The Development and Usability of Interactive Comics Based on 5S Practices to Enhance Students' Comprehension of Safety and Cleanliness in Workplaces and Labs

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Abstract: 5S practice aims to create a clean, orderly, and efficient work environment. The existing form of delivery of 5S practices is less attractive to students because it is only delivered in front of workshops and laboratories with unclear writing and long explanations. Therefore, the objective of this study is to develop and evaluate the applicability of interactive comics based on 5S practices to enhance students' understanding of safety in workshops and laboratories at Sekolah Menengah Kebangsaan Sultan Abdul Aziz, Teluk Intan. This research study has used quantitative methods to collect data from the respondents. The design of the interactive comic is based on the ADDIE Model (Analysis, Design, Development, Implementation, Evaluation). Through the research that has been conducted, the sample for this study involved 260 students who used the workshop and laboratory at SMK Sultan Abdul Aziz. The data obtained was analysed using frequency analysis to obtain the mean value and standard deviation using the Statistical Package for Social Sciences (SPSS) software version 27. The results of the study show 5S Practical Interactive Comic Evaluation has a mean of 4.462 and a standard deviation of 0.380, followed by animation rating (mean: 4.453; standard deviation: 0.416) and overall satisfaction of the 5S Practical Interactive Comic (mean: 4.502; standard deviation: 0.403). This study shows that students are more interested in reading and understanding the 5S practice in the form of interactive comics than in the conventional form. This study also shows that this interactive comic of 5S practices provides the benefits and importance of implementing 5S practices clearly. With this, it can be concluded that the development of interactive comics of 5S practices can help teachers to explain 5S practices to students more interactively.

1.   Introduction

The 5S practice, originally from Japan, was initially designed and introduced in industries and businesses to enhance operational efficiency and effectiveness (Asaad, Yusoff and Saad, 2012). In the education sector, the implementation of 5S practices in private and public schools aims to improve safety levels, systematic management, and maintain orderly and comfortable workshop and laboratory conditions for students to engage in teaching and learning processes. However, some students' dislike for reading leads them to underestimate these practices because 5S practices in schools are often provided in long descriptions spanning two to three sheets of paper with unclear writing. To address this issue, the innovation of illustrated comics related to 5S practices can help students better understand and apply 5S practices in workshops and laboratories during the teaching and learning process.

These 5S practices are not fully implemented because some teachers believe that these tasks are time-consuming, complicated, trivial, and not their responsibility to execute (Yulia, 2024). The existing delivery format of 5S practices, which is less engaging for students, is often just posted in front of workshops and laboratories with unclear writing and lengthy explanations. This results in the 5S practice delivery being less effective for students. According to Nikmah et al. (2019), comic media fundamentally helps to encourage and stimulate students' interest in learning. By

developing interactive 5S practice comics, students are easily attracted to the interesting content and will read it. The

2.   Literature Review

2.1   5S Practice

The 5S practice originated as a management approach in private sectors such as Japanese companies and factories (Michalska & Szewieczek, 2007). It was introduced in Singapore in 1986 and later adopted in Malaysia, Thailand, Korea, China, India, Indonesia, Sri Lanka, Russia, Hungary, Poland, Bulgaria, Colombia, Uruguay, Brazil, Costa Rica, and Mexico (Noranita, 2015). The 5S practice, adapted from Japanese terms, is expressed in Malaysian as: Sisih (Seiri), Susun (Seiton), Sapu (Seiso), Seragam (Seiketsu), and Sentiasa Amal (Shitsuke). Here is a brief description of each of the five 5S practices.

2.2   Comics as a Learning Medium

21st-century learning has expanded beyond traditional classroom environments (Bakar, 2016). Comic-based learning has become popular due to its ability to offer new learning experiences and boost student motivation (Deligianni & Pouroutidi, 2016). Comics can serve both as teaching aids and self-learning media (Sigit et alk., 2024) and the rising interest in comics has made comic literacy a critical component of new media pedagogy (Duffy, 2016). Comics come in various forms, including picture comics and text-image comics, with examples like the "Father and Son" strip (Plauen & Rottenberg, 2017) being well-known. Cartoons often convey values such as patriotism and kindness, and are designed for educational purposes (Şentürk & ŞİMŞEK, 2022). The ease of understanding comics makes them suitable teaching tools for education (Weitkamp & Burnet, 2007), and using media in learning can enhance student interest and motivation (Fitri, 2021).

