

Investigating the Video Watching Profiles of Low- and High-Achieving Students

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Abstract

Video-based learning is widely used in educational settings, and numerous studies have examined its effectiveness. While the literature provides strong evidence of the connection between video-watching behaviors and student success in these courses, further research is needed on the specific motivations behind video use among low- and high-achievers to develop targeted instructional strategies that enhance learning outcomes. This study aimed to investigate the relationship between students' video-watching motivations and their academic achievement in an online learning environment, with a focus on the differences between low- and high-achievers. Fifty-three undergraduate students participated in the study, watching course videos for various purposes, including pre-class preparation, post-class review, assignment help, and exam preparation. Their self-reported motivations for starting video sessions were logged and analyzed within the scope of this research. The findings of the study showed that, except for assignment help, there was no statistically significant difference in video-watching motivations between low- and high-achievers. Moreover, exam preparation was found to be the primary motivation for watching videos in both groups. Post-class review, on the other hand, was the least reported motivation among students in both groups. The research results are expected to benefit educators by helping them tailor instructional strategies, enhance learning support, and improve overall academic outcomes.

Keywords: video-watching motivations, academic achievement, video-based learning, educational videos, self-regulated learning

Düşük ve Yüksek Başarı Gösteren Öğrencilerin Video İzleme Profillerinin Araştırılması

Öz

Video tabanlı öğrenme, eğitim ortamlarında yaygın olarak kullanılmakta olup, bu yöntemin etkinliğini inceleyen çok sayıda çalışma bulunmaktadır. Alanyazın, video izleme davranışları ile öğrenci başarısı arasındaki güçlü ilişkiye dair kapsamlı kanıtlar sunmasına rağmen, düşük ve yüksek başarı gösteren öğrencilerin video izleme motivasyonlarına ilişkin daha fazla araştırmaya ihtiyaç duyulmaktadır. Bu bağlamda, öğrencilerin video izleme motivasyonlarının anlaşılması, öğrenme çıktılarının iyileştirilmesine yönelik hedeflenmiş öğretim stratejilerinin geliştirilmesine katkı sağlayabilir. Bu çalışma, çevrimiçi öğrenme ortamında öğrencilerin video izleme motivasyonları ile akademik başarıları arasındaki ilişkiyi incelemeyi amaçlamakta ve düşük ve yüksek akademik başarı gösteren öğrenciler arasındaki farklılıklara odaklanmaktadır. Çalışmaya, ders videolarını ön hazırlık, ders sonrası tekrar, ödev desteği ve sınav hazırlığı gibi çeşitli amaçlarla izleyen 53 lisans öğrencisi katılmıştır. Öğrencilerin video izleme oturumlarına başlama motivasyonları öz raporlamaya dayalı olarak alınmış ve bu motivasyonlar analiz edilmiştir. Çalışmanın bulguları, ödev desteği dışında düşük ve yüksek akademik başarı gösteren öğrenciler arasında video izleme motivasyonları açısından istatistiksel olarak anlamlı bir fark olmadığını ortaya koymuştur. Ayrıca, her iki öğrenci grubunda da sınav hazırlığının video izleme için birincil motivasyon olduğu belirlenmiştir. Buna karşılık, ders sonrası tekrar, her iki grupta da en az bildirilen motivasyon olmuştur. Araştırma sonuçlarının, eğitimcilerin öğretim stratejilerini öğrencilerin ihtiyaçlarına göre uyarlamalarına, öğrenme desteğini geliştirmelerine ve genel akademik başarıyı artırmalarına katkı sağlaması beklenmektedir.

