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Educational Video Virality and Platform Engagement in the EduwebTV KPM Repository

(Video Pendidikan Tular dan Penglibatan Platform dalam Repositori EduwebTV KPM)

MUHAMMAD MOHD TAHIR*, HELMI NORMAN & FARIDAH MYDIN KUTTY

ABSTRACT

Educational video virality is an important issue for institutions managing large digital learning repositories, where many resources remain available but receive limited access. This study examined metadata characteristics and platform engagement on the official EduwebTV KPM YouTube channel using a descriptive quantitative metadata analytics design. Public YouTube Data API metadata were analysed for 10,208 videos published between 2020 and 2024. Videos were operationally classified as viral when they attained at least 1,000 views, yielding 634 videos (6.21% of the final dataset). These videos had an average duration of 85.10 minutes and an average title length of 8.54 words, with dominant curriculum-facing keywords, reported here in English translation, including form, language, Malay, knowledge, discourse, room and DLP. Platform engagement analysis showed a mean of 13,978.66 views and a mean engagement rate of 3.31%. Strong positive correlations were found between views and likes ($r = 0.977$, $p < .001$) and between views and comments ($r = 0.940$, $p < .001$). Metadata analytics can therefore support evidence-informed understanding of visibility, discoverability and platform response, but does not provide direct evidence of learning outcomes. The study offers implications for educational video repositories, lecture capture, open educational resources and digital media governance.

Keywords: educational video analytics; YouTube metadata; platform engagement; operational virality; digital repository

ABSTRAK

Video pendidikan tular menjadi isu praktikal bagi institusi yang mengurus repositori pembelajaran digital berskala besar kerana banyak sumber kekal tersedia tetapi kurang dicapai. Kajian ini meneliti ciri metadata dan penglibatan platform bagi video dalam saluran YouTube rasmi EduwebTV KPM menggunakan reka bentuk analitik metadata kuantitatif deskriptif. Metadata awam YouTube Data API dianalisis bagi 10,208 video yang diterbitkan antara tahun 2020 hingga 2024. Video diklasifikasikan secara operasi sebagai tular apabila mencapai sekurang-kurangnya 1,000 tontonan, menghasilkan 634 video (6.21% daripada dataset akhir). Video tersebut mempunyai purata tempoh 85.10 minit dan purata panjang tajuk 8.54 perkataan, dengan kata kunci berorientasikan kurikulum yang dominan seperti tingkatan, bahasa, melayu, ilmu, wacana, bilik dan DLP. Analisis penglibatan menunjukkan purata 13,978.66 tontonan dan kadar penglibatan purata 3.31%. Korelasi positif yang sangat kuat ditemui antara tontonan dengan tanda suka ($r = 0.977$, $p < .001$) serta antara tontonan dengan komen ($r = 0.940$, $p < .001$). Dapatan menunjukkan bahawa analitik metadata dapat menyokong pemahaman berasaskan bukti tentang keterlihatan, kebolehtemuan dan respons platform, tetapi tidak memberikan bukti langsung tentang hasil pembelajaran. Kajian ini menawarkan implikasi praktikal untuk pengurusan repositori video pendidikan, rakaman kuliah, sumber pendidikan terbuka dan tadbir urus media digital.

Kata kunci: analitik video pendidikan; metadata YouTube; penglibatan platform; video pendidikan tular; repositori digital

INTRODUCTION

Digital transformation has changed how educational content is designed, distributed and used across school and university contexts. Educational video has become a central medium in digitally mediated learning because it integrates verbal explanations, visual representations, demonstrations and narrative sequencing within flexible learning environments. The accelerated use of video-supported teaching during and after the COVID-19 period has also drawn attention to a practical question: why do some educational videos become visible and responsive on open platforms, while many others remain weakly accessed despite being publicly available? This issue is important for educational technology research because the value of a digital repository cannot be assessed solely by the number of videos uploaded (Brame 2016; Mayer 2021). Recent systematic reviews confirm that video can support learning,

but its benefits depend on instructional design, task demands and the learning context rather than on the medium alone (Noetel et al. 2021; Navarrete et al. 2025).

EduwebTV KPM provides a useful empirical setting for examining this issue. It functions as an official public repository of educational videos hosted through the YouTube platform and produced for the Malaysian teaching and learning community. Its public platform setting enables a large-scale examination of how metadata, visibility and observable engagement operate within an official educational repository. Comparable challenges also arise in lecture capture systems, open educational resources, MOOCs and institutional video repositories, particularly in relation to metadata quality, discoverability, platform engagement and evidence-informed media governance.