2.3   The Effectiveness of Comics as a Learning Medium

Saputro (2016) evaluated comics with 46 students and experts in media and teaching materials, focusing on aspects like design, color, and content. The study found that scientific comic media effectively generated student interest and improved understanding of ecosystems. It concluded that comics could be a valuable alternative teaching tool for seventh-grade science, recommending their use and highlighting the need for collaboration among educators to support and resource these materials.

Sukmanasa, Indiyani, & Novita. (2017) developed digital comic media for teaching Social Studies to fifth-grade students in Bogor. Traditional teaching methods were deemed less effective, leading to low student interest. The study showed that digital comics increased student engagement and learning outcomes. The research involved validating the material with teachers and highlighted the effectiveness of digital comics in enhancing student motivation and learning.

Fitria et al. (2023) explored the use of comic media in science education and its impact on student learning outcomes. The study defined comic media as a medium for conveying teaching messages and found that comics improved student learning and reduced boredom compared to traditional lectures. It emphasized the positive effects of comic media on student understanding and test scores, advocating for its integration into science education.

Zakaria et al. (2023) examined the use of comic strips as an alternative teaching tool for disaster education in primary schools in Aceh, Indonesia. The comics, validated by experts, were found to be engaging and effective for teaching disaster themes. The study concluded that comic strips could significantly enhance student engagement and understanding in disaster education, providing a fun and effective learning experience.

2.4   The Need for Comics in Translating Information

Comics play a crucial role in conveying information in a unique and effective way to students, combining illustrations and text to present stories and information visually (Mendiburo-Seguel & Heintz, 2020). By using images and illustrations, comics help students understand concepts and situations more clearly and engagingly. Developing interactive 5S practice comics can increase student interest in learning and applying 5S practices in daily life, as well as reduce accidents through clear visualization.

Comics often use engaging and memorable visual elements, which aid students in retaining information more effectively. The use of simple language in comics also makes understanding easier. In terms of translation, comics are an excellent tool for presenting information in a more easily understandable manner. They are not only used in learning

sessions but also serve as interactive and effective guides for safety and cleanliness in workshops and laboratories, making the 5S practices more appealing and comprehensible to students.

3.   Methods

3.1   ADDIE Model

The researcher chose the ADDIE model to develop the interactive 5S practice comics because it is a fundamental instructional design model and the basis for many other models (Dousay & Stefaniak 2018). The ADDIE model consists of five stages: (i) Analysis; A needs analysis review is conducted privately online. (ii) Design; Preparation of tests, selection of media, selection of format, and initial comic design (iii) Development; Develop software based on design planning and elements such as text, images, graphics, paper selection, and the selection of comic and animation categories (iv) Implementation; Expert validation and pilot study and (v) Evaluation; 260 students evaluated the usability of the interactive 5S practice comic (Larson & Lockee, 2014; McKenney & Reeves, 2012; Morrison, Ross & Kemp, 2004). The ADDIE model is an iterative instructional design process that involves formative assessment at each stage, allowing for a return to previous stages if necessary. In this study, the development of interactive 5S practice comics used the ADDIE model and was evaluated by students at SMK Sultan Abdul Aziz, Teluk Intan. The researcher gathered both positive and negative feedback from students and made improvements based on this feedback, which might require returning to earlier phases to enhance the product.

3.2   Population and Sample

According to Yuliana, Sugiyono, & Mehta. (2021) the population is the general area consisting of objects or subjects with specific qualities and characteristics to be studied, while Gay and Airasian (2003) describe the population as the target group for researchers. Zaidi & Lee (2021) emphasize the importance of choosing an appropriate sampling technique for survey studies, with the sample representing the population (Arikunto, 2002). The researcher used cluster random sampling among 800 students at SMK Sultan Abdul Aziz who use workshops and laboratories, with a sample size of 260 students based on the Krejcie & Morgan table. The purpose of the sample is to examine the effect of using 5S practice protocol-based comics on students' understanding of safety and cleanliness in workshops.