Anahtar Kelimeler: video izleme motivasyonları, akademik başarı, video tabanlı öğrenme, eğitsel videolar, öz düzenlemeli öğrenme

Introduction

Video-based learning has become a widely adopted instructional approach in online education, offering students flexible access to educational content. Researchers are still investigating the extent to which video-engagement patterns shape students' comprehension, retention, and overall academic performance (Fiorella & Mayer, 2022; Ploetzner, 2024). While previous studies have examined video interaction behaviors such as pausing, rewinding, and fast-forwarding, there remains a gap in understanding how students' purposes for watching videos relate to their academic success (Blau & Shamir-Inbal, 2021; Yazawa et al., 2023). Moreover, students' video watching-motivation can be driven by various goals, including pre-class preparation, post-class review, assignment assistance, and exam preparation, yet the impact of these different viewing purposes on learning outcomes remains unclear. This gap highlights the need for research that focuses specifically on students' reasons for watching educational videos. Understanding these purposes is essential for gaining deeper insight into learning processes and for collecting data that can inform instructional design in video-based learning environments. Therefore, this study aimed to examine whether there is a significant difference in video-watching purposes between low- and high-achievers in an online learning environment. Specifically, the following research questions were addressed:

1. What are the profiles of low- and high-achievers based on their video-watching purposes?
2. Is there a significant difference between the video-watching purposes of low- and high-achievers?

The remainder of this paper is structured as follows: The following section describes the background research on students' video-watching purposes and timing. The methodology section outlines the data collection and analysis process, followed by the presentation of findings, discussion, and conclusion.

Background

Researchers are interested not only in the extent to which students engage with course materials, but also in the timing and purpose of this engagement. For example, Lee et al. (2022) discovered that students' video-watching patterns varied throughout the semester, with a noticeable increase in engagement as exams approached. Research on post-class reviews indicate that implementing effective learning techniques enhances students' academic performance and long-term knowledge retention (Bjork et al., 2013). One of the primary benefits of post-class review is retrieval practice, which allows students to mentally reconstruct and test information. This approach has been found to produce stronger learning effects compared to traditional memorization methods, preparing students for long-term knowledge application across different contexts (Karpicke & Blunt, 2011). Förster et al (2022) stated that students who watched videos before class demonstrated superior performance in both short-term assessments, such as final exams, and long-term knowledge retention, as measured by follow-up tests conducted four months later. Prior research (Adesope & Trevisan, 2017; Bjork et al., 2013; Karpicke & Blunt, 2011) has emphasized that post-class review has a profound impact not only on academic performance but also on long-term learning, self-regulation, and metacognitive awareness. Given these findings, educators and instructional designers should promote learning environments that encourage students to develop strong review habits. Hughes et al. (2018) found that students who watched preparatory videos before in-class sessions performed better in their final exams, with each additional day of early video viewing correlating with an increase in exam scores. Pre-class video watching alone accounted for 9% of the variance in final exam performance. Laparra et al. (2023) found that students began watching videos a few days before quizzes, midterms, and final exams. Notably, most students started watching videos only two days before the exam. Consequently, those who began watching videos at least three days in advance generally achieved higher scores. These findings provide strong insights into the positive impact of time management and self-regulation skills on academic success.

Examining students' video-watching purposes and timing is also important from the perspective of self-regulated learning. Self-regulated learning is a skill that involves planning, implementing, and evaluating one's own learning processes, enabling students to achieve their academic success and personal development goals (Pintrich, 1995; Zimmerman, 2000). Developing this skill allows students to set their own learning goals, select appropriate strategies, monitor their progress through self-assessment, and manage their time effectively to sustain motivation (Ramdass & Zimmerman, 2011; Zimmerman, 1998). Self-regulated learning is particularly critical in online learning environments, as it fosters more effective, independent, and responsible learners (Zimmerman, 1998). Therefore, examining students' video-watching purposes and timing can serve as a meaningful proxy for monitoring their self-regulated learning skills.

Method

Study Participants

This study was conducted during the 2023–2024 spring semester with 53 first-year students enrolled in the Algorithm Design and Development course offered by the Department of Computer Education and Instructional Technologies at a Public University. The study included 29 male and 24 female students.

