Digital Innovation through Instagram-Based Augmented Reality in Introduction to the SKCK Making Process for the South Sulawesi Regional Police

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Abstract: Digital innovation in public services has gained significant global attention, particularly in enhancing service delivery and user engagement. This study explores the use of Instagram-based Augmented Reality (AR) as a novel approach to inform and educate the public about the procedure for obtaining a Surat Keterangan Catatan Kepolisian (SKCK) at the South Sulawesi Regional Police. Traditional methods, such as printed brochures and static websites, often fail to provide clear and accessible guidance, leading to inefficiencies and user frustration. In contrast, Instagram-based AR offers an interactive, visually engaging experience, enabling users to receive real-time, step-by-step instructions via AR filters. This approach simplifies the SKCK application process by providing dynamic and user-friendly guidance, reducing errors and time spent at police stations. A trial involving surveys and user feedback was conducted to evaluate the effectiveness of this digital tool. The results indicate that AR significantly improves user understanding, satisfaction, and engagement compared to conventional methods. This study demonstrates the potential of AR to enhance public service delivery and offers insights into the application of digital technologies in governmental processes. The proposed innovation is not only an effective solution for the SKCK process but also sets a precedent for future digital transformations in public services.

1. Introduction

Digital innovation in public services has gained significant attention from governments worldwide, focusing on utilizing digital technologies to enhance service delivery and efficiency. The concept of co-creation has emerged as a fundamental aspect of digital transformation in the public sector, emphasizing user-centric and inclusive services [1]. This approach fosters innovation and ensures that services cater to the diverse needs of the population they serve. Additionally, the integration of digitalization has been identified as a key driver of contemporary public service innovations, enabling governments to initiate and facilitate innovative practices [2]. Augmented Reality (AR) is an innovative technology that integrates digital information into the user's real-world environment, enhancing the physical world by overlaying imperceptible data that would otherwise be invisible to the human eye [3], [4],[5], [6] . This concept bridges the gap between the virtual and real worlds, offering a unique way to interact with information and digital content in a tangible environment [7],[8]. By superimposing layers of virtual content onto physical objects, AR enables users to visualize and interact with information in 3D visuals, providing a more detailed and immersive experience [9],[10].

Instagram-based Augmented Reality (AR) has shown potential in enhancing user experience by utilizing the visual nature of the platform to provide entertainment and interactive elements [11]. Research indicates that AR technologies can positively impact user engagement and perceived usability, making them valuable tools for improving user experiences [12]. Studies have demonstrated that integrating AR into platforms like Instagram can effectively increase awareness, interactivity, and enjoyment in learning processes [13]. The development of AR learning tools through Instagram filters has been found to be beneficial for educational purposes, showcasing the versatility of AR applications [14].

The current SKCK (Surat Keterangan Catatan Kepolisian) making process for the South Sulawesi Regional Police is fraught with several issues. The procedure is often time-consuming, requiring multiple visits to police stations, lengthy paperwork, and long waiting times. Additionally, there is a significant lack of clear and accessible guidance for the public on the steps involved in obtaining an SKCK. This lack of clarity leads to confusion, errors in application submissions, and frequent need for corrections, further prolonging the process and causing frustration among applicants. To address these challenges, we propose the implementation of Instagram-based Augmented Reality (AR) to simplify the SKCK making process. This digital innovation leverages the widespread use and user-friendly nature of Instagram to provide interactive, step-by-step guidance through AR features. By using AR overlays, users can receive real-time instructions and visual cues on their smartphones, making the process more intuitive and less prone to errors. This approach is expected to significantly improve efficiency by reducing the time and effort required to complete the SKCK application.

Moreover, it enhances user satisfaction by providing a clear, engaging, and accessible method for navigating the application process.

This research proposes a digital innovation in the form of Instagram-based Augmented Reality (AR) as an information and education medium regarding the procedure for making a Police Record Certificate (SKCK) at the South Sulawesi Police. In contrast to conventional methods that rely on printed brochures or static websites, the use of Instagram-based AR offers an interactive experience that is more engaging and accessible to the wider public. AR allows users to access information visually and dynamically through specially designed Instagram filters, providing step-by-step instructions in the process of creating a SKCK in a more engaging and easy-to-understand way.

