protective equipment which were commonly used in construction works. The

audiovisual media was categorized as “feasible” based on the evaluation by the material expert so that it could be presented to the construction workers of *PT Sasmito Proyek Pembangunan Gedung FMIPA UGM* after some revisions were made. In developing audiovisual materials, attention should be paid to the selection of words or terminologies and to the target audience so that the presentation could be received and understood easily.

This is in line with Kholid (2017) stating that there are a number of factors to consider in selecting and applying a media, i.e. characteristics of the message receiver, message contents, and the way of explaining the message. These three factors need to be considered in order to achieve the learning objective, i.e. the improvement in learning outcomes. Counseling media should always refer to the need and should be able to be executed by the target of counseling (Leilani et al., 2015).

Based on the evaluation by the media expert, after some revisions were made, the language aspect of the audiovisual media got an improved score of 70%, the quality of media got 96%, and the audio and visual appearance got 76%. The total score of the audiovisual media improved by 16% from before to after revisions. The previous score of 69% improved to 85% after some revisions were made. The audiovisual media which was previously categorized as “feasible” changed to “highly feasible” so that it was allowed to be presented to the workers of *PT Sasmito Proyek Pembangunan Gedung FMIPA UGM* after improvement was made to the backsound music.

After improvement was made, presentation of the materials became better, suited to the illustration, and not in a hurry. The audiovisual media in this study was presented with illustration, narration, and accompanying backsound music. In the production of the audiovisual media, the composition and organization of materials, narration, illustration, and backsound music should be done properly so that it could be seen and listened to by the workers with comfort. Without proper composition, an audiovisual media would confuse the workers and would not achieve the objective of the presentation, that is the improvement of knowledge. Audiovisual media animation should also be suited to the materials to be presented so that it would help the workers in visualizing the materials.

This is in line with the study by Muthia, Fitriangga dan Yanti (2015) explaining that audiovisual media presents motions, images, and voices so that it is not monotonous. The results of this study showed that the presentation of health counseling using audiovisual media was more effective to improve the knowledge compared to the presentation by speech (lecturing) with the *p-value* of 0.041. This was proven by the improvement in the knowledge of the test group with intervention of audiovisual media with the rate of 86% which was higher than the achievement of the control group with lecturing intervention which was 57.02%. Motions, images, and voices presented in an audiovisual media should be suited to the content of the material to be presented.

This is in line with the study conducted by Mawan et al. (2017) stating that audiovisual materials should be illustrated according to the material contents to be understood easily. In addition, the use of video may overcome space and time constraints since there is only 15 minutes available for the presentation. In the study, the average score before intervention was 61.33 and average score after intervention was 89.10. The difference in the score of the people’s knowledge was shown by the *p-value* of  $0.00 < 0.05$  so that it could be concluded that the use of audiovisual media is effective in improving the knowledge among the people.

The average level of knowledge among the workers of *PT Sasmito Proyek Pembangunan Gedung FMIPA UGM* before presented with audiovisual media was 11.20, whereas the score after they were presented with audiovisual media was 2.6. Based on the test with Wilcoxon Sign Rank, the average difference of the level of knowledge among the workers of *PT Sasmito Proyek Pembangunan Gedung FMIPA UGM* between before and after the intervention was the *p-value* of 0.001 ( $<0.05$ ). Therefore, it could be concluded that there was a difference in the knowledge between before and after the intervention. Based on the average difference in the workers’ level of knowledge between before and after intervention, it was found that there was an improvement in the workers’ knowledge level after the intervention.

Audiovisual media has been effective in improving the level of knowledge among the workers since the media involved two senses, i.e. sighting and hearing senses. In addition, audiovisual media in the form of moving animation was a new campaign media among the construction workers so that

it easily attracted the workers' attention. The materials in the audiovisual media were organized in good order and were narrated well so that they were easily received and understood by the construction workers.

This is in line with the study by Sugawara and Nikaido (2014) stating that counseling using audiovisual media involves sighting and hearing in one process so that audiovisual media becomes one of the good media to be used in counseling. In the study, there were the results showing the level of knowledge of patients before being presented with audiovisual media where 33.3% were categorized as "sufficient" and 66.7% were categorized as "insufficient". The patients' level of knowledge was found to improve after they were presented with audiovisual media. This could be proved from the fact that the number of patients whose level of knowledge was categorized as "good" became 10%, while those with "sufficient" and "insufficient" categories were 56.7% and 33.3% respectively.

In addition to being a good media for counseling, according to Sasmita, Ilmi, and Huriati (2017), audiovisual media is also one effective media for health counseling. In their study, the results showed that the number of respondents in the intervention group who were categorized as "good" during the pre-test was 12 respondents or 57.7% of the total respondents. Upon the provision of intervention, the number of respondents who were categorized as "good" during the post-test increased to 17 respondents or 81% of the total respondents. Meanwhile, the number of respondents who were categorized as "good" in the control group was not different between the pre-test and the post-test, i.e. 12 respondents or 57.1% of the total respondents. The Mann-Whitney test conducted by the researchers resulted in the *p-value* of 0.000 (<0.05), thus it could be concluded that there was correlation between health education conducted with audiovisual media and the knowledge of washing hands among the children of school age.