Course Design and Video Contents

Algorithm Design and Development is a compulsory course conducted with a blended learning approach. This approach supports students' interactions in the classroom while also supporting individual learning through digital content (Garrison & Vaughan, 2008). The face-to-face part of the course was carried out as two hours of theory and two hours of practice per week. In the theoretical course, the basic topics of the C# programming language were taught to the students in line with the weekly lesson plan; in the practice section, they were allowed to develop various applications in the C# programming language using the Visual Studio IDE. In the online part of the course, the lecture videos recorded by the instructor were shared with the students via the Moodle Learning Management System (LMS). In addition, at the end of each course, quizzes were administered to the students on the weekly topic covered. Finally, weekly homework assignments were shared with the students through Moodle. A total of 21 instructional videos were shared with students throughout the semester, covering key topics in an introductory programming course. The videos span from Week 2 to Week 14, with a focus on both fundamental concepts and practical skills. Early weeks introduce foundational topics such as programming basics, console input/output, and the Visual Studio environment. As the semester progresses, the content advances to variables, type casting, and operators. In the mid-semester weeks, control structures like if-else, while, and for loops are explained. Later weeks emphasize modular programming, with a detailed breakdown of method types in Week 13, comprising seven separate videos on different method configurations and usage. The final instructional content in Week 14 addresses file operations, including reading, writing, and directory management. An example screenshot from the videos watched by students during the course is presented in Figure 1.

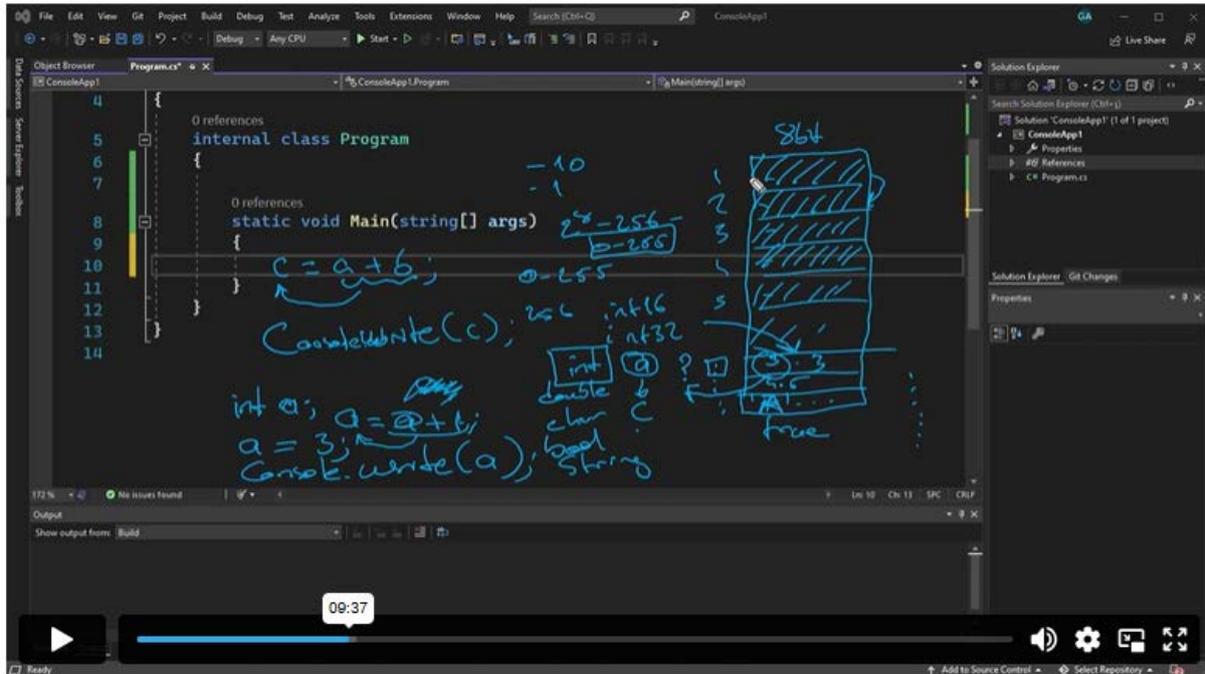


Figure 1. Screenshot from the Course Video

The videos were prepared as screen recordings and included both theoretical explanations and practical examples. The videos were made available to students on a weekly basis prior to each class and remained accessible throughout the semester.

