DEVELOPMENT OF CONTENT RECOMMENDATION SYSTEMS IN THE FORM OF METADATA–BASED CAROUSEL

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Abstract

This study aims to develop a metadata-based content recommendation system using a Carousel model to support effective communication and promotion at the Universitas Terbuka Service Center (Sentra Layanan Universitas Terbuka/SALUT), particularly at SALUT HEBAT in Semarang City. While prior studies on digital content strategies often emphasize paid advertising or algorithm-driven personalization, limited attention has been given to metadata-based visual approaches in distance education services. The Carousel model was selected because it can present content in a visual and interactive format, thereby enhancing audience engagement and appeal. This research employs a qualitative descriptive method, with data collection techniques including interviews, observations, and documentation of social media activities. A one-month implementation produced encouraging results, with 303 views, 277 likes, and 78 link clicks on SALUT's Instagram content, achieved without paid advertising (Meta Ads). These findings demonstrate that metadata-based content strategies, combined with consistent visual design and clear calls to action, can organically attract audience interest. The study recommends optimizing Meta Ads, providing digital marketing training, developing a dashboard monitoring system, and fostering local collaboration for content dissemination. This research contributes by addressing the gap in sustainable, low-cost digital engagement strategies for distance education services and offering a replicable model for broader.

Keywords: *recommendation system, metadata, carousel model, social media, digital content.*

INTRODUCTION

Metadata-based recommendation systems are an approach in the development of recommendation technology that utilizes metadata as the main element in the process of filtering, organizing, and presenting relevant choices for users, especially on social media. Metadata functions as a container for information that provides additional details about certain objects such as content, services, or products. In this context, metadata has a central role in analyzing the needs and preferences of users.

The Carousel format is a type of visual content that is commonly used on social media and allows the presentation of multiple images, videos, or text in one post that can be shifted horizontally. This format is popular on various platforms such as Instagram, Facebook, and

LinkedIn. The main reason for using this model is its ability to provide an interactive experience for users while increasing audience engagement with the content.

However, the Universitas Indonesia (UI) service center has not yet adopted the Carousel model in its media content strategy. This becomes an interesting point to be examined, considering that this format has become the first choice among content creators to attract attention and maintain audience engagement. Within the Universitas Terbuka (UT) environment, SALUT is an initiative designed to strengthen support for distance education services. SALUT helps UT students find learning groups according to their study programs and provides solutions to various learning challenges, whether academic, geographical, or preference-based.

Beyond serving as a center for academic assistance, SALUT also functions as an official channel of communication and coordination approved by UT. In this study, the focus is directed at implementing the Carousel format within a metadata-based recommendation system to develop a more appealing content strategy tailored to prospective students' needs. The goal is to design social media content that strengthens SALUT's image as both an informative and engaging public interface.

Metadata-based recommendation systems with the Carousel model are manifested in visual forms such as images, videos, and texts distributed through social media platforms. Social media was chosen as the primary channel due to its effectiveness in reaching segmented users based on metadata, and its alignment with the interactive nature of the content. This approach is consistent with Habermann's (2020) perspective, which emphasizes that what cannot be measured cannot be improved. The use of the Carousel model is also believed to simplify the process of creating and revising digital content thanks to its various supporting features.

The current reality shows that not all SALUT centers implement Carousel-based social media strategies to increase student admissions. For instance, SALUT HEBAT in Semarang has a relatively lower number of students compared to other districts located farther away. Therefore, this research focuses on the use of Carousel-based social media strategies to expand reach to potential students. Previous research by Salsabilla et al. (2023) revealed that individual interest in social media content is influenced by multiple factors, such as education level, information overload, generational differences, and content design strategies. Not only visual appearance but also the substance of the content plays a crucial role in shaping public information consumption habits.

Furthermore, research on the effect of Carousel Headlines on Liputan6.com shows that this format significantly influences the reading interest of Generation Y and Z. Carousel content from Liputan6 is also shared on its official Instagram account and is considered part of the evolution of digital journalism. Although only launched in 2017, this format remains relevant today (Salsabilla et al., 2023). Based on this evidence, further research is needed on the application of Carousel in other social media contexts, including SALUT accounts, because it has proven to significantly influence audience engagement, particularly among Generations Y and Z, with a 39.4% engagement rate on Instagram @Liputan6 content.

This study is motivated by the need to develop a recommendation system that can effectively reach prospective students through social media. Accordingly, the main research problems addressed include: (1) how metadata models in Carousel-format social media can be adopted by SALUT and integrated into a recommendation system; (2) what technical and functional requirements are needed to support the development of a Carousel-based content recommendation system that fits the characteristics of SALUT services; and (3) what form of

metadata-based recommendation system with a Carousel format can enhance SALUT's role in engaging prospective students.

Aligned with these research problems, the purpose of this study is to identify and explain the form of metadata models in Carousel-format social media content that can be utilized by SALUT as part of a recommendation system. This study also aims to map the technical and functional requirements for designing the system, as well as to formulate an effective recommendation model to enhance user participation and strengthen SALUT's performance as a learning support service at UT.