This is in line with the study by Fatimah et al. (2019) who conducted tests on the effectiveness of audiovisual media in the form of video to improve knowledge. The results of the study showed that the average level of knowledge among the people before intervention was 2.75, whereas the average level of knowledge after the intervention was 9.32. The analysis using *paired sample t-test* showed significant change in the people's knowledge with the *p-value* of 0.000, thus it could be concluded that the average level of knowledge among the group of people in the Operational Area of Medical Health Center Perumnas II RW 05 Pontianak Barat (Wilayah Kerja Puskesmas Perumnas II RW 05 Pontianak Barat) regarding G1R1J had significant difference between before and after presentation with audiovisual media in the form of video.

This is in line with the study conducted by Marizi, Novita dan Setiawati (2019) stating that there has been improvement in knowledge upon intervention of audiovisual media. In their study, the respondents whose knowledge was categorized as "good" consisted of only as few as 4 people or 13.3% of the total respondents, whereas those with sufficient knowledge were 15 people or 50% and those with insufficient knowledge were 11 people or 36.7% of the total respondents. Upon the intervention of audiovisual media, there was an increase in the number of respondents with good knowledge of IUD contraception with as many as 21 people or 70% of the total respondents, whereas those with sufficient knowledge were 8 people or 26.7% and those with insufficient knowledge were as few as 1 person or 3.3%. The bivariate analysis using Marginal Homogeneity statistical test resulted in the *p-value* of 0.0001 (<0.05), thus it was concluded that there was significant influence of audiovisual media regarding IUD on the knowledge of fertile age women at Puskesmas (Community Health Center) Sematang Borang in 2019.

Audiovisual media is an effective and efficient learning media since it involves two senses and help in overcoming space and time constraints. The importance of effective and efficient learning media is also explained in Quran, that is in Surah (Chapter) An-Naml (27) 28-30:

(28) Go with this my letter and throw it down unto them; then turn away and see what (answer) they return.

(29) (Balqis) said: "O chieftains, there hath been thrown unto me a noble letter,

(30) It is from Sulaiman, and it is: "In the name of Allah, the Beneficent, the Merciful".

These verses tell us about Prophet Sulaiman AS who delivered a message in the form of a letter to Queen Balqis using the media of a "hud-hud" bird. In that time, hud-hud birds were effective media



so that messages were delivered properly and as expected. The appointment of hud-hud birds as information delivery agents was an effort to develop effective and efficient communication (Pito, 2018).

Besides effective and efficient media, attractive learning media is also required to make respondents interested to pay attention to the presented materials. The importance of attractive learning media is also mentioned in the Quran in the Surah An-Naml (27) 44: It was said unto her: "Enter the hall." And when she saw it she deemed it a pool and bared her legs. (Sulaiman) said: "it is a hall, made smooth, of glass." Balqis said: "My Lord! I have wronged myself, and I surrender with Sulaiman unto Allah, the Lord of the Worlds."

It was described in the above surah that upon Queen Balqis' arrival at the palace, she was made amazed with the transparent floor looking like a fish pond. Queen Balqis then decided to repent and married with Prophet Sulaiman. This explains that Prophet Sulaiman applied sophisticated technology as a medium in that time to make Queen Balqis interested so that the Prophet's message was delivered properly (Pito, 2018).

#### 4. Conclusion

The audiovisual media is feasible to be presented to the workers of PT Sasmito Proyek Pembangunan Gedung FMIPA UGM based on the evaluation by the material expert with the total score of 76%. The audiovisual media is highly feasible to be presented to the workers of PT Sasmito Proyek Pembangunan Gedung FMIPA UGM based on the evaluation by the media expert with the total score of 85%.

High level of knowledge among the workers of PT Sasmito Proyek Pembangunan Gedung FMIPA UGM before audiovisual media presentation was possessed by 37 people or 92.5% of the total respondents. Whereas, low level of knowledge among the workers of PT Sasmito Proyek Pembangunan Gedung FMIPA UGM before audiovisual media presentation belonged to 3 people or 7.5%. The average level of knowledge among the workers of PT Sasmito Proyek Pembangunan Gedung FMIPA UGM before audiovisual media presentation was 11.20.

High level of knowledge among the workers of PT Sasmito Proyek Pembangunan Gedung FMIPA UGM after audiovisual media presentation was possessed by 40 people or 100% of the total respondents. The average level of knowledge among the workers of PT Sasmito Proyek Pembangunan Gedung FMIPA UGM after audiovisual media presentation was 13.18.

The tests with *Wilcoxon Sign Rank* resulted in the *p-value* of 0.000 (<0.05) meaning that there was a difference in the average level of knowledge among the workers of PT Sasmito Proyek Pembangunan Gedung FMIPA UGM between the condition before and the condition after the presentation of audiovisual media by the value of 1.98.

#### Declaration

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**Conflict of Interest:** The researchers declare that no conflict of interests exists in this study.

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