Data Collection Process

Before beginning any video on the Moodle LMS, students were prompted (via a specially developed tool) to indicate their watching purpose: Preparation before the lesson, Review after the lesson, Help with an assignment, Preparation for an exam (Quiz, Midterm, Final), and Other. A quiz was administered before each class session. Throughout the term, homework, quiz, and exam scores were recorded, ultimately contributing to the overall academic performance for each student.

Data Collection Tools

Two types of data were gathered: (1) students' self-reported video watching purposes and (2) their academic performance records. A custom script was integrated into the video pages on Moodle to record students' self-reported data. Figure 2 shows the recorded video-watching purposes. After the student records their response, they start watching the video, and this process repeats every time the video page is loaded. This process ensured that each learner's intended watching purpose was recorded for every session.

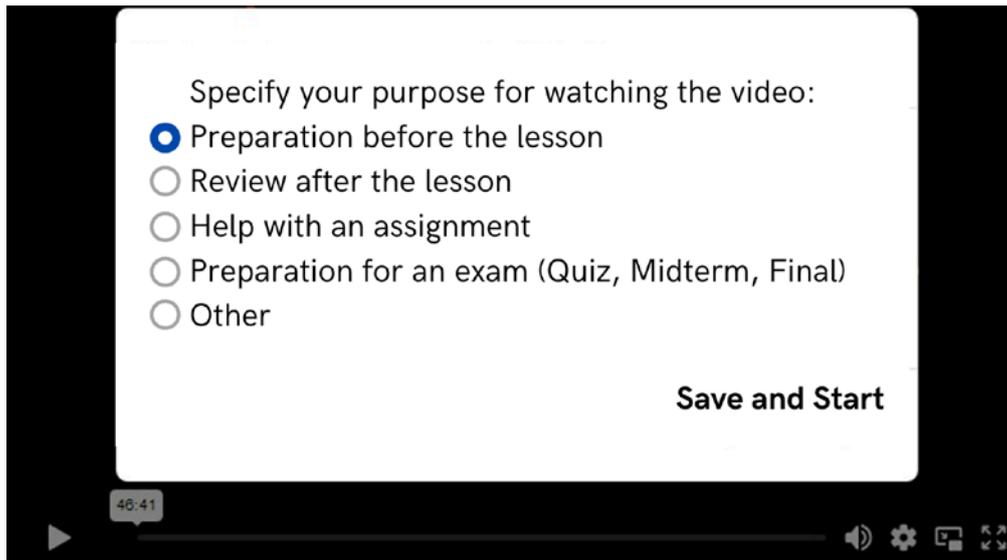


Figure 2. Pop-Up Question at the Start of Each Video Session

Data Analysis

Before data analysis, the dataset underwent preprocessing. The video session calculation provides insights into how many times a student watched course videos and for what purpose. The data was extracted from the database using SQL (Structured Query Language) and stored as a Microsoft Excel file. Students were classified as high-, middle- or low-achievers based on their final grade in the course. This classification was added to the dataset as the "Achievement" column. To answer the research questions only low- and high-achievers' data were filtered. The entire preprocessing workflow was performed using the Python programming language and the Pandas library. The Mann-Whitney U test was conducted to compare video watching purposes of low- and high-achieving students, utilizing the SciPy and Pandas libraries. This non-parametric statistical test was selected due to its ability to assess differences between independent groups without assuming a normal distribution. Additionally, the effect size (r) was calculated from the Mann-Whitney U test results to quantify the magnitude of observed differences between the two achievement groups. Effect size offers a standardized metric for interpreting the practical significance of findings with $r = 0.1$ considered small, $r = 0.3$ medium, and $r = 0.5$ large (Cohen, 1994; Sullivan & Feinn, 2012).