In terms of contribution, this research provides both theoretical and practical benefits. Theoretically, it enriches the body of knowledge in information science, particularly regarding the application of metadata in developing social media content recommendation systems in Carousel format. Practically, it offers concrete solutions for prospective UT students to find learning groups suited to their academic needs via SALUT services, while improving efficiency and quality in managing distance learning support.

To enhance reproducibility, the study also applies a systematic qualitative data analysis approach. Interview transcripts, observational notes, and documentation were subjected to open coding to identify recurring patterns, followed by thematic analysis to group codes into broader themes aligned with the research questions. This structured process ensures that findings are grounded in transparent analytical steps and can be replicated or extended by future researchers.

Therefore, this study seeks to address the following research questions: How can metadata models in Carousel-format social media content be adopted and integrated into a recommendation system for SALUT, What technical and functional requirements are necessary to support the development of such a system in alignment with SALUT's characteristics and In what ways can a metadata-based recommendation system with the Carousel format enhance SALUT's role in engaging prospective students and strengthening distance education services?

By answering these questions, this study aims to provide both theoretical and practical contributions. Theoretically, it enriches the field of information science by extending the application of metadata in social media-based recommendation systems. Practically, it offers a replicable framework for UT to improve digital communication strategies and strengthen student engagement through SALUT.

RESEARCH METHOD

This research is applied in nature with a descriptive qualitative approach, aiming to explore how metadata-based recommendation systems can be developed and implemented by SALUT nationally. The study focuses on three main aspects: (1) the role of social media metadata in content management, (2) the technical and functional requirements for building recommendation systems, and (3) the impact of these systems on the effectiveness and participation in SALUT services. Beyond describing the metadata model, the study also analyzes operational and contextual factors that influence its practical development.

The primary research site is SALUT HEBAT Semarang, located at Jalan Bear Barat VIII/11. This site was selected due to its relatively lower student enrollment compared to other regions, making it a relevant case for testing innovative social media strategies. Data from other SALUT centers were also used for comparison.

Data sources consist of both primary and secondary materials. Primary data were collected through interviews with four SALUT administrators, three UT front-desk staff, and five prospective students. Secondary data included institutional documents, available social media metadata, and statistical usage reports. To enrich content production, eight creative talents were engaged to design four types of visual products: videos, infographics, posters, and flyers.

Data collection techniques combined interviews, documentation analysis, and three months of participant observation of SALUT's social media activities. Interviews explored technical and functional requirements for the recommendation system, while documentation and observation provided insights into existing metadata practices and patterns of audience interaction.

For content development, the study applied the Carousel format to structure posts—educational, promotional, and narrative—into logically sequenced slides. Content design used Canva, Adobe Photoshop, and Figma with standardized sizes for Instagram and Facebook (1080×1080 pixels for square and 1080×1350 pixels for portrait). Consistency with UT branding was maintained through uniform fonts, colors, and design elements. Each post concluded with a clear Call to Action (CTA) such as "Slide for more information" or "Visit our site." This design strategy was intended to encourage active engagement (likes, shares, comments, and link clicks) while enabling detailed information delivery.

The analysis process followed open coding of interview transcripts and observation notes, which were then grouped into thematic categories aligned with the research questions. To enhance rigor, inter-coder reliability checks were conducted between two researchers to minimize bias. Triangulation was applied by comparing findings across interviews, documentation, and observational data.

Methodological limitations should also be acknowledged. The one-month testing period may not fully capture long-term engagement dynamics, and the absence of a control group limits causal inference regarding the effectiveness of the Carousel model. Additionally, confounding factors such as seasonal admission cycles, external campaigns, or viral trends may have influenced engagement metrics. These limitations highlight the need for further studies with longer observation periods and comparative groups to validate the findings.

Through this methodological framework, the study seeks not only to generate applicable content strategies for SALUT but also to contribute theoretically to the discourse on metadata-driven recommendation systems in digital education services.

RESULT AND DISCUSSION

The results showed that the implementation of metadata-based carousel content models on social media SALUT had a significant impact on audience interaction and interest, especially on Instagram and Facebook platforms. During the one-month period of content testing without the use of Meta Ads facilities, the Instagram account SALUT recorded 303 views, 277 likes, and 78 link clicks leading to the registration information page or UT education service. This finding aligns with Haq & Haryanti (2025), who state that the use of carousel content can increase museum audience engagement. It is also confirmed by Wei et al. (2021), who emphasize that increased perception of control as a result of reading carousel advertisements correlates positively with consumer involvement and favorable advertising responses. These figures show that the engagement rate obtained is relatively high, especially when compared to the average accounts of other educational institutions that do not utilize interactive visual content. Carousel

has proven to be more attractive because it presents information in stages in a slide format, allowing the audience to explore deeper and more comprehensive content.
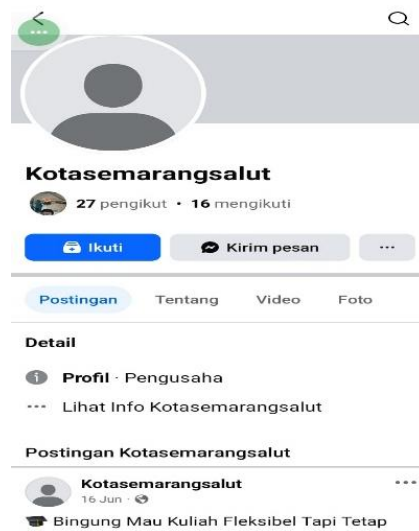

