Analysis of Media Needs of Health and Safety Learning Based on Android Smartphone for Students

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Abstract In order to help teaching and learning activities in order to achieve learning objectives, learning media that are needed according to the needs and demands of the times are needed. Therefore we need a study that examines the needs of learning media. This study aims to determine the needs of health and safety learning media design that will be used in the learning process. The research sample is students of Mechanical Engineering Education Study Program, Faculty of Engineering, Yogyakarta State University selected based on stratified random sampling. Data obtained from questionnaires were then analyzed using quantitative analysis techniques with a percentage scale. The findings in this study are: (1) students prefer learning health and safety using image media with the acquisition of 77.8%, (2) students prefer exposure to occupational health and safety material divided into chapters with the acquisition of a score of 55.6%, (3) students prefer occupational health and safety media with background images and bright colors, (4) students prefer occupational health and safety learning that can be accessed on smartphones with 77.8% gain, and (5) students expect health and safety learning Android smartphone-based work can implement emergency features with 66.7% acquisition.

Keywords: health and safety, media needs analysis, learning media, android learning


1. Introduction

Education is an effort deliberately chosen to influence and help, which aims to improve knowledge, physical, and moral so that it can slowly deliver to the highest goals and ideals [1]. Education aims to teach humans to have the knowledge needed to improve their lives through the learning process; besides, education is an essential part of building a country. Education is a process that has specific goals that are directed to develop the potential of human beings. Besides, education is a step that is needed to get balance and perfection in life. The emphasis of education compared to teaching lies in the formation of individual consciousness and personality in addition to the transfer of knowledge and expertise. With this process, a country can pass down religious values, culture, thoughts, and expertise to generations, so that they are ready to face the brighter future life of the nation and state.

The learning process aims to educate students in learning how to obtain and process knowledge, skills, and attitudes to learn the subject matter presented so that it can be mastered well [2]. The learning process will produce human resources who have skills in their fields. Therefore education and learning are seen as an essential process involving significant components, namely students, educators, and learning resources that take place in a learning environment. Learning is a combination that is composed of human elements, facilities, equipment, and procedures that influence each other to achieve learning objectives [3]. In contrast, learning is a complex internal process involved in the cognitive, affective, and psychomotor domains [4]. Improving the quality of learning and learning is one of the bases for improving overall education. In learning technology, problem-solving in the form of learning system components that have been arranged in the function of design, utilization, and combined to become a complete learning system. Learning is a core activity in interaction education that involves educators and the transformation of material through learning. Efforts to improve the quality of education become an integrated part as an effort to improve the quality of people in aspects of ability, personality, and responsibility. To support this, appropriate learning media are needed so that the learning process can run well so that students can absorb the material taught by educators properly. Learning media is a form of intermediary used by humans to convey ideas, ideas, opinions to recipients [5].

Adjusting to the rapid technological development, moreover, one of the developments aimed at the field of communication technology, is a smartphone that can be used as a learning medium. This media can be classified as electronic learning media, which arises as a result of the development of advanced and renewable technologies.
The use of an android smartphone as a medium of learning is one of the solutions to create learning that is packaged in scientific and technological disciplines, as a container that plays a vital role in media in educational technology [6]. Smartphones have switched functions like a personal computer that is in the grip here. We can send messages, pictures, even videos, create documents, access social media, study, browse, and so on. In this regard, the role of the media becomes vital. Learning media in the form of technology are seen as applications of knowledge in the form of learning applications occupying strategic positions in facilitating and facilitating learning. The rapid development of information and communication technology and contact with almost all walks of life, without exception in the world of education. Data on the percentage of students aged 5-24 years who access information and communication technology in 2018 can be seen in (Table 1):

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Access to Information Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Smartphone</td>
</tr>
<tr>
<td>Elementary school</td>
<td>46,91</td>
</tr>
<tr>
<td>Middle School</td>
<td>81,72</td>
</tr>
<tr>
<td>High school</td>
<td>94,05</td>
</tr>
<tr>
<td>College</td>
<td>98,36</td>
</tr>
</tbody>
</table>

