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<https://doi.org/10.5281/zenodo.17916027>**Educational Quality of YouTube Videos on Endoscopic Submucosal Dissection: A LAP-VEGaS-Based Analysis** **Vural Argın¹**¹Department of General Surgery Marmara University Pendik Research and Education Hospital, Istanbul, Türkiye**ABSTRACT**

Introduction: Endoscopic submucosal dissection (ESD) is a technically demanding procedure that requires advanced training, yet the educational quality and reliability of related YouTube content remain uncertain.

Objective: This study aimed to evaluate the educational quality of YouTube videos related to ESD using the LAP-VEGaS scoring system and to examine their association with viewer engagement metrics.

Methods: A cross-sectional study was conducted in November 2025 by searching YouTube with the keyword “endoscopic submucosal dissection,” yielding 26 eligible videos after applying predefined criteria. For each video, basic characteristics (upload date, duration, views, likes, dislikes, comments) and viewer interaction metrics (like rate, view rate, Video Power Index) were recorded. Two independent reviewers assessed educational quality using the nine-item LAP-VEGaS scoring system, classifying videos as high quality (HQ, ≥ 9 points) or low quality (LQ, < 9 points). Statistical analyses were performed using SPSS 26.0, with $p < 0.05$ considered significant.

Results: Of the 26 analyzed videos, 13 (50%) were classified as HQ. HQ videos had significantly higher LAP-VEGaS scores than LQ videos (13.61 ± 1.98 vs. 4.15 ± 1.77 , $p < 0.001$). HQ videos tended to be longer than LQ videos ($1,262 \pm 748$ s vs. $1,028 \pm 1,239$ s, $p = 0.064$). The view ratio was significantly higher in LQ videos ($p = 0.043$). No significant differences were found between groups regarding total views, like ratio, or VPI.

Conclusion: The educational quality of ESD-related YouTube videos is inconsistent and often inadequate, underscoring the need for peer-reviewed, structured content to provide more reliable educational resources.

Keywords: Endoscopic Submucosal Dissection, YouTube, Educational Quality, LAP-VEGaS Scoring System, Video Power Index, Surgical Education.

INTRODUCTION

Endoscopic submucosal dissection (ESD) is a minimally invasive technique that allows en bloc resection of superficial gastrointestinal neoplasms while preserving organ integrity (1). Compared with conventional endoscopic mucosal resection (EMR), ESD enables higher rates of curative resection and more accurate histopathologic evaluation, leading to improved local control and reduced recurrence (2). Despite these advantages, the procedure is technically challenging, requires a long learning process, and necessitates comprehensive observation of expert procedures and specialized training (3). Recently, online video-sharing platforms, particularly YouTube, have become widely used by surgeons and trainees as supplementary educational tools (4). These platforms provide open access to surgical content that can facilitate the learning of complex techniques such as ESD. However, since peer review and standardized oversight are absent on YouTube, significant differences exist in the accuracy, completeness, and educational quality of the videos (5). To objectively evaluate the quality of surgical videos, the Laparoscopic Video Education Guidelines (LAP-VEGaS) score was developed as a valid tool for assessing educational value across various domains, including case presentation, procedural steps, intraoperative anatomy, and outcomes (6). Although the LAP-VEGaS scoring system has been applied to evaluate laparoscopic and robotic surgery videos, there is limited evidence regarding its use in the context of ESD training content on YouTube (7).

The present study aimed to assess the educational quality of the most-viewed YouTube videos on endoscopic submucosal dissection (ESD) using the LAP-VEGaS scoring system and to compare viewer

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engagement parameters including view count, like ratio, video duration, and the Video Power Index (VPI) between high- and low-quality videos.

METHODS

Study Design and Data Collection

This cross-sectional observational study evaluated the educational quality of YouTube videos related to endoscopic submucosal dissection (ESD). A comprehensive search was performed on the YouTube platform in November 2025 using the keyword “endoscopic submucosal dissection”. The search was conducted in a standard web browser without login to avoid algorithmic personalization or search bias. The first 100 search results were screened and arranged according to the number of views to identify the most popular and relevant videos.

Video Selection Criteria

Videos were included if they demonstrated the complete or partial procedure of ESD, had sufficient visual clarity to identify key procedural steps, and were publicly accessible without copyright restrictions. Videos were excluded if they consisted solely of lectures, webinars, animations, or conference presentations, were duplicates or non-English, or did not depict procedural footage of ESD. After applying these criteria, a total of 26 videos were included in the final analysis.

Video Characteristics and Engagement Metrics

For each video, data were collected on upload date, duration (seconds), number of views, likes, and dislikes. Based on these parameters, the following engagement metrics were calculated: Like ratio = Likes / (Likes + Dislikes), View ratio = Views / Days since upload, Video Power Index (VPI) = (Like ratio × View ratio) / 100 [8].

