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FIRE CLASS WEBSITE: A DIGITAL TRAINING PLATFORM TO ENHANCE ARFF EMERGENCY PREPAREDNESS AT AIRPORT

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Abstract

Emergency Response Planning (ERP) is a comprehensive framework developed and periodically evaluated by airport operators to address potential threats that may affect aviation safety and operational continuity. However, conventional training methods still limit personnel's access to updated learning resources. This study aims to develop the Fire Class website as a digital learning platform that provides structured ERP training materials to improve the training effectiveness of Airport Rescue and Firefighting (ARFF) personnel. The research employed a Research and Development (R&D) approach using the ADDIE model, consisting of five stages: Analysis, Design, Development, Implementation, and Evaluation. Quantitative data were analyzed through expert validation and user assessments. The results show that the Fire Class website achieved a "Highly Feasible" category with an expert evaluation score of 93.3% and a user satisfaction score of 90.8%, indicating strong acceptance and usability. These findings confirm that web-based learning media are effective in enhancing training accessibility, flexibility, and engagement for ARFF personnel. The Fire Class website contributes to the digital transformation of aviation safety education by providing an adaptive, cost-efficient, and scalable model for continuous professional development.

Keywords: *airport rescue, digital learning, emergency response planning, firefighting class*

Introduction

Aviation safety is one of the most critical aspects of the transportation industry, as aviation accidents can result in severe human, economic, and operational consequences. To ensure safety and maintain readiness in responding to emergencies that may disrupt flight operations, every airport is required to establish a comprehensive Airport Emergency Planning (AEP) system. Airport emergencies are infrequent events with potentially devastating impacts, highlighting the importance of comprehensive preparedness. As a result, airport emergency plans emphasize regular emergency exercises, including full-scale drills, to ensure the readiness of the entire rescue organization (Flauto et al., 2024). Therefore, airports must implement an AEP that outlines standardized procedures for managing various emergencies.

Within the AEP framework, the Airport Rescue and Firefighting (ARFF) unit plays a central role as the primary responder responsible for mitigating hazards, conducting rescue operations, and ensuring operational safety during emergency events. Airport operators are mandated to develop, implement, and periodically evaluate emergency plans involving all relevant stakeholders, including ARFF units, airlines, medical services, police, and military forces. Such coordination ensures that emergency scenarios can be managed effectively and that operational continuity is maintained. Preparedness is not limited to response actions but also involves integrated planning, training, exercises, and personnel development, which must be carried out continuously.

Other hazardous situations occurring within airport areas (Saputra et al., 2023). ARFF personnel are required to respond rapidly, perform rescue operations, and conduct firefighting activities under high-pressure conditions. Research by (Eryılmaz et al., 2024) tated at the micro level, human resource factors such as recruitment and training play a key role in building ARFF professionals' resilience. At the meso level, leadership and robust safety measures emerge as significant contributors to resilience. The analysis identified by (Blocker, 2020.) that major regulatory shortcomings predominantly concern deficiencies in documentation accuracy and completeness, insufficient personnel training, and minimum compliance in staffing and equipment. Continuous training and education are therefore essential to maintain and enhance ARFF readiness (Komalasari & Utama, 2022). A clear grasp of the fundamental components of ARFFS is required to support effective implementation by expanding knowledge in ARFFS by exploring three essential domains (Woodman, 2024). Through the application of individual and team performance theories in ARFF training programs, personnel are expected to strengthen their technical capabilities while simultaneously improving coordination and communication effectiveness (Saputra et al., 2023). Along with the increasing complexity of airport operations, conventional ARFF training methods and limited drill schedules face several constraints, such as, lack of flexibility, time-consuming, and do not optimally support continuous learning.