Findings

This study aimed to (1) identify low- and high-achievers' profiles based on their video-watching purposes, and (2) examine whether there is a significant difference in video-watching purposes (e.g., pre-class preparation, post-class review, assignment assistance, and exam preparation) between low- and high-achievers.

Table 1 presents the distribution of video-watching purposes among students grouped by achievement levels, incorporating median values (Md), frequencies, and percentages. The high-achiever group ($N = 19$) allocated 21.27% of their video-watching to pre-class preparation (Md = 5). Post-class review and assignment assistance each accounted for 10.25% (Md = 1 and Md = 2), respectively. Exam preparation was the most frequent purpose, making up 38.2% of total video-watching (Md = 9). Low-achiever group ($N = 21$) exhibited a different pattern, with exam preparation constituting the largest portion (58.16%) of their video use (Md = 13). Pre-class preparation accounted for 18.84% (Md = 2), while post-class review and assignment assistance were the least frequent purposes, representing 2.97% (Md = 1) and 5.49% (Md = 0), respectively. Other purposes accounted for 20.03 % of high-achievers' video-watching (Md = 3), 6.89 % of middle-achievers' (Md = 0), and 14.54 % of low-achievers' (Md = 2). These results show that High-achievers distribute their

video-watching time more evenly through pre-class preparation, post-class review, assignment assistance, and exam preparation. Low-achievers rely more heavily on exam preparation, dedicating the largest proportion of their video-watching to this purpose.

Table 1. Distribution of Video-Watching Purposes among Low and High Achievers

Group	Watching Purposes	Median	f	%
High Achievers (N=19)	Preview	5	137	21.27
	Review	1	66	10.25
	Assignment	2	66	10.25
	Exam	9	246	38.20
	Other	0	129	20.03
Low Achievers (N=21)	Preview	2	127	18.84
	Review	1	20	2.97
	Assignment	0	37	5.49
	Exam	13	392	58.16
	Other	0	98	14.54

In Figure 3, the findings highlight differences in video-watching purposes between low- and high-achievers based on their self-reported motivations before watching course videos. In the Preview category, the high-achievers show a higher median than the low-achievers. The range is wide in both groups, and there are more outliers in the low achievers. For Review, both groups have the same median. Most values are concentrated near the bottom, with a few outliers observed. In the Assignment category, the high achievers show a higher median and more variability. The low achievers show a compressed distribution with most values near zero. For Exam, both groups have the highest medians overall. The low achievers show greater variability and a larger number of outliers. In contrast, the high achievers' values are more concentrated. In the Other category, both groups have similar medians. The Low group has a slightly wider spread and more outliers than the high achievers.