Educational Quality Assessment

The educational quality of each video was assessed using the Laparoscopic Video Education Guidelines (LAP-VEGaS) scoring system [6]. This validated tool consists of nine domains, each scored between 0 (not presented) and 2 (comprehensively presented), yielding a maximum total score of 18 points. Two independent evaluators (both experienced endoscopists) scored all videos after a calibration session on five pilot cases. Any disagreement between evaluators was resolved through consensus discussion. Videos were classified as high quality (HQ) if the total LAP-VEGaS score was ≥ 9 and as low quality (LQ) if it was < 9 , consistent with previous studies [7].

Statistical Analysis

Statistical analyses were performed using IBM SPSS Statistics for Windows, version 26.0 (IBM Corp., Armonk, NY, USA). Continuous variables were tested for normality using the Shapiro–Wilk test and presented as mean \pm standard deviation (SD) or median with interquartile range (IQR) as appropriate. Categorical variables were summarized as frequencies and percentages. Comparisons between high-quality (HQ) and low-quality (LQ) video groups were performed using the independent samples t-test for normally distributed data and the Mann–Whitney U test for non-normally distributed variables.

Research Ethics

This study was based on publicly available YouTube data and did not involve human participants; therefore, ethics committee approval was not required.

RESULTS

A total of 26 YouTube videos related to endoscopic submucosal dissection (ESD) were included in the final analysis (Table 1). The mean view count was $10,827 \pm 5,530$ (median: 2,303; range: 216–146,354), and the mean video duration was $1,145 \pm 1,010$ seconds (median: 690; range: 300–4,400). The mean like ratio was 0.88 ± 0.32 , while the mean view ratio and Video Power Index (VPI) were 469 ± 861 and 187 ± 250 , respectively. The mean LAP-VEGaS score across all videos was 8 ± 5 (median: 9; range: 2–17), indicating substantial variation in educational quality among available ESD content. When categorized by LAP-VEGaS score, 13 videos (50%) were classified as high-quality (HQ) (score ≥ 9) and 13 (50%) as low-quality (LQ) (score < 9) (Table 2).

Table 1. General characteristics and viewer engagement parameters of YouTube videos on ESD

Video ID	View count	Comments (n)	Duration (s)	Likes ratio	View ratio	Video power index	LAP-VEGaS score
1	390	0	146354	1	45.10	0.45	7
2	617	0	1501	1	2.65	0.03	17
3	622	0	802	1	0.62	0.0062	4
4	911	0	19519	1	5.64	0.056	12
5	518	0	789	1	0.89	0.0089	3
6	1320	0	8428	0	4.70	0	11
7	300	0	1333	1	0.84	0.0084	4
8	300	0	2334	1	1.47	0.0147	5
9	950	0	216	0	0.71	0	14
10	4400	18	15986	1	8.98	0.0898	5
11	3000	0	807	1	0.27	0.0027	3
12	540	0	2272	1	1.25	0.0125	11
13	1140	0	461	1	0.67	0.0067	4
14	3000	1	10856	1	8.66	0.0866	16
15	360	0	1727	1	1.05	0.0105	14
16	360	0	800	1	0.14	0.0014	3
17	1200	0	7003	1	3.08	0.0308	14
18	2100	1	8554	1	3.76	0.0376	14
19	1800	0	11249	0	3.67	0	11
20	1200	2	13844	1	4.50	0.045	13
21	480	0	11177	1	5.91	0.0591	8
22	1800	1	8557	1	3.76	0.0376	14
23	480	0	611	1	0.69	0.0069	4
24	660	0	804	1	0.62	0.0062	2
25	720	0	435	1	0.30	0.00302	2
26	600	0	5100	1	1.70	0.017	16

Table 2. Descriptive statistics of engagement and educational quality metrics of YouTube videos on endoscopic submucosal dissection (ESD)

Parameters	Mean \pm SD	Median (Range)
View count (n)	10827 \pm 5530	2303 (216-146354)
Duration (s)	1145 \pm 1010	690 (300-4400)
Likes ratio	0.88 \pm 0.32	1 (0-1)
View ratio	469 \pm 861	283 (27-4510)
Video power index	187 \pm 250	76 (0-898)
LAP-VEGaS score	8 \pm 5	9 (2-17)

The mean duration of HQ videos was longer ($1,262 \pm 748$ seconds vs. $1,028 \pm 1,239$ seconds, $p = 0.064$) and the total number of views was slightly lower ($7,602 \pm 5,542$ vs. $14,053 \pm 40,045$, $p = 0.064$), but these differences were not statistically significant. The viewing rate was significantly higher for LQ videos ($542 \pm 1,219$) than for HQ videos (396 ± 222 ; $p = 0.043$). Other engagement metrics, including the like rate ($p = 0.071$) and VPI ($p = 0.304$), did not show a significant difference between groups. As

expected, the average LAP-VEGaS score was significantly higher in HQ videos (13.61 ± 1.98) than in LQ videos (4.15 ± 1.77 ; $p < 0.001$) (Table 3).