Making educational videos available does not necessarily mean that they will be widely seen. On open platforms, user attention is often unevenly distributed, with a limited proportion of content receiving a disproportionate share of views, likes and comments. This pattern matters because educational institutions may invest heavily in content production but pay insufficient attention to how content is indexed, signalled, found and responded to by users. In this context, metadata such as title, duration, publication date, view count, like count and comment count can provide useful behavioural traces of public platform response (Berger & Milkman 2012; Cukurova, Giannakos & Martinez-Maldonado 2020; Kitchin 2014). Research on open educational resources and video analytics further shows that metadata quality and interaction traces can support search, recommendation and evidence-informed design decisions, although these traces remain incomplete representations of learning (Tavakoli et al. 2021; Khalil et al. 2024). Recent work has also combined video metadata with learner behaviour to examine how educational videos are selected and used across digital learning environments (Martínez-Martínez, Montoliu & Remolar 2024).

In video-based learning, the organisation and presentation of information remain important. Cognitive Theory of Multimedia Learning (CTML) emphasises the importance of managing cognitive load, structuring information clearly and using signalling to support attention and processing (Mayer 2021; Mayer & Moreno 2003). In the present article, CTML is used cautiously. It provides a conceptual rationale for why title clarity, duration and visible signalling may matter in educational video environments, but it is not used to claim that platform metrics demonstrate learning achievement. Views, likes and comments are treated as indicators of platform-level response rather than direct evidence of comprehension, motivation or academic performance. Evidence from teacher education and experimental video research also indicates that video design, content structure and active prompts can shape the quality of learning experiences (Kestin & Miller 2022; Weng, Ng & Chiu 2023).

Research on online video and digital content circulation suggests that visibility is influenced by content features, platform affordances and user response. In YouTube and MOOC environments, production choices, video structure and platform recommendation systems may influence how users encounter and interact with content (Covington, Adams & Sargin 2016; Guo, Kim & Rubin 2014). Large-scale evidence further suggests that video design and course context are associated with patterns of educational video engagement (Parker, Bunch & Pike 2024). However, in the context of official educational repositories, relatively little is known about how metadata characteristics are associated with operational virality, especially in the Malaysian educational setting.

Several gaps remain. There is a practical gap between large-scale educational video production and the uneven public reach of repository content. Evidence is also limited on the metadata profile of videos that achieve operational virality within official educational repositories. Methodologically, many studies of educational media rely on perception-based data, whereas platform metadata can provide direct traces of observable user response. There is also a transferability gap for higher education, where evidence from large official repositories can inform the governance of lecture capture, open educational resources and institutional media platforms. Systematic reviews of digital engagement nevertheless caution that behavioural indicators require pedagogical interpretation and should not be treated as self-evident measures of learning (Nkomo, Daniel & Butson 2021).

This article examines YouTube Data API metadata from the official EduwebTV KPM channel to address two objectives: first, to identify the main metadata characteristics of educational videos that meet the operational virality threshold; and second, to analyse platform engagement patterns through views, likes, comments and engagement rate. The study provides a descriptive account of how educational videos perform in an official digital repository at scale. Its contribution is not to establish causality or learning effectiveness, but to provide evidence-informed insight into educational video virality, visibility, discoverability and observable user response in ways that are relevant to educational technology and higher education media governance.

METHODOLOGY

2.1 RESEARCH DESIGN

This study employed a descriptive quantitative metadata analytics design. This design was appropriate because the

study examined the metadata profile and engagement patterns of educational videos using platform-generated data rather than survey responses, interviews or experimental measures. Metadata analytics is understood here as the systematic extraction, cleaning and descriptive analysis of platform data fields that document how digital content is published, indexed and responded to by users in publicly observable ways.

The unit of analysis was the individual educational video. Each video was treated as a digital object with measurable attributes, including title, publication date, duration, views, likes and comments. The study did not collect data from identifiable pupils, teachers, lecturers or YouTube users. All analyses were conducted at the aggregate video level using public metadata. Therefore, the findings should be interpreted as repository-level and platform-level evidence rather than as evidence of individual learning behaviour.

2.2 POPULATION AND DATASET

The analytical population comprised videos published on the official EduwebTV KPM YouTube channel between 2020 and 2024. The channel was purposively selected because it is an official educational video repository in Malaysia and provides publicly accessible metadata through the YouTube Data API (Google Developers 2024). Data were extracted from the YouTube Data API on 09 May 2025. The study used a comprehensive dataset rather than drawing a random sample. The final cleaned dataset comprised 10,208 videos.