Several previous studies have demonstrated the potential of digital technologies in enhancing ARFF training and airport emergency preparedness (Saputra et al., 2023) developed the ARFF Smart Application (ASA) as a digital learning tool to improve the training and competency of ARFF personnel at I Gusti Ngurah Rai Airport. Other research highlights the effectiveness of interactive learning media in strengthening preparedness for airport emergencies (Prayudi & Anggriani, 2022). Research by (DaShuai & Ruifang, 2020) state the role of 5G technology, where it put in the convergence of aircraft personnel positioning technologies, real-time situational monitoring, drone-based sensing and data transmission, real-time fire simulation and prediction, and remotely operated fire hydrants with unmanned ARFF vehicles can substantially enhance aircraft fire rescue performance and reduce operational risks for fire rescue personnel. In addition, a web-based platform known as FIREMAN has been implemented to support airport emergency management by providing location information and navigation assistance, demonstrating its

effectiveness and operational suitability for ARFF personnel.

However, previous studies have not explicitly addressed the need for a structured, continuous, and routine digital learning platform that aligns with monthly ARFF training programs within the AEP framework. Most existing research focuses on general fire safety education, simulation-based training, or operational support applications, without fully integrating standardized emergency procedures, airport-specific training requirements, and continuous learning cycles for ARFF personnel. Furthermore, existing platforms tend to function as standalone systems and do not comprehensively support routine competency development or interoperability among stakeholders involved in airport emergency preparedness.

Prior research has also examined web-based applications for ARFF maintenance management, such as the study conducted at Syamsudin Noor Airport in Banjarmasin (Anwar, 2023). Research by (Liu et al., 2023) using virtual reality to enhance the speed and effectiveness of aviation emergency response, this study addresses key challenges, including prolonged emergency preparedness time, limited diversity of training scenarios, and the high costs associated with real-world emergency exercises. Other studies indicate that digital media can enhance learning effectiveness and efficiency (Meliyani et al., 2022). Nevertheless, these studies have not specifically focused on the development of an integrated digital learning platform designed to support continuous, routine ARFF training within the AEP framework.

Based on the identified gap, this study proposes the development of a Fire Class website as an integrated digital learning platform designed to support monthly emergency response training programs for ARFF personnel. The Fire Class website consolidates training materials, instructional videos, simulations, and quizzes into a single accessible platform aligned with AEP standards and ARFF operational requirements. Therefore, the objective of this study is to develop and evaluate the Fire Class website to enhance the efficiency, accessibility, and engagement of monthly ARFF training programs at Sultan Mahmud Badaruddin II International Airport, compared to conventional training methods (Darmawan & Khairudin, 2017).

The novelty of this research lies in the development of a fully integrated digital learning platform for continuous ARFF training within the Airport Emergency Planning framework. By combining instructional materials, interactive simulations, and evaluation components in one system, the Fire Class website is expected to standardize learning processes, facilitate continuous skill development, and strengthen airport emergency preparedness in Indonesia.

Methods

This study employed a Research and Development (R&D) approach aimed at producing and evaluating the feasibility of a digital learning platform, namely the Fire Class website, to support monthly emergency response training for Airport Rescue and Firefighting (ARFF) personnel. The development stage followed Level 3 of the R&D classification, which emphasizes product revision and effectiveness testing. To ensure a systematic and structured development process, the ADDIE instructional design model Analysis, Design, Development, Implementati on, and Evaluation was adopted as the main development framework.

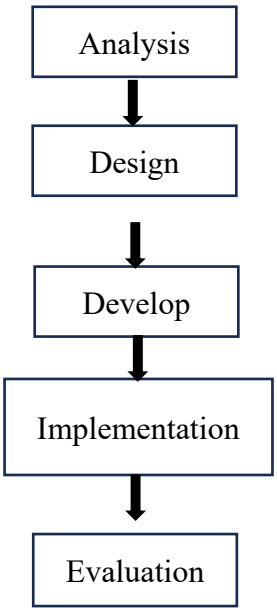

Figure 1. Development Stage

The research was conducted at Sultan Mahmud Badaruddin II International Airport, Palembang. The study involved 33 active ARFF personnel who participated as respondents during the product trial stage. Participants were selected using purposive sampling based on their operational roles, experience in emergency response activities, and direct involvement in airport emergency preparedness training. This selection ensured that the evaluation of the Fire Class website was conducted by users who were representative of its intended operational context.