Figure 1. Catch service from a Facebook account

From observations of interactions in comments and direct messages (DM), it was found that many prospective students asked about registration procedures, SALUT locations, and available majors. This indicates that the uploaded content successfully triggered curiosity and served as an entry point for the conversion process from visitors to students. Furthermore, the 78 link clicks embedded in Instagram bio and captions show that the audience is not only passive but actively follows up on the content they see. Link click rates reaching more than 25% of total viewers indicate the effectiveness of metadata-based content preparation and the strength of Calls to Action (CTA) in each post. This explanation aligns with Arianto & Rani (2024), who argue that social media serves as a direct communication tool through relevant, informative, and entertaining content. Kusumasondjaja (2021) also highlights that consumer responses are more influenced by visual elements than verbal ones on Instagram content. Similarly, Gross et al. (2023) provide theoretical insights into how message strategies and source credibility can optimize the effectiveness of influencer advertising..

The discussion of these findings also connects with Arfin et al. (2025), who underline the importance of understanding audience preferences and producing adjusted content, as well as the strategic integration of social media practices in contemporary marketing landscapes. In addition, consistency in visual elements such as UT branding colors, official fonts, and a friendly communicative tone emerged as key supporting factors. Design templates using Canva and Adobe Photoshop allowed the team to present uniform, professional content, reinforcing digital identity.

While these results are promising, several limitations must be acknowledged. First, the study was conducted over only one month, which limits the ability to observe long-term engagement patterns and sustainability of audience interest. Second, the findings are based solely on organic reach without paid advertising support, which, while valuable for testing, may not reflect broader implementation challenges when scaling strategies across multiple regions. Third, audience interactions were analyzed descriptively without deeper sentiment or network analysis, which restricts the depth of behavioral insights.

Potential challenges also arise in broader implementation. For example, varying levels of digital literacy across regions could affect how audiences engage with carousel-based content. Resource constraints, such as limited personnel for content production and monitoring, may also hinder scalability. Furthermore, reliance on visual-heavy strategies risks excluding audiences with accessibility limitations, such as visual impairments, if inclusive design is not prioritized.

Nevertheless, the findings provide a strong foundation for integrating carousel content more broadly, supported by narrative variations such as student testimonials, registration guides, and program highlights. If complemented with Meta Ads, the potential increase in reach and engagement could be significantly greater, as these tools enable precise targeting by age, location, interests, and educational background. Despite the limitations, this study demonstrates that metadata-based carousel strategies can organically foster engagement and contribute to effective communication in distance education services.

CONCLUSION

This study concluded that the development of metadata-based content recommendation systems using the Carousel model proved effective in increasing audience engagement on social media. The one-month testing results demonstrated positive performance, with 303 views, 277 likes, and 78 link clicks on the Instagram account, achieved without the use of Meta Ads. This indicates that interactive visual content, when supported by relevant and consistent metadata, can more precisely reach the audience and encourage active interactions.

The findings not only provide practical insights for practitioners in digital education promotion but also advance theoretical understanding of how metadata-driven strategies can be effectively applied within educational contexts. The integration of metadata quality with interactive visual models illustrates a replicable framework for enhancing both communication and engagement in higher education institutions. By structuring complex information into staged and engaging sequences, the Carousel model demonstrates its dual role as a communication tool and a pedagogical support mechanism.

However, this study is limited by its short implementation period and the absence of a control group, which may affect the generalizability of the results. Future research should therefore prioritize longer-term implementation, comparative studies across different social media platforms, and broader application in multiple SALUT offices. Linking these directions to the identified limitations will provide stronger evidence for scalability, sustainability, and the adaptability of metadata-based recommendation systems in diverse educational environments.

SUGGESTION

On the basis of research findings and their weaknesses, the suggestions for further research are:

1. Utilization of Meta Ads should begin to be implemented in the next development phase so that content range can be expanded in a directed manner, especially to target groups such as class XII students, high school alumni, or workers who want to go to a distance lecture.
2. Consistency of production and publication of content needs to be maintained by creating a weekly or monthly editorial calendar that is adjusted to the UT academic calendar and relevant local issues.

3. Digital literacy training and social media content for salut staff are strongly recommended that they can independently manage accounts, design metadata-based content, and read statistical data from Google Analytics or Meta Business Suite.
4. Collaboration with local communities, schools, and community leaders can be maximized to expand the spread of organic content, such as through the QR Code sharing program, an online mini talk show, or campaign at Car Free Day.

Development of more complex recommendation systems, such as integration with chatbot, AI-based automatic tagging systems, or interactive dashboards for management, can be considered as the direction of research and long term development.

THANK YOU-NOTE

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