Within this dataset, videos were operationally classified as viral when they attained at least 1,000 views. In this study, virality is operationally defined as the attainment of at least 1,000 views within the EduwebTV KPM repository. This threshold is not intended to represent universal or mass-market virality across all YouTube contexts, but rather to identify educational videos that achieved meaningful public visibility relative to the wider repository.

Accordingly, the article uses cautious terms such as educational video virality, operational virality, operationally viral educational videos, higher-visibility educational videos and videos meeting the operational virality threshold. These terms are used to avoid treating viral content as a sensational or universal label. The focus is on repository-specific visibility within an official educational video collection rather than on general internet virality.

2.3 INSTRUMENTATION AND VARIABLES

The primary instrument for data retrieval was the YouTube Data API, supported by a scripted extraction and dataset preparation workflow. The metadata fields used in the analysis included video identifier, title, publication date, duration, view count, like count and comment count. These variables were selected because they reflect three relevant dimensions of repository performance: discoverability signals, content structure and observable user response.

Several derived indicators were used for analysis. Title length was operationalised as the number of words in the video title. Video duration was reported in minutes. Total engagement was calculated as the sum of likes and comments. Engagement rate was calculated using the following formula: engagement_rate = [(likes + comments) / views] × 100. This indicator was calculated only for videos with valid non-zero view counts and was treated as a descriptive measure of visible interaction relative to exposure.

2.4 DATA COLLECTION AND CLEANING PROCEDURE

Data collection began by defining the channel scope, time frame and required metadata fields. The YouTube Data API was then used to retrieve public video-level metadata, which was stored in a structured dataset for preparation and analysis. The workflow included field verification, date standardisation, duration conversion and validation of numeric interaction fields. The scripted workflow reduced manual handling and helped maintain consistency across records.

Data cleaning involved the removal or correction of records that could compromise analytical reliability. The cleaning process addressed duplicate entries, missing critical fields, inconsistent duration formats, records outside the 2020–2024 time scope and metadata anomalies. Potentially high-performing videos were reviewed carefully so that valid high-visibility videos were not removed merely because their view counts were unusually large. High-performing videos with valid metadata were retained in the final dataset.

The study used public metadata only. It did not collect personally identifiable user information, did not access private analytics dashboards and did not analyse individual user profiles. Comment text was not subjected to qualitative analysis in this article. As the study used publicly available video-level metadata and did not involve human participants or identifiable personal data, the analysis posed minimal ethical risk. These boundaries are important because the study is designed as a descriptive metadata analysis at the aggregate video level rather than as a user-level behavioural or learning outcomes study. They also reflect ethical priorities for digital trace data, including privacy, data validity, governance and accountability (Hakimi, Eynon & Murphy 2021).

2.5 DATA ANALYSIS

Data analysis was aligned with the two objectives of the article. For the first objective, descriptive statistics were used to identify the metadata profile of videos meeting the operational virality threshold. The analysis reported the size of the final dataset, the number and percentage of videos reaching at least 1,000 views, average duration, average title length and dominant title keywords.

Title keyword analysis was conducted descriptively by examining recurring words in the titles of videos within the operationally viral subset. The analysis focused on identifying frequently occurring curriculum-facing terms that signalled subject area, learning level or instructional context. The resulting keywords were interpreted as descriptive indicators of title signalling and discoverability, rather than as causal predictors of virality. The analysis did not use advanced natural language processing, TF-IDF modelling, topic modelling or machine learning classification.

For the second objective, platform engagement was analysed through view count, like count, comment count and engagement rate. Means, medians, standard deviations, maxima and distributional patterns were used to describe engagement levels. Because the raw interaction metrics were strongly positively skewed and included a small number of extremely high-performing videos, medians were reported alongside means. Pearson correlation coefficients were used to examine associations between views and likes and between views and comments within the videos meeting the operational virality threshold. These correlations were interpreted cautiously as exposure-linked co-variation, not as evidence of causal influence or pedagogical effectiveness.

RESULTS AND DISCUSSION

3.1 METADATA PROFILE AND DISCOVERABILITY

The final cleaned dataset contained 10,208 videos published on the official EduwebTV KPM YouTube channel between 2020 and 2024. Of these, 634 videos met the operational virality threshold of at least 1,000 views. This represented 6.21% of the final dataset. Operational virality was therefore concentrated in a relatively small proportion of the repository rather than being evenly distributed across all published videos.

Within the subset of videos meeting the operational virality threshold, the average duration was 85.10 minutes and the average title length was 8.54 words. Dominant title keywords, reported here in English translation, included form, language, Malay, knowledge, discourse, room and DLP. These curriculum-facing terms appeared to signal learning level, subject area or instructional context. The pattern is descriptive and should not be interpreted as evidence that any single metadata feature caused a video to reach the threshold.