Analysis Stage

At this stage, the researchers conducted direct observations of the monthly Emergency Response Training (ERP) activities at the ARFF Fire Station Unit. The analysis focused on identifying training needs, existing learning methods, media limitations, and participant engagement during training sessions. The findings indicated that conventional training methods relied heavily on face-to-face instruction and printed materials, with limited use of interactive digital media. These conditions highlighted the need for an accessible and flexible digital learning platform to support continuous ARFF competency development.

Design Stage

Based on the needs analysis, the Fire Class website was designed as a web-based learning platform using Google Sites, chosen for its ease of use, accessibility, and cross-device compatibility. (Puspita et al., 2021) The system design was visualized using Unified Modeling Language (UML) diagrams to illustrate system structure, user interactions, and workflow processes. The platform was structured to accommodate two types of users: ARFF personnel as end users and administrators responsible for managing and updating learning content.

Development Stage

During the development phase, training materials were transformed into digital learning content, including instructional texts, animated training scenarios, videos, and quizzes. Scenario-based animations were developed using Microsoft PowerPoint and enhanced with visual effects, sound elements, and realistic emergency situations aligned with tabletop and partial exercise practices. The learning content was then integrated into the Fire Class website, ensuring alignment with ARFF operational procedures and emergency response regulations. This approach supports interactive and simulation-based learning, which has been shown to improve learning effectiveness and decision-making in emergency management contexts (Abich et al., 2021). Data collection was conducted using structured questionnaires distributed to the respondents during the trial phase of the Fire Class website. The questionnaire instrument was designed to measure user perceptions across four main aspects: usefulness, ease of use, ease of learning, and user satisfaction. These indicators were selected to assess the feasibility, practicality, and effectiveness of the website as a digital learning medium. The collected data provided quantitative insights into the suitability of the developed product for ARFF training purposes.

To ensure the validity and reliability of the research data, expert validation was conducted through source triangulation involving both subject matter experts and media experts. The content validation was carried out by one instructor from the Aviation Polytechnic of Palembang and three operational evaluators, namely an ARFF supervisor, Chief Bravo personnel, and Chief Charlie personnel at Sultan Mahmud Badaruddin II International Airport. The subject experts evaluated the learning content based on the accuracy of the material, relevance to ARFF operational procedures, clarity of language, and overall instructional quality. In addition, media validation was conducted by a computer science expert from the Aviation Polytechnic of Palembang, who assessed the website in terms of usability, suitability, accuracy, and performance efficiency. This validation process followed the criteria outlined (Michael Ezra et al., 2023)

This research was conducted at the Aviation Polytechnic of Palembang and involved the initial definition stage as part of the ADDIE development process. The primary instruments used to collect product quality data

were checklist-based questionnaires administered to subject experts, media experts, and ARFF personnel as users. The questionnaire items were structured to obtain systematic evaluations of the website-based learning media, including content quality, system functionality, and user experience.

The feasibility of the Fire Class website was determined by calculating the product suitability percentage using predefined decision-making criteria. To interpret the feasibility level of the developed product, a product suitability percentage classification was used as the decision-making reference, as presented in Table 1.

Tabel 1. Product suitability percentage

Assessment Percentage	Interpretation
81% – 100%	Highly Feasible
61% – 80%	Feasible
41% – 60%	Fairly Feasible
21% – 40%	Less Feasible
0% – 20%	Not feasible

The feasibility percentage of the Fire Class website was calculated using the following formula:

$$\text{Feasibility Percentage} = \frac{\text{Score obtained}}{\text{Expected score}} \times 100\%$$

The interpretation of feasibility levels was categorized as follows: 81%–100% (Highly Feasible), 61%–80% (Feasible), 41%–60% (Fairly Feasible), 21%–40% (Less Feasible), and 0%–20% (Not Feasible). The feasibility percentage was calculated by dividing the obtained score by the expected score and multiplying the result by 100%

Following expert validation, the feedback and suggestions obtained were used as references for product revision and further development (Fridayanti et al., 2022). Subsequently, the revised Fire Class website underwent additional testing and evaluation to ensure that all features functioned properly and aligned with the intended learning objectives (Saputra et al., 2023). Data obtained from the validation and testing stages were analyzed using descriptive quantitative analysis to determine the feasibility and effectiveness of the developed product.