3.3   Pilot Study

A pilot study was conducted using two sets of questionnaires distributed randomly to 30 students at SMK Sultan Abdul Aziz, Teluk Intan, Perak. The purpose of this pilot study was to determine whether the items in the questionnaires could assess the usability of the Interactive 5S Practice Comic in terms of its evaluation, animation evaluation, and overall satisfaction. The data obtained from the pilot study were analyzed using the Statistical Package for Social Sciences (SPSS) version 27. Cronbach's Alpha was used to determine the reliability of the questionnaire items.

4.   Results and Discussion
4.1   Development of 5S Practice Interactive Comics

The construction of this 5S practice interactive comic began with designing the front cover. The development of this cover is one of the important elements in producing interactive comics practicing 5S, as it determines the first view for the target group. The resulting front page is in accordance with the requirements analysis that has been carried out and displays appropriate and easy-to-understand pictures, headings, and graphics (Figure 1). Furthermore, the researcher made a script based on the content that had been produced from the needs analysis, namely using easy-to-understand language suitable for the target group, namely SMK Sultan Abdul Aziz students, and using *an* appropriate font (Figure 2) (Figure 3). In addition, the researcher has also created visual characters such as teachers and students. A good visual character is one that can be distinguished in terms of shadow images such as shirt colour, use of glasses, and hairstyle (Figure 4).
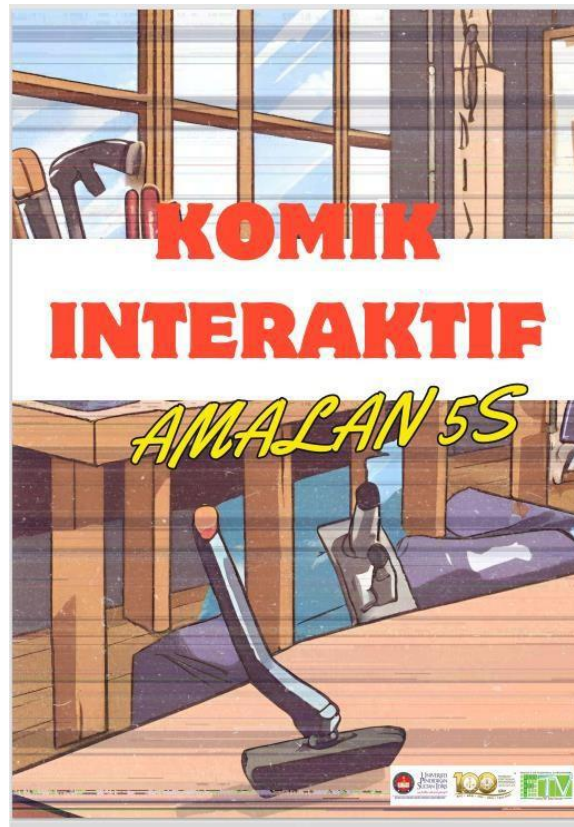
Fig. 1: The front page of the comic

Fig. 2: An interactive comic on 5S practices that uses easy-to-understand language

Fig. 3: Use of appropriate fonts

Fig. 4: Visual characters in the 5S practice interactive comic

4.2   Validity and Reliability

The interactive 5S Practice comic was developed and sent to experts for validation to ensure it meets established standards. Validating the content through experts is crucial in module development, drawing from literature review, representative populations, and expert panels (Burn & Grove, 2010). The comic was validated by two experienced experts in agricultural education from the Department of Agricultural Science at Universiti Pendidikan Sultan Idris. Following

the experts' validation, the researcher made improvements based on their feedback to address any deficiencies in the interactive comic.

Data obtained from the pilot study were analysed using Statistical Package for Social Sciences (SPSS) version 27. Cronbach's Alpha was used to determine the reliability of the items in the questionnaire. The analysis results from the pilot study showed that the Cronbach's Alpha scores were 0.965 for 5S Practical Interactive Comic Evaluation, 0.914 for animation rating, and 0.881 for Overall satisfaction of the 5S Practice interactive comic. All three Cronbach's Alpha scores demonstrate a very good and effective level of reliability with high consistency. The high level of consistency indicates that the data can be used in the actual research study (Bond & Fox, 2015).

4.3   Demographic Profiles Respondents

A total of 260 students of Sekolah Menengah Kebangsaan Sultan Abdul Aziz, Teluk Intan were randomly selected to help conduct the study as respondents to analyse the needs of interactive comics. The analysis was conducted online using the "*Google Forms*" platform and the respondents were students from form one to form five who used workshops and laboratories (Table 1).