The mean duration of 85.10 minutes contrasts with the microlearning literature, which generally describes microlearning as short, focused units organised around specific learning objectives (Alias & Abdul Razak 2023; Lee 2023; Monib, Qazi & Apong 2025). This difference should be interpreted in context. EduwebTV KPM includes many long-form institutional recordings, such as discourse programmes, official briefings and conference-style events. The observed mean therefore reflects the mixed content ecology of the repository rather than suggesting that instructional videos should generally be long. Research on educational and dissemination videos on YouTube likewise suggests that video length is relevant to platform performance and audience retention (Lijo, Castro & Quevedo 2024).

TABLE 1: Metadata Profile of Operationally Viral Educational Videos

Metadata indicator	Result	Interpretation
Final dataset	10,208 videos	Cleaned dataset after screening
Operationally viral videos	634 videos	Videos with at least 1,000 views
Percentage of operationally viral videos	6.21%	Share of the final dataset
Operational virality threshold	≥1,000 views	Context-sensitive definition for this study
Average duration	85.10 minutes	Mean duration within the operationally viral subset
Average title length	8.54 words	Mean number of words in video titles
Dominant title keywords	form, language, Malay, knowledge, discourse, room, DLP	Curriculum-facing terms indicating subject, level or instructional context

Note. The profile is descriptive and does not establish that duration, title length or keyword use caused videos to reach the operational virality threshold.

Only 6.21% of the final EduwebTV KPM dataset met the operational virality threshold. This concentration of visibility suggests that repository performance depends not only on content volume, but also on how content is signalled, indexed and made discoverable. In large educational repositories, users often make rapid relevance judgements based on visible metadata before deciding whether to watch a video. Titles containing recognisable curriculum-facing terms may therefore serve as practical signals of relevance.

The dominant title keywords identified in this study—form, language, Malay, knowledge, discourse, room and DLP—were linked to learning level, subject matter or instructional context. Their presence suggests that recognisable curriculum-related terms may help users identify whether a video is relevant to their learning needs. The analysis remains descriptive, however. It cannot show that these keywords caused operational virality because the study did not test causal effects or compare keyword patterns through predictive modelling.

CTML provides a useful but limited lens for interpreting this result. From a multimedia learning perspective, clear signalling and manageable information structure can support attention and reduce unnecessary cognitive load (Mayer 2021; Mayer & Moreno 2003). In this article, CTML is used to explain why clarity, signalling and information organisation may matter at the front end of video selection. It is not used to claim that videos with certain metadata features produced better learning outcomes. Such a claim would require separate evidence involving comprehension, achievement, motivation or retention.

3.2 PLATFORM ENGAGEMENT PATTERNS

Platform engagement among operationally viral educational videos was unevenly distributed. The videos recorded a mean of 13,978.66 views, compared with a median of 2,436.00 views and a maximum of 4,220,209 views. The substantial difference between the mean and median reflects a skewed distribution, with a small number of exceptionally visible videos raising the overall average.

The same subset recorded a mean of 315.93 likes (median = 76.50, SD = 2,078.14, maximum = 51,110) and a mean of 21.82 comments (median = 2, SD = 115.68, maximum = 2,716). The mean engagement rate was 3.31% (median = 3.17%, SD = 2.14%, maximum = 21.64%). Correlation analysis showed a very strong positive association between views and likes ($r = 0.977$, $p < .001$) and between views and comments ($r = 0.940$, $p < .001$). Videos with greater reach therefore tended to accumulate more visible response signals. These correlations represent co-variation only and should not be interpreted as evidence that views caused likes or comments, or that the engagement metrics demonstrate learning effectiveness.

TABLE 2: Platform Engagement Patterns among Operationally Viral Educational Videos

Metric	Mean	Median	SD	Maximum
Views	13,978.66	2,436.00	167,896.76	4,220,209
Likes	315.93	76.50	2,078.14	51,110
Comments	21.82	2	115.68	2,716
Engagement rate	3.31%	3.17%	2.14%	21.64%

Note. SD = standard deviation. The large gap between mean and median views reflects a strongly positively skewed distribution, indicating that a small number of exceptionally visible videos substantially raised the average. These metrics represent observable platform engagement and should not be interpreted as evidence of learning effectiveness.

Videos meeting the operational virality threshold generated observable platform responses through views, likes and comments. The skewed distribution reveals a repository pattern in which a relatively small number of videos account for disproportionately high visibility. This pattern is useful for understanding repository performance, but it should not be treated as evidence of educational effectiveness.