Results and Discussions

This section presents and discusses the results of the feasibility testing and user evaluation of the Fire Class website as a digital learning platform for monthly ARFF emergency response training. The discussion emphasizes quantitative findings, interpretation of results, comparison with previous studies, and theoretical and practical implications. Based on field observations conducted during monthly Emergency Response Training (ERP) at the ARFF Fire Station Unit of Sultan Mahmud Badaruddin II Airport, several limitations in conventional training implementation were identified. These included limited use of digital learning materials, reliance on conventional media, passive learning processes, restricted visibility for some participants, centralized decision-making, uneven coordination among units, and inflexible training scenarios. These conditions indicated a need for a more accessible, interactive, and flexible training support system. The Fire Class website was developed to address these limitations by providing a digital learning platform that can be accessed via smartphones and computers. The platform offers regularly updated training materials, regulations, and emergency response scenarios, aiming to enhance digital literacy and training effectiveness among ARFF personnel. The feasibility of this solution was subsequently evaluated through expert validation and user testing.

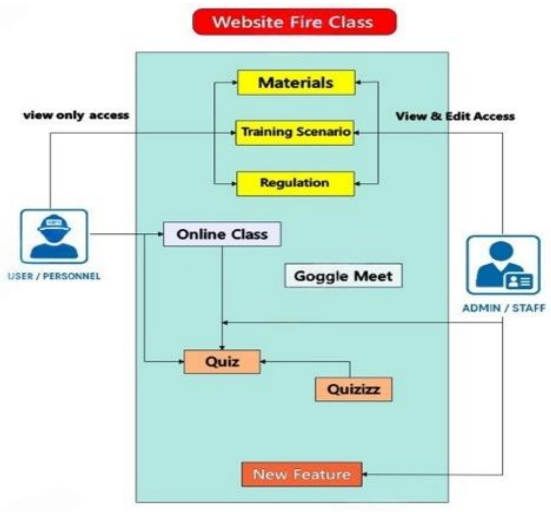

Figure 2. Unified Modelling Language Website Fire Class

The feasibility of the Fire Class website was assessed by subject matter experts and media experts to ensure that the platform met pedagogical and technical standards. The evaluation covered four aspects: content quality, usability, overall quality, and relevance of training scenarios. Engaging and interactive learning media are essential to improve training effectiveness in emergency response education (Darmawan & Khairudin, 2017). The Fire Class website is a digital learning system designed to support emergency response training at airports.

Figure 3. Home

Fire Class was created using Google Sites because Google Sites is ease of use, efficient, and accessible via various devices (Puspita et al., 2021). It allows ARFF personnel to access training materials and simulations online anytime, anywhere as shown on Figure 3. The Unified Modeling Language (UML) approach Was used to visualize the structure and visual interaction between components. The results of media expert validation showed an average feasibility score of **93.3%**, which falls into the *Highly Feasible* category as shown on Figure 4.