Table 1: Demographic profiles respondents

Variable	Category	Frequency	%
Gender	Male	111	42.7
	Female	149	57.3
Age (old)	13	34	13.1
	14	34	13.1
	15	39	15.0
	16	82	31.5
	17	71	27.3
Workshop and laboratory use	Science Lab	42	16.2
	Physic and Chemical Lab	32	12.3
	RBT Workshop	50	19.2
	SRT Workshop	23	8.8
	Agricultural Workshop	44	16.9
	PVMA Workshop (Aquaculture)	36	13.8
	PVMA Workshop (Processing)	33	12.7

4.4   5S Practice Interactive Comics Usability Assessment

Based on Table 2, all sections interactive 5S comic evaluation, animation assessment, and overall satisfaction with the interactive 5S comic received positive feedback from respondents. The highest mean score (Table 2) for the interactive 5S comic evaluation, indicating that respondents clearly understood and appreciated the content of the comic. The comic emphasizes workplace organization and cleanliness, key aspects of the 5S technique from Japan, which includes Sort, Set in order, Shine, Standardize, and Sustain to ensure cleanliness and standardization (Nurdiawati, Jubaedi, & Wada, 2023). As a Lean Management tool, 5S uncovers waste and maintains an orderly environment (Niemann, Reich, & Stöhr, 2024). The percentage distribution indicates 66.2% of respondents strongly agree and 30.0% agree that the comic effectively represents the 5S concept. Only 2.7% somewhat disagree, with a minimal percentage either less agreeable (0.8%) or strongly disagreeing (0.4%). This aligns with Wulandari & Daryanto (2022) who found that students are more engaged with illustrated books compared to textbooks.

The lowest average score of 4.453 was for the animation evaluation. This lower score reflects issues with animation consistency due to the use of Canva, which resulted in less engaging animations. However, the choice of character features and color usage was effective. Fitri (2021) emphasize that media use in education can boost student motivation. Thus, while the animation's effectiveness could be improved, it remains crucial for enhancing student engagement with the interactive 5S comic. The interactive 5S practice comic's use of attractive and creative colors. Effective color use is essential for engaging audiences and enhancing aesthetic appeal, contributing to an immersive

experience (Zhao, 2020). Creative color schemes are crucial for captivating audiences and improving user experiences in educational and artistic contexts. The percentage distribution shows that 60.4% of respondents strongly agree that the use of colors is engaging and creative, while 34.6% agree with this assessment. Conversely, 4.2% of respondents somewhat disagree with the use of colors, and a small percentage (0.4%) either somewhat disagree or strongly disagree. The item score is high, with a mean of 4.54 and a standard deviation of 0.63.

Regarding the overall satisfaction with the interactive 5S comic, the researcher states that the comic's design is suitable for students. Comics have been shown to be effective educational tools that engage students and improve learning outcomes. Studies indicate that comics appeal to students, making the learning process more engaging and enjoyable. A goal-directed design approach was used to gain user perspective in developing supporting tools to visualize the material's crucial points in the form of comic strips, and the resulting user interface model supports teachers in delivering learning material in comic form following the expected objectives.The percentage distribution shows that 65.8% of respondents strongly agree that the comic's design is appropriate for students, while 31.2% agree. Conversely, 2.3% of respondents somewhat disagree, and 0.8% strongly disagree that the comic's design is suitable for students. The item score is high, with a mean of 4.61 and a standard deviation of 0.61.

Table 2: Means and standard deviations of interactive 5S comic evaluation, animation assessment, and overall satisfaction

Section	Mean	Std. Deviation
5S Practical Interactive Comic Evaluation)	4.462	0.3
Animation rating	4.453	0.4
Overall satisfaction of the 5S Practice interactive comic)	4.502	0.4

5. Conclusion

The overall evaluation of the usability of interactive 5S practice comics at SMK Sultan Abdul Aziz, Teluk Intan, shows a positive impact on students in enhancing their understanding of safety and cleanliness in workshops and laboratories. The researchers successfully achieved the two main objectives, demonstrating that the innovation through comics is well received by the students. This study emphasizes the importance of safety and cleanliness in high-risk environments such as workshops and laboratories, where teachers need to play an active role in ensuring students are always safe. In conclusion, these interactive comics not only assist in conveying 5S practices in an easily understandable manner but also serve as a valuable guide for teachers and students in the future.

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