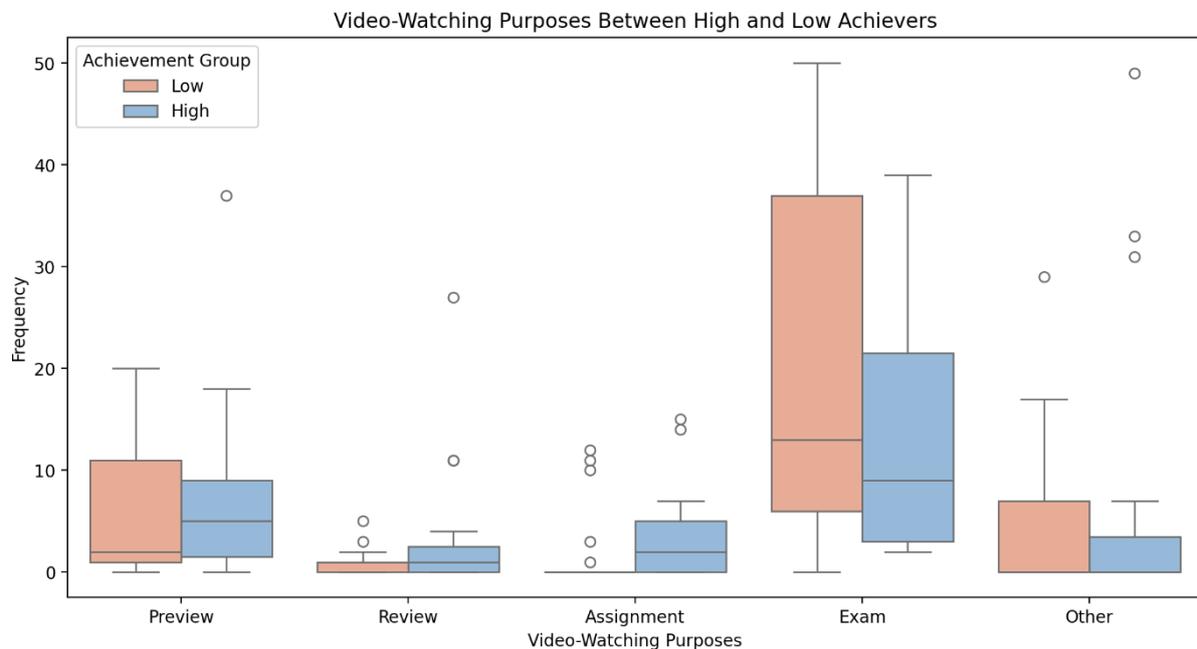


Figure 3. Box Plot of Video-Watching Purposes by Achievement Level

The findings reveal how high- and low-achieving students differ in their self-reported reasons for watching educational videos. Exam preparation was identified as the primary reason for watching videos in both groups, whereas post-class review was the least reported purpose.

Table 2 presents the Mann-Whitney U test results for various video-watching purposes across student achievement groups. The results indicate no statistically significant differences between high-achievers and low-achievers for Preview ($U = 214.0$, $p = 0.70$, $r = 0.06$), Review ($U = 243.5$, $p = 0.22$, $r = 0.19$), and Exam-related video watching ($U = 169.5$, $p = 0.42$, $r = -0.13$). However, a statistically significant difference was observed in video watching for assignment assistance ($U = 281.0$, $p = 0.02$, $r = 0.35$), indicating that high-achievers reported watching videos for assignment assistance more frequently than low-achievers with a medium effect size ($r = .35$).

Table 2. Mann-Whitney U Test Results for Video Watching Purposes

Purposes	U-Statistic	P-Value	Z-Score	Effect Size (r)
Preview	214.0	0.70	0.393	0.06
Review	243.5	0.22	1.192	0.19
Assignment	281.0	0.02*	2.207	0.35*
Exam	169.5	0.42	-0.813	-0.13
Other	206.5	0.84	0.190	0.03

* $p < 0.05$. Effect size (r): small ≥ 0.1 , medium ≥ 0.3 , large ≥ 0.5 (Sullivan & Feinn, 2012).