From the data in (Table 1), it can be described, the higher the level of education, the greater the percentage who use smartphones. Figures at the elementary level/equivalent are far below other levels of education. At the level of secondary and tertiary education, almost all students use smartphones. Meanwhile, the use of computers among students is not too extensive. The most significant contribution of smartphone usage is from students (colleges), where around 98.36% of students use smartphones. There are lots of operating systems on smartphones, one of which is Android. Android is the most popular operating system today that has been used by millions of smartphones. One of the latest learning media that fits the demands of the times is the Android smartphone-based learning media. Smartphone-assisted learning provides comfort, concise content, and enables learning without being limited by time and space [7]. Besides learning by using a smartphone can provide excellent experiences and opportunities in learning because learning becomes interesting, increasing productivity so that efficient use in the learning process [8]. In general, the benefits obtained are an exciting learning process, more interactive, the amount of teaching time can be reduced, the quality of learning can be improved, and the teaching and learning process can be done anywhere and anytime. Student learning attitudes can be improved [9]. Integrating information and communication technology is a business and the latest step in designing learning to be more effective and efficient in learning materials, especially occupational health and safety subjects. The use of smartphone-based learning can make learning more meaningful and make learning more centered on students. The use of android smartphone media that are connected to the internet can be used to listen and view videos related to lessons, find information. Technology is not the most crucial role in the learning process. In learning activities that integrate technology, students can use the internet to find information, analyze a matter, present the results of the analysis in the form of tables and graphs and read what they have obtained. The use of technology in the learning process like this will make students more active, better than they are only passive, only receive information. Integration and development of information technology in learning activities not only equip students with advanced technology skills, but more than that developing technology can improve things such as encouraging students to think critically, encourage collaboration and coordinate with friends, develop creativity and try, add communication skills, and last but not least is technology that can bring pleasant comfort in the teaching and learning process. In a pleasant learning environment, one can easily remember what he has learned because this learning process gives a distinct impression to students.

Occupational health and safety are activities that guarantee the creation of safe working conditions, avoiding physical and mental disruption through coaching and training, directing, and controlling the implementation of work [10]. Occupational accidents from several studies show that human factors are very influential, namely 80-85% [11]. Occupational safety and health is a policy program that is used to prevent the occurrence of accidents at work. The implementation of occupational health and safety is one form of an effort to create a workplace that is safe, healthy, free from pollution so that it can be free from workplace accidents and occupational diseases that can ultimately increase work efficiency and productivity. Laboratory or workshop is a place where students, students, lecturers, and researchers do work. This is not immune from the various possible dangers of various types of chemicals and equipment that are in it, other than that it can result in hazards that are not uncommonly high risk when doing work if you do not know-how and procedures for using the equipment to be used. Therefore, understanding and awareness of the safety and hazards of work in a laboratory or workshop are needed. There have been many accidents and damage to facilities and equipment. This can be avoided and anticipated if you know and always follow safe work procedures. In the current era of globalization, occupational health, and safety is one of the prerequisites stipulated in economic relations, trade, goods, and services between countries that must be fulfilled by all countries. Although the provisions regarding occupational health and safety have been regulated in such a way, in practice, it is not as expected. So many factors in the field that affect work health and safety, such as human, environmental, and psychological factors. Occupational safety and health need to be considered in the work environment because health is a condition or healthy situation of a person both physically and spiritually. At the same time, work safety is a condition where workers are guaranteed safety while working both in using machines, work tools, processing processes as well as workplaces and the environment is also guaranteed. Humans have sought work safety for a long time. In carrying out work, inadvertently in a conscious or unconscious state, humans have experienced accidents that result in injuries that may even take lives.
From this fact, humans try not to have accidents, or similar events will not be repeated. Of course, the methods applied in the past were different from those applied now, which is an effort made by improving work equipment and the way the system works. After knowing how to work, work principles, and introduction to work accidents and work safety, it can be useful for us as a guide before doing work. How to work and working principles are steps before and after we do work so that during the work process, there are no unwanted mistakes and can cause accidents that can harm yourself or others. For work safety, we need to know how we can avoid work accidents, and if an accident occurs, we already know how to handle it. In job security, the first thing that must be obeyed is the discipline of the rules and regulations that exist so that no accidents occur. The education that is implemented in occupational health and safety learning is considered essential for achieving maximum understanding so that every worker can understand both theory and practice. With the implementation of a culture of standby when working, it is expected that workers can do their jobs safely and comfortably without worrying so they can work optimally. Therefore, learning occupational health and safety is very important to educate in working, especially in the department of mechanical engineering, where the level of work accidents can occur in carrying out practices in the workshop. A work accident. Students who will practice in the field or the workshop must pay attention to occupational safety and health care so that during the work process in order to run appropriately and correctly. When doing work, students do not pay attention to the regulations that have been applied will harm the students themselves, tools, machines, and the environment. There are several stages in applying health and work safety that has been made by Yogyakarta State University to address the practice process in the field and the workshop for their students, namely (Figure 1):

![Figure 1. Stages in Implementing Occupational Health and Safety](image)