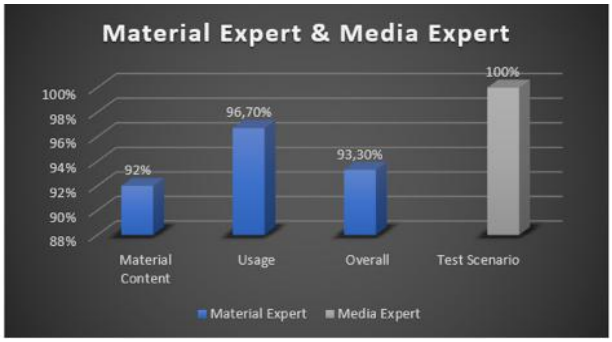

Figure 4. Assessment by subject matter experts and media experts

This high score indicates that the website performs well in terms of interface design, functionality, system performance, and instructional clarity. The media expert recommended the inclusion of more interactive training scenarios that closely resemble real emergency conditions to further enhance contextual learning.

Overall, the validation results confirm that the Fire Class website is technically and pedagogically suitable for supporting ARFF training activities. User evaluation was conducted with 33 ARFF personnel as respondents. The assessment focused on four usability indicators: usefulness, ease of use, ease of learning, and satisfaction. The results are summarized in Table 2.

Table 2. User Assessment

No	Indicator	Scor obtd	Scor Max	%	Cat.
1	Usefullness	1348	1485	90,7%	Very Feasible
2	Ease of Use	135	1485	90,5%	Very Feasible
3	Ease of Learning	756	825	91,6%	Very Feasible
4	Satisfication	1049	1155	90,8%	Very Feasible
5	Overall	4498	4950	90,8%	Very Feasible

The findings state in Table 2 indicates high levels of user acceptance across all indicators, with usefulness scoring 90.7%, ease of use 90.5%, ease of learning 91.6%, and satisfaction 90.8%. The overall feasibility score reached 90.8%, categorizing the platform as *Very Feasible*. These consistently high scores (above 90%) demonstrate that the Fire Class website effectively supports ARFF learning needs and overcomes accessibility and engagement limitations commonly found in conventional training sessions.

The results of this study are consistent with previous research highlighting the effectiveness of digital learning platforms in aviation emergency training (Saputra et al., 2023) reported that mobile-based ARFF training applications improved learning

accessibility and operational readiness among fire-rescue personnel. Similarly, (Sahudra et al., 2024) emphasized that digital learning tools enhance emergency preparedness efficiency by providing flexible access to training resources. The findings of the present study further support these conclusions, as reflected by high usability and satisfaction scores. At the international level (Chittaro et al., 2018) demonstrated that digital training environments improve engagement and response accuracy in safety-critical contexts. Likewise, a systematic review (Stefan et al.,

making. The Fire Class website demonstrates similar benefits by embedding interactive scenarios within a structured digital learning environment.

Unlike previous studies that primarily focused on standalone simulations or prototype-scale implementations, this research evaluates a structured, web-based learning platform integrated with routine ARFF competency cycles and aligned with ICAO and DGCA regulatory frameworks. Therefore, this study contributes to the literature by addressing the gap in continuous, web-based professional

Figure 5. Tabletop partial exercise scenario used in the web-based ARFF training simulation.

The present study reinforces these findings by providing empirical evidence of a web-based ARFF training platform implemented in an operational airport environment. From a theoretical perspective, the results align with instructional design principles that emphasize systematic development and continuous evaluation to ensure learning effectiveness (Spatioti et al., 2023)The high usability ratings indicate that the Fire Class platform successfully applies these principles. Furthermore, the integration of simulation-supported learning is supported by (Abich et al., 2021) who found that interactive video simulations are effective in improving emergency management decision-

Practically, the Fire Class website offers a scalable and cost-effective solution that can be adopted by other airports to support continuous ARFF training. The platform enhances accessibility, supports regulatory compliance, and complements conventional. Training by enabling personnel to reinforce their knowledge and decision-making skills outside scheduled sessions.

However, this study has limitations. The evaluation involved a limited sample of 33 ARFF personnel at a single airport and focused primarily on usability and feasibility outcomes rather than long-term operational performance. Future research is recommended to involve multiple airports and incorporate longitudinal

evaluations that measure operational indicators such as response time, decision-making accuracy, and coordination effectiveness during real or simulated emergency scenarios.