Discussions

The findings indicate differences in video-watching purposes between high-achievers and low-achievers in a blended learning environment. Exam preparation was identified as the primary reason for watching videos in both groups, whereas post-class review was the least reported purpose. In other words, all the students primarily watched the videos for Exam preparation. The findings indicate that there was no statistically significant difference between high- and low-achievers in their use of videos for pre-class preparation, post-class review, and exam preparation. However, a significant difference was observed in watching videos for assignment assistance with a medium effect size. Although the difference between high- and low-achievers was not statistically significant, the box plot and descriptive statistics suggest that high-achievers watch the videos for Preview more frequently than low-achievers. Similarly, Hughes et al. (2018) found that students who viewed preparatory videos before attending in-class sessions achieved higher final exam scores with each additional day of early video watching positively influencing their performance. Additionally, video watching for Assignment emerged as a key differentiator between achievement groups with high achievers reporting more frequent use of videos for assignment support. Prior research (Kim et al., 2014; Zhang et al., 2021) suggests that video watching for assignment assistance is strongly associated with academic achievement. This also aligns with self-regulated learning theories (Zimmerman, 2000), which emphasize the importance of planning, monitoring, and adapting study strategies in the learning process. From a self-regulated learning (SRL) perspective, the variation in how high- and low-achieving students utilize "assignment" videos likely reflects differences in their ability to plan strategically and leverage resources effectively. Engaging with videos to support assignment completion requires forethought—setting specific goals, analyzing task demands, and managing time efficiently—to identify the precise knowledge (Zimmerman, 2000). Previous studies reported that post-class review enhances cognitive processing and metacognitive awareness (Agarwal & Bain, 2024; Chen et al., 2018). However, in this study, post-class review was reported at low levels across both achievement groups.

Conclusion

This study contributes to the growing body of literature on video-based learning by examining how students' video-watching purposes—pre-class preparation, post-class review, assignment assistance, and exam preparation—relate to their academic achievement. The findings show that students primarily watch course videos for exam preparation while rarely engaging with them for pre-class preparation, post-class review, or assignment support. This indicates that exam preparation serves as a common motivator for video usage across achievement levels, a pattern supported by research

highlighting the role of high-stakes assessments in driving increased engagement with instructional videos among diverse student populations (Guo et al., 2014).

These findings also highlight a need for pedagogical interventions that promote broader and more purposeful video engagement. Future research could explore how targeted interventions, such as learning analytics dashboards or adaptive video segmentation, may help students allocate more time to pre-class preparation or post-class review, thereby improving academic performance. Learning analytics dashboards allow students to set specific viewing goals (e.g., watching pre-class videos) and monitor their progress throughout the term (Bote-Lorenzo & Gómez-Sánchez, 2017; Kim et al., 2021). One effective approach is to offer students explicit training in self-regulated learning (SRL), covering goal setting, time management, and self-monitoring. Such training has been shown to support more strategic and distributed engagement with instructional content (Ramdass & Zimmerman, 2011; Zimmerman, 2000). Another evidence-based approach involves prompting students to articulate their video-watching goals before accessing content and reflecting on those goals afterward, a technique shown to foster greater metacognitive awareness and more intentional engagement (Chen & Wu, 2015). Furthermore, linking pre-class video content to in-class tasks—such as quizzes, collaborative activities, or discussions—has been found to increase students' motivation to view these materials in advance (Hughes et al., 2018). Finally, embedding low-stakes retrieval practice tasks—such as post-video quizzes or concept mapping exercises—can incentivize students to revisit videos after class and reinforce learning (Agarwal & Bain, 2024; Karpicke & Blunt, 2011).

In addition to its contributions, this study has several limitations. First, this study is limited to the analysis of data collected from a blended learning environment in which videos were used to support in-class learning. The results may differ in learning environments where videos serve as the sole instructional material. Furthermore, students' video-watching purposes were collected through self-reports; no verification was made using log data regarding when or how long students watched the videos. Finally, although the system did not allow students to download the videos, there remains a technical possibility that they could have downloaded and watched them offline. This may have influenced the findings.

Author Contribution

The article was derived from the doctoral dissertation of *the first author*, conducted under the supervision of *the second author* (Thesis No: 959235).

Ethics

This research was conducted with the approval of Hacettepe University Institute of Educational Sciences Research Ethics Committee, dated 10.06.2024 and numbered E-66107507-050-00003586250.

Conflict of Interest

The authors state that they have no conflict of interest.

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