This innovation has great potential to increase public awareness and understanding of the procedure for making SKCK, which is often considered confusing and time-consuming. With AR, the information conveyed becomes more engaging, so users can easily follow each stage without feeling intimidated by the existing process. In addition, Instagram-based AR takes advantage of social media platforms that are already very popular, so that they can reach more people with high efficiency.

In this study, we will develop and test an Instagram filter application that is designed to display information about the SKCK creation procedure. These filters will include interactive elements such as text, images, and animations that provide visual guidance to the user. A trial will be carried out to measure the effectiveness of this media in increasing users' understanding of the SKCK creation process. Data will be collected through surveys and interviews with users to get feedback and evaluate the performance of these AR applications.

The main contribution of this study is the introduction of new methods in the delivery of public information that can be adopted by other government agencies. By integrating AR technology into social media platforms such as Instagram, we hope to provide innovative solutions to more effective public communication and education issues. In addition, this research will also provide insight into how AR technology can be implemented in the context of public services in Indonesia, especially in the police sector.

2. Materials and Method
2.1 Data Collection
To collect data in the development of an Instagram-based AR application for the SKCK creation process, two types of research were used: primary data and secondary data. Primary data was obtained through direct observation and interviews with SKCK service users at the South Sulawesi Regional Police. In addition, a survey was conducted to collect user feedback regarding the difficulties and challenges faced in the current SKCK creation process.

Meanwhile, secondary data was obtained from literature studies related to the process of making SKCK, Augmented Reality technology, and the use of social media in public services. The literature comes from books, journals, and articles that discuss the implementation of AR in public administration as well as similar case studies in other fields.

2.2 Software Development

The The method used in the development of Instagram-based AR applications is the waterfall software development model. The use of this method is because the process is built in one stage and the target of the application is to make it easier for the community in the process of making SKCK. The application development stage uses a waterfall model as shown in figure 1.
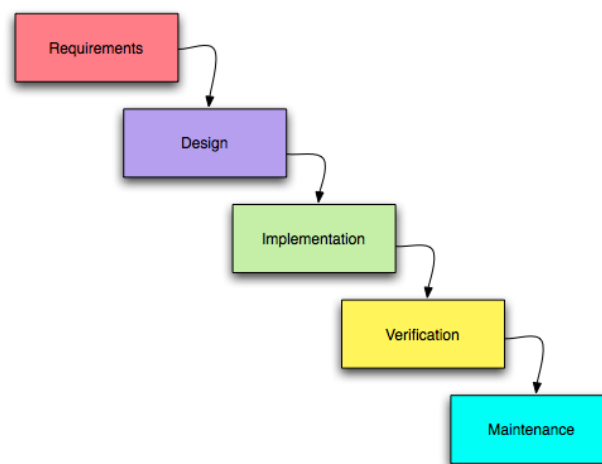

Fig 1. Waterfall model

3. Results and Discussion
3.1. System Analysis

The first stage in the development of this application is needs analysis, where the needs for the creation of Augmented Reality are identified. This includes collecting relevant materials such as information about the steps of making SKCK, the requirements needed, and the hardware and software needed to run the application.

3.2. Design

In the design stage, markers for AR content were created and an easy-to-use user interface (UI) design was developed. The app is designed to provide an intuitive user experience with appealing visuals and clear instructions, which can be accessed through the Instagram platform.

3.3. Implementation

Implementation involves integrating all the components that have been designed into a functional application. The application development used Unity software, supported by Vuforia SDK to incorporate AR functionality. The 3D content was created using Polycam and 3D Paint applications to ensure a realistic and attractive look. The app is then integrated with Instagram to allow users to access AR content easily. A view of the app can be seen in figure 2.

Figure 2. Instagram camera view

3.4. Evaluation

This research data was obtained after demoing the SKCK filter on Instagram at Polda Sulsel and distributing links to research questionnaires via Google Form. The circulated research questionnaire obtained data from 124 respondents. A valid instrument has the ability to measure what should be measured. The data obtained from this research is empirical data that can be observed and meets certain standards in terms of validity. Validity indicates the degree of accuracy between the data that actually occurs on the object and the data that can be collected by researchers [15].