Seeing this phenomenon, researchers have the idea to analyze the needs of Android smartphone-based learning media, especially on learning health and safety. Based on the pre-survey results, the average student already has a smartphone with an Android operating system that they use daily for entertainment purposes, such as playing video games, chatting, listening to songs, and watching videos. This is certainly very unfortunate if the technology is only for entertainment purposes, such as playing games even though the technology can be appropriately utilized and has enormous potential to improve achievement in learning. Also, students showed that there was no use of android-based media to study work health and safety lecture material. Consideration of the choice of instructional media has an essential position as the key to the successful delivery of material according to the objectives. The choice of media must be based on learning competence, characteristics of the target students, characteristics of the media concerned, time, cost, availability of facilities, the context of use, and technical quality of the media [12]. Regarding this matter, the researchers invited students to use their smartphones not only for entertainment purposes but as a source of learning to improve learning achievement. Before the process of making learning media, especially on occupational health and safety material, efforts are needed to find out the demands and criteria of the desired learning media. Therefore, this research is preliminary research before the product manufacturing process that aims to analyze the needs of students, especially in the scope of Mechanical Engineering Education, Faculty of Engineering, Yogyakarta State University regarding media designs that are preferred and following the demands of the times.

2. Research Methodology

![Figure 2. Research Steps](image)

This study uses quantitative research, which is expected to describe the needs of students regarding learning media on learning health and safety. Quantitative research, based
on the philosophy of positivism, is used to examine specific populations or samples \[13\]. Quantitative data obtained were analyzed first for tabulation, in order to facilitate data processing, then the average score was calculated using a percentage scale. A random sampling technique does sampling. This aims so that all levels are represented. The data analysis stage is to analyze and make interpretation of the results of the research data obtained. Data collection is done by using a closed questionnaire that contains questions following the objectives to analyze the needs, before using the questionnaire first validated. Validation of needs analysis instruments by asking for input and advice from experts. The steps taken by researchers to analyze the needs of students in occupational health and safety lecture material can be seen in (Figure 2).

3. Subjects and Research Sites

<table>
<thead>
<tr>
<th>Subject</th>
<th>Place</th>
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</thead>
<tbody>
<tr>
<td>Undergraduate students</td>
<td>Mechanical Engineering Study Program, Faculty of Engineering, Yogyakarta State University.</td>
</tr>
<tr>
<td>Diploma-3 students</td>
<td></td>
</tr>
</tbody>
</table>

4. Research Results and Discussion

Occupational health and safety courses for students majoring in Mechanical Engineering Yogyakarta State University are compulsory courses that must be taken by every student. Therefore, researchers are interested in researching to find out the preferred learning media criteria and following the demands of the times and provide alternative learning media used in learning. Based on the results of the needs analysis related to the needs of learning media for occupational health and safety, the results obtained are:

1) Students prefer learning health and safety using picture media with the acquisition of 77.8%. (Figure 3)

2) Students prefer exposure to occupational health and safety material divided into chapter sections, with a score of 55.6%. (Figure 4)

3) Students prefer health and safety media with background images and bright colors with a score of 66.7%. (Figure 5)

4) Students prefer learning health and safety that can be accessed on a smartphone with the acquisition of 77.8%. (Figure 6)

5) Students expect health and safety learning based on Android smartphones to be able to implement emergency features with the acquisition of 66.7%. (Figure 7)
Table 3. Research Result

<table>
<thead>
<tr>
<th>Aspek</th>
<th>Description</th>
<th>Result (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Media</td>
<td>Students prefer learning health and safety using image media.</td>
<td>77,8%</td>
</tr>
<tr>
<td>Material</td>
<td>Students prefer exposure to occupational health and safety material divided into chapter sections.</td>
<td>55,6%</td>
</tr>
<tr>
<td>Display</td>
<td>Students prefer health and safety media to work with background images and bright colors.</td>
<td>66,7%</td>
</tr>
<tr>
<td>Flexibility</td>
<td>Students prefer occupational health and safety learning, which can be accessed on the smartphone.</td>
<td>77,8%</td>
</tr>
<tr>
<td>Features</td>
<td>Students hope that health and safety learning based on Android smartphones can implement an emergency feature.</td>
<td>66,7%</td>
</tr>
</tbody>
</table>

5. Research Limitations

This research was only conducted to describe the design needs of health and safety learning media. It was only carried out on students of the Mechanical Engineering Education Study Program, Faculty of Engineering, Yogyakarta State University.

6. Conclusions

This study can provide an overview of instructional media designs that fit the needs of students and according to the demands of the times. The findings in this study are: (1) students prefer learning health and safety using image media with the acquisition of 77.8%, (2) students prefer exposure to occupational health and safety material divided into chapters with the acquisition of a score of 55.6%, (3) students prefer occupational health and safety media with background images and bright colors, (4) students prefer occupational health and safety learning that can be accessed on smartphones with 77.8% gain, and (5) students expect health and safety learning Android smartphone-based work can implement emergency features with the acquisition of 66.7%.

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