Conclusion

This study concludes that the Fire Class website is a feasible and effective digital learning platform for supporting monthly emergency response training of Aircraft Rescue and Fire Fighting (ARFF) personnel at Sultan Mahmud Badaruddin II International Airport. Developed using the ADDIE instructional design model, the platform demonstrated high feasibility based on expert validation and user evaluation, indicating its ability to enhance training accessibility, learner engagement, and continuity of ARFF competency development. The findings confirm that the research objective of developing a web-based learning system aligned with airport emergency preparedness requirements has been successfully achieved. From a theoretical perspective, this study contributes to aviation safety education by demonstrating the applicability of instructional design models in digital-based ARFF training. Practically, the Fire Class website provides a cost-efficient and scalable solution that can complement conventional training methods and support continuous professional development of ARFF personnel in compliance with ICAO and DGCA emergency preparedness standards. This study is limited by its implementation at a single airport involving a relatively small number of participants and by its primary focus on usability and feasibility outcomes. Future research is recommended to expand the application of the Fire Class platform across multiple airports and to evaluate its long-term impact on operational performance, decision-making accuracy, and emergency response effectiveness through longitudinal and scenario-based assessments.

References

Abich, J., Parker, J., Murphy, J. S., & Eudy, M. (2021). A Review of the Evidence for Raining Effectiveness with Virtual Reality Technology. *Virtual Reality*, *25*, 919–933. https://doi.org/10.1007/s10055-020-00498-8

Anwar, R. I. Y. (2023). Aplikasi Maintenance Airport Rescue and Fire Fighting (ARFF) Bandar Udara Syamsudin Noor Banjarmasin Berbasis Web. *Jupiter: Publikasi Ilmu Keteknikan Industri, Teknik Elektro Dan Informatika*, *1*, 01–07. https://doi.org/10.61132/jupiter.v1i6.61

Blocker, K. (2020). Aircraft Rescue and Fire Fighting Capabilities: Are Today's Aircraft Rescue and Fire Fighting Capabilities: Are Today's Standards Protecting Passenger's Futures? https://commons.erau.edu/student-works/151

Chittaro, L., Corbett, C. L., McLean, G. A., & Zangrando, N. (2018). Safety Knowledge Transfer Through Mobile Virtual Reality: A Study of Aviation Life Preserver Donning. *Safety Sciece*, *102*, 159–168. https://doi.org/https://doi.org/10.1016/j.ssci.2017.10.012

Darmawan, E. S., & Khairudin, Moh. (2017). Development of an Interactive Learning Media to Improve Competencies. *In International Conference on Technology and Vocational Teachers (ICTVT 2017) (pp.24-27).* https://doi.org/https://doi.org/10.2991/ictvt-17.2017.5

DaShuai, L. I., & Ruifang, S. (2020, March). Airport Rescue and Firefighting Way in the 5G Era. In *IOP Conference Series: Materials Science and Engineering* (Vol. 792, No. 1, p. 012017).

Eryılmaz, İ., Dirik, D., & Öney, T. (2024). A Phenomenological Study on Psychological Resilience of Aircraft Rescue and Fire Fighting Professionals. *Current Psychology,* 43(23), 20286-20308.

Flauto, A., Marcis, L., Pallavicini,P., Calzolari, F., Nanetti, T., Scopelliti, A. G., ... & Imbriaco, G. (2024). Mass Casualty Incident Preparedness for Airport Emergencies: Report From an Aeroplane Crash Simulation at Guglielmo Marconi Airport, Bologna (Italy). *Disaster*

medicine and public health preparedness, 18, e5.

Fridayanti, Y., Irhasyuarna, Y., & Putri, R. F. (2022). Pengembangan Media Pembelajaran Audio-Visual Pada Materi Hidrosfer Untuk Mengukur Hasil Belajar Peserta Didik SMP / MTS. *Jurnal Pendidikan Dan Ilmu Sosial 1*(3), 49–63. https://doi.org/https://doi.org/10.55784/jupeis.Vol1.Iss3.75

Komalasari, Y., & Utama, W. D. (2022). Level of Understanding of Palembang Aviation Polytechnic Cadets on Aviation Fire Rescue Rules and Regulations. *JMKSP (Jurnal Manajemen, Kepemimpinan, dan Supervisi Pendidikan),* 7(2), 602-612.