In this study, the validation test was conducted by comparing the r-count value with the r-table value (df = n-2). If r-count is greater than r-table, then the question is declared valid; conversely, if r-count is smaller than r-table, then the question is declared invalid. Measuring the validity of a question is done with r-count > r-table at a significant level of 5% or 0.05. The r-count formula is as follows:

$$r = \frac{n\Sigma xy - \Sigma x\Sigma y}{\sqrt{(n\Sigma x^2 - (\Sigma x)^2)(n\Sigma y^2 - (\Sigma y)^2)}}$$

Table 1. Questionnaire

No	Question	Code
1.	In my opinion, the Instagram filters on the South Sulawesi police SKCK Instagram account are easy to learn.	P1
2.	Instagram filters on the South Sulawesi police skck Instagram account are easy to use	P2
3.	Menurut saya filter Instagram yang ada pada akun Instagram skck polda sulsel mudah di akses	P3
4.	Instagram filters on the South Sulawesi police skck Instagram account provide accurate information.	P4
5.	I assume that the Instagram filters on the South Sulawesi police skck Instagram account can be useful for me.	P5
6.	I am comfortable using Instagram filters on the South Sulawesi police skck Instagram account.	P6
7.	I assume that the Instagram filters on the South Sulawesi police skck Instagram account are not boring.	P7
8.	I understand and understand how to use Instagram filters on the South Sulawesi Police skck Instagram account.	P8

Table 2. Validation Test Results

Code	r-count	Description
P1	0.792	Valid
P2	0.848	Valid
P3	0.755	Valid
P4	0.855	Valid
P5	0.803	Valid
P6	0.827	Valid
P7	0.851	Valid

P8	0.875	Valid

The application of Instagram-based AR in the SKCK process has shown significant potential in addressing the identified issues. The use of AR provides a clear and engaging method for users to understand the application steps, reducing errors and the need for repeat visits to the police station. Integration with Instagram leverages the widely used platform, ensuring accessibility and convenience for a wide audience. Compared to traditional methods, AR apps have shown better efficiency and user satisfaction. Clear visual instructions and interactive elements make the process more intuitive and less time-consuming. These innovations not only simplify administrative processes but also increase public engagement and trust in digital government services.

The Instagram-based AR application for the SKCK creation process offers a practical and innovative solution to improve the efficiency of public services. The positive evaluation results show that this approach can provide significant benefits for both police departments and the community, setting a precedent for future digital innovation in public administration. Further work will focus on expanding the app's features and conducting further studies to measure its long-term impact on user experience and administrative efficiency.

4. Conclusion

Based on the results of the research, it can be concluded that the use of Instagram-based Augmented Reality (AR) in the process of obtaining a Police Record Certificate (SKCK) at the South Sulawesi Regional Police has significant potential to enhance efficiency and user satisfaction. The development of Instagram filters using Meta Spark Studio v170 enables clearer, more interactive, and engaging delivery of information regarding the SKCK application procedure. Compared to conventional methods such as printed brochures or static websites, Instagram-based AR offers a more dynamic and accessible experience for the public.The validity test results show that this Instagram filter application effectively conveys information with a higher level of understanding, reduces application errors, and accelerates administrative processes. Furthermore, this approach takes advantage of an already popular social media platform, making it possible to reach a wider audience with high efficiency. This innovation not only provides a practical solution for simplifying the administrative process at the South Sulawesi Regional Police, but also opens up opportunities for the use of AR technology in public services in Indonesia, particularly in the police sector. This research provides insights into how AR can be implemented to improve public communication and education, as well as enhance public engagement and trust in digital government services. Moving forward, further development of this application may include feature enhancements and more in-depth studies to evaluate the long-term impact on user experience and administrative efficiency.

Acknowledgements

References
[1]   A. P. R. Müller, C. C. Flores, V. Albrecht, T. Steen, and J. Crompvoets, "A Scoping Review of Empirical Evidence on (Digital) Public Services Co-Creation," *Adm. Sci.*, vol. 11, no. 4, p. 130, 2021, doi: 10.3390/admsci11040130.