The strong positive correlations between views and likes and between views and comments show that these metrics co-varied within the operationally viral subset. One plausible explanation is exposure: videos that reach more viewers have more opportunities to receive likes and comments. Greater reach may therefore be associated with more visible interaction. The correlations do not demonstrate that views caused likes or comments, nor do they show that users learned more from highly viewed videos.

Platform engagement metrics capture observable user response rather than learning achievement. Views, likes and comments can help identify which educational videos attracted public attention and visible reaction, but they cannot reveal watch time, retention, conceptual understanding, affective engagement or classroom impact. This distinction helps avoid over-claiming in educational technology research. Recent video analytics studies likewise show that behavioural traces are useful for comparing engagement patterns and informing course

design, but they need to be interpreted within the learning context and alongside richer evidence (Bergdahl et al. 2024; Khalil et al. 2024; Navarrete et al. 2025). Metadata analytics can therefore inform content governance, but it cannot replace pedagogical evaluation.

3.3 IMPLICATIONS FOR EDUCATIONAL VIDEO GOVERNANCE

The findings are relevant to EduwebTV KPM and other institutions that manage educational video collections. Resources may remain technically available but still be difficult to discover when titles, metadata and repository structures are not organised strategically. Institutional video governance should therefore include regular attention to metadata quality, curriculum-facing terminology and platform performance analytics (Menzel 2023).

For KPM, schools and centres that support teaching and learning, producing more video content alone is unlikely to be sufficient. Institutions also need to review how videos are titled, categorised, described, archived and evaluated over time. Clear metadata can make content easier to identify, while platform analytics can show whether resources are attracting attention and visible response. Similar practices may also be useful for lecture capture systems, open educational resources, MOOCs and institutional video repositories.

For instructional designers, the findings point to a layered approach to publishing video content. Long-form recordings can be retained when institutional completeness is important, but they can be made easier to use through timestamps or video chapters, structured thumbnails that highlight subject, level and purpose, and shorter derivative clips organised around coherent concepts. This form of video chunking can provide microlearning entry points while preserving access to the complete recording (Alias & Abdul Razak 2023; Monib, Qazi & Apong 2025). Segmentation should follow meaningful conceptual boundaries rather than arbitrary time cuts, because simply increasing the number of segments does not automatically improve learning (Krieglstein et al. 2023). Where appropriate, embedded questions or reflective prompts may also be paired with segmented clips to encourage more active viewing (Kestin & Miller 2022).

Teacher education programmes may also draw value from these findings. Future teachers increasingly need to understand not only how instructional videos are designed, but also how digital platforms influence content visibility and learner access. The EduwebTV KPM case brings together instructional media design, learning analytics, repository governance, digital media audit and evidence-informed digital pedagogy. This is consistent with evidence that purposefully designed video-based learning can support the development of pre-service teachers' content, pedagogical and psychological competencies (Weng, Ng & Chiu 2023).

CONCLUSION

This study examined educational video virality and platform engagement within the EduwebTV KPM repository. Of the 10,208 videos analysed, 634 videos (6.21%) met the operational virality threshold of at least 1,000 views. These videos showed identifiable metadata patterns and generated observable platform responses through views, likes, comments and engagement rate. The strong correlations among the platform indicators reflect co-variation and greater opportunities for interaction among highly viewed videos; they do not establish causality or learning effectiveness.

Metadata analytics can help institutions understand visibility, discoverability and repository-level response, but it cannot replace pedagogical evaluation. For KPM, schools, teacher education programmes and other institutions managing educational video collections, the findings highlight the need to review titles, categories, descriptions, archiving practices and performance analytics regularly. Producing more content alone is unlikely to be sufficient if users cannot readily identify or access relevant resources.

The study is limited by its reliance on public YouTube metadata and the absence of internal measures such as watch time, audience retention, traffic sources, recommendation pathways, user demographics and direct learning outcomes. It also did not examine the content or pedagogical meaning of comments. Future research could combine metadata analytics with internal platform data, qualitative comment analysis, interviews, classroom evidence and comparisons across school, university, MOOC and institutional repositories. Such work may help clarify which visibility patterns are transferable and how platform engagement relates to actual educational use.

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Muhammad Mohd Tahir*
Fakulti Pendidikan
Universiti Kebangsaan Malaysia
p90022@siswa.ukm.edu.my

Helmi Norman
Fakulti Pendidikan
Universiti Kebangsaan Malaysia
helmi@ukm.edu.my

Faridah Mydin Kutty
Fakulti Pendidikan
Universiti Kebangsaan Malaysia
Faridah_mydin@ukm.edu.my

*Corresponding Author: Muhammad Mohd Tahir

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