Liu, Z., Li, C., Li, Y., Liu, B., & Zhu, W. (2023, November). Aviation Emergency Rescue Virtual Training System Based on Virtual Reality. *In Third International Conference on Artificial Intelligence, Virtual Reality, and Visualization (AIVRV 2023) (Vol. 12923, pp. 446-454)*.

Meliyani, A. R., Mentari, D., & Syabani, Gina Purnama Zuhri, N. Z. (2022). Analisis Kebutuhan Media Pembelajaran Digital Bagi Guru Agar Tercipta Kegiatan Pembelajaran Yang Efektif dan Siswa Aktif. *Jurnal Jendela Pendidikan, 2*(02), 264–274. https://doi.org/https://doi.org/10.57008/jjp.v2i02.179

Michael Ezra, L., Clara Hetty, P., Elisabeth, M., Yohanes Priadi, W., & Mutiara, C. (2023). Evaluasi Functional Suitability, Performance Efficiency, Usability, dan Portability Berdasarkan ISO 25010 pada Aplikasi VR Gamelan Slenthem. *KONSTELASI: Konvergensi Teknologi Dan Sistem Informasi*, *3*, 24–36. https://doi.org/https://doi.org/10.24002/konstelasi.v3i1.6620

Prayudi, A., & Anggriani, A. A. (2022). Pengembangan Media Pembelajaran Interaktif Berbasis Web Menggunakan Google Sites untuk Meningkatkan Prestasi Belajar Siswa. *Jurnal Pendidikan Dan Media Pembelajaran*, *1*, 9–18. https://doi.org/https://doi.org/10.59584/jundikma.v1i1.2

Puspita, D., Nuansa, S., & Mentari, A. T. (2021). Students ' Perception Toward the Use of Google Site as English Academic Diary. *Jurnal Pengabdian Masyarakat, 2*(2),494–498. https://doi.org/https://doi.org/10.31004/CDJ.V2I2.1980

Sahudra, T. M., Kenedi, A. K., Asnawi, A., Sutrisno, I. H., & Khalil, N. A. (2024). Community-Based Web-Learning Disaster Mitigation Learning Media Innovation to Improve Student Learning Motivation. *In 7th International Conference on Learning Innovation and Quality Education (ICLIQE 2023)* (pp. 500–508). https://doi.org/https://doi.org/10.2991/978-2-38476-301-6_47

Saputra, M. I. D., Sukahir, S., Parjan, P., Amalia, D., & Nugraha, W. (2023). Asa Application (Arff Smart Application) As Learning Media To Improve The Competence Of Arff Personnel. *Proceeding of International Conference of Advance Transportation, Engineering, and Applied Social Science*, *2*, 650–659. https://doi.org/10.46491/icateas.v2i1.1722

Spatioti, A., Kazanidis, I., & Pange, J. (2023). Educational Design And Evaluation Models Of The Learning Effectiveness In E-Learning Process: A Systematic Review. In *Turkish Online Journal of Distance Education* (Vol. 24, pp. 318–347). https://doi.org/https://doi.org/10.17718/tojde.1177297

Stefan, H., Mortimer, M., & Horan, B. (2023). Evaluating the Effectiveness of Virtual Reality for Safety-Relevant Training: a Systematic Review. *Virtual Reality*, *27*, 2839–2869. https://doi.org/https://doi.org/10.1007/s10055-023-00843-7

Woodman, S. (2024). An Investigation of the Purpose and Benefit of Aviation Rescue Fire Fighting Services, How Such Benefit is Created and Where The Service is Best Located *(Doctoral dissertation, CQUniversity)*.