[2]   L. Mattsson and P. Andersson, "Private-Public Interaction in Public Service Innovation Processes- Business Model Challenges for a Start-Up EdTech Firm," *J. Bus. Ind. Mark.*, vol. 34, no. 5, pp. 1106–1118, 2019, doi: 10.1108/jbim-10-2018-0297.

[3]   M. Eckert, J. S. Volmerg, and C. M. Friedrich, "Augmented Reality in Medicine: Systematic and Bibliographic Review," *Jmir Mhealth Uhealth*, vol. 7, no. 4, p. e10967, 2019, doi: 10.2196/10967.

[4]   K. Kazemzadeh, "Advances in Artificial Intelligence, Robotics, Augmented and Virtual Reality in Neurosurgery," *Front. Surg.*, vol. 10, 2023, doi: 10.3389/fsurg.2023.1241923.

[5]   W. N. Hidayat, M. I. Ibad, M. N. Sofiana, M. I. Aulia, T. A. Sutikno, and R. Wakhidah, "Magic Book with Augmented Reality Technology for Introducing Rare Animal," *2020 3rd Int. Conf. Comput. Informatics Eng. IC2IE 2020*, pp. 355–360, 2020, doi: 10.1109/IC2IE50715.2020.9274590.

[6]   E. R. Nainggolan *et al.*, "The Implementation of Augmented Reality as Learning Media in Introducing Animals for Early Childhood Education," *2018 6th Int. Conf. Cyber IT Serv. Manag. CITSM 2018*, no. Citsm, 2019, doi: 10.1109/CITSM.2018.8674350.

[7]   J. W. Lai and K. H. Cheong, "Educational Opportunities and Challenges in Augmented Reality: Featuring Implementations in Physics Education," *Ieee Access*, vol. 10, pp. 43143–43158, 2022, doi: 10.1109/access.2022.3166478.

[8]   R. N. Khairani, "Application of Augmented Reality on Chemistry Learning: A Systematic Review," *J. Penelit. Pendidik. Ipa*, vol. 9, no. 11, pp. 1221–1228, 2023, doi: 10.29303/jppipa.v9i11.4412.

[9]   E. Quqandi, M. Joy, I. Drumm, and M. Rushton, "Augmented Reality in Supporting Healthcare and Nursing Independent Learning," *Cin Comput. Informatics Nurs.*, vol. 41, no. 5, pp. 281–291, 2022, doi: 10.1097/cin.0000000000000910.

[10]   M. K. Bekele, R. Pierdicca, E. Frontoni, E. S. Malinverni, and J. Gain, "A Survey of Augmented, Virtual, and Mixed Reality for Cultural Heritage," *J. Comput. Cult. Herit.*, vol. 11, no. 2, pp. 1–36, 2018, doi: 10.1145/3145534.

[11]   M. J. Pelletier, A. Krallman, F. G. Adams, and T. Hancock, "One Size Doesn't Fit All: A Uses and Gratifications Analysis of Social Media Platforms," *J. Res. Interact. Mark.*, vol.

14, no. 2, pp. 269–284, 2020, doi: 10.1108/jrim-10-2019-0159.

[12]   A. Javornik, B. Marder, M. Pizzetti, and L. Warlop, "Augmented Self - The Effects of Virtual Face Augmentation on Consumers' Self-Concept," *J. Bus. Res.*, vol. 130, pp. 170–187, 2021, doi: 10.1016/j.jbusres.2021.03.026.

[13]   I. Sukmawati, "Augmented Reality in Instagram Story Filter for Increasing Awareness Through Learning Interactivity and Enjoyment," 2022, doi: 10.2991/assehr.k.220601.050.

[14]   W. A. Dewandono, "Development of Learning Media Based on Augmented Reality (AR) Instagram Filter in Shokyu Hyoki 1," *J. Japanese Lang. Educ. Linguist.*, vol. 8, no. 1, pp. 63–76, 2024, doi: 10.18196/jjlel.v8i1.20628.

[15]   M. B. Musah *et al.*, "Testing the validity of academic staff performance predictors and their effects on workforce performance," *Int. J. Eval. Res. Educ.*, vol. 12, no. 2, pp. 941–955, 2023, doi: 10.11591/ijere.v12i2.24230.