Table 3. Comparison of viewer engagement metrics between high and low quality YouTube videos on endoscopic submucosal dissection (ESD)

Parameters	High Quality (n=13)	Low Quality (n=13)	P
View count, mean, SD	7602±5542	14053±40045	0.064
Duration, mean, SD (s)	1262±748	1028±1239	0.064
Comments (n)	4	1	0.134
Likes ratio, mean, SD	0.79±0.43	1	0.071
View ratio, mean, SD	396±222	542±1219	0.043
Video power index, mean, SD	175±251	199±259	0.304
LAP-VEGaS score, mean, SD (n)	13.61±1.98	4.15±1.77	<0.001

DISCUSSION

The present study evaluated the educational quality of YouTube videos related to endoscopic submucosal dissection (ESD) using the LAP-VEGaS scoring system and compared viewer engagement parameters between high- and low-quality videos. Among the analyzed videos, only half met the criteria for high educational quality, indicating considerable variability and generally suboptimal standards of available online ESD content. High-quality videos showed significantly higher LAP-VEGaS scores, whereas the view ratio was significantly higher in low-quality videos. No significant differences were observed between the two groups in terms of total view count, video duration, number of comments, like ratio, or Video Power Index (VPI).

Several previous studies have examined the quality of surgical or endoscopic videos on YouTube and reported similarly inconsistent results (9). Although YouTube offers wide accessibility and serves as a valuable supplementary learning tool, the lack of peer review and content moderation leads to significant heterogeneity in terms of the reliability and comprehensiveness of surgical information (10). A meta-analysis evaluating gastrointestinal endoscopy videos found that less than 40% provided adequate explanation of the procedure (11). Our findings are consistent with these reports and demonstrate that video popularity, as measured by view count or number of likes, is not necessarily correlated with educational quality.

The LAP-VEGaS scoring system, developed by Celentano et al., has been validated as an objective tool to evaluate surgical video quality across multiple domains, including case presentation, intraoperative steps, and outcomes (12). Subsequent studies have applied this framework to laparoscopic colorectal, hepatobiliary, and robotic procedures, demonstrating high interobserver agreement and reproducibility (13). However, its application in the evaluation of endoscopic submucosal dissection (ESD) videos has been limited (14). The present study demonstrates that the LAP-VEGaS scoring system can be feasibly adapted for endoscopic procedures, offering a structured and practical approach for assessing the didactic value of ESD videos. In our analysis, high-quality videos showed significantly higher LAP-VEGaS scores, supporting the utility of this system in distinguishing the educational quality of ESD content. Interestingly, low-quality videos exhibited higher view ratios, suggesting that video popularity does not necessarily reflect educational value. These findings emphasize that in the development of online surgical education materials, greater attention should be paid not only to accessibility or viewer engagement but also to structured educational principles such as clear narration, stepwise procedural demonstration, and inclusion of outcomes. The LAP-VEGaS framework thus provides a valuable and standardized reference for improving the quality and consistency of ESD and other endoscopic training videos.

Another important observation of this study is that viewer engagement metrics including view count, like ratio, and the Video Power Index (VPI) were not significantly associated with educational quality.

This finding indicates that videos with higher LAP-VEGaS scores are not necessarily those most frequently viewed, emphasizing that popularity does not equate to instructional value (15). Similar findings have been reported in previous studies, where surgical and endoscopic videos on YouTube with high viewership often lacked academic accuracy or comprehensive procedural explanations (16). These results highlight a persistent gap between visibility and educational merit in online surgical resources. Consequently, online surgical education materials should not be evaluated solely based on accessibility or engagement statistics, but rather according to structured educational frameworks, expert validation, and adherence to standardized pedagogical criteria (17). In our study, low-quality videos demonstrated higher view ratios, further reinforcing this inconsistency and illustrating the limitations of relying on viewer-based metrics as indicators of instructional quality. Therefore, a stronger collaboration between professional surgical societies and video-sharing platforms is warranted to establish academic validation and quality-control mechanisms for online surgical education content. Such initiatives would enhance the reliability of disseminated surgical information and improve the overall effectiveness of digital surgical training worldwide.

Limitations

This study has several limitations. First, the analysis is limited to English YouTube videos obtained using a single keyword (“endoscopic submucosal dissection”), which may not cover all relevant educational content. Second, as the study design is cross-sectional, it was not possible to assess potential temporal changes in video quality or engagement trends. Third, viewer engagement metrics such as likes and comments may not accurately represent educational value, as they reflect subjective user preferences. Finally, although the LAP-VEGaS scoring system has been validated, it remains partially subjective and may vary depending on the evaluator's level of experience.

CONCLUSION

This study demonstrated that the overall educational quality of YouTube videos on endoscopic submucosal dissection (ESD) is highly variable and frequently suboptimal when assessed using the LAP-VEGaS scoring system. Only half of the analyzed videos met the criteria for high-quality educational content. Viewer engagement metrics such as view count, like ratio, and Video Power Index (VPI) did not correlate with objective educational quality, indicating that video popularity does not necessarily reflect instructional value. These findings emphasize the need for peer-reviewed, standardized, and structured video resources to enhance the reliability of ESD education on open-access platforms like YouTube.

DESCRIPTIONS

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