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Assessing the Quality and Reliability of Fall Safety Training Videos on YouTube: A Preliminary Study

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Fall hazards persist as a critical concern in the construction industry, constituting a leading cause of both fatal and non-fatal accidents. Over the years, scholars and industry professionals have come up with numerous safety training strategies to overcome this challenge. However, these safety training programs often fail to educate the trainees adequately due to their traditional and ineffective nature. Recently, YouTube has been adopted widely as a platform to disseminate educational information and resources. However, the quality and reliability of the YouTube videos remain questionable. This study focuses on assessing the quality and reliability of fall safety training videos available on YouTube. To achieve the objective, this study adopted one of the widely adopted tools, DISCERN. The results of this study demonstrate that the majority of assessed videos are of good quality and can be relied on as it comes to fall safety training. This research is one of the first attempts in highlighting the potential of DISCERN as a robust tool for assessing and filtering YouTube videos. The results affirm the feasibility of leveraging YouTube as a viable platform for utilizing reliable fall safety training content, thus contributing to the enhancement of safety practices within the construction industry.

Key Words: YouTube, Fall Hazards, Safety Training, Construction Safety, Training Videos

Introduction and Background

The construction industry is regarded as one of the most dangerous workplaces around the world. More than 60,000 fatalities are reported annually in the construction industry globally (Lingard, 2013). In the United States alone, approximately 1,000 fatal and more than 200,000 non-fatal accidents are reported every year (BLS, 2021). Among numerous reasons, falls is one of the leading causes of these fatal and non-fatal accidents in the construction industry (OSHA, 2011). Studies and reports demonstrate that more than 32% of the construction accidents are resulted from fall hazards (BLS, 2021; Kang, 2018; National Safety Council, 2021). Among them, approximately 70% result in fatalities (National Safety Council, 2021). Apart from the lost lives, physical and emotional distress, these accidents significantly impact the profit margin and project success adversely (OSHA, 2023).

In response, researchers and industry professionals have been putting a significant amount of effort into developing plans and strategies to mitigate the number of accidents due to the fall hazards. Among others, safety training is one of the most commonly adopted approaches to prevent safety incidents and fall hazards. However, falls consistently remains the leading cause of accidents in the construction industry. In other words, the traditional safety training methods have largely been proved to be ineffective in mitigating fall hazards. A significant amount of previous research efforts have demonstrated that these traditional safety training methods are mostly lecture-based and they are often labeled as boring and monotonous by the experts (Bhandari et al., 2019; Namian et al., 2016). To overcome this challenge, many researchers have advocated for non-traditional, more active, and self-directed training approaches.

One such non-traditional, and self-directed approach of receiving training is watching appropriate videos on YouTube. In the recent years, YouTube has gained much popularity for educational and training purposes (Chintalapati & Daruri, 2017). YouTube has been extensively utilized for learning numerous activities such as cooking, playing musical instruments, riding a bike, fixing cars, and troubleshooting computers, among others. YouTube has also been proven useful in the field of science and math education such as data analysis, computer programming, and game development among others (Ellmann et al., 2017; Piteira & Costa, 2013; Talbert, 2014). More notably, YouTube has become a major source of training and education in the field of healthcare. Studies report that medical students and trainees rely significantly on YouTube videos to learn about surgical procedures (Rapp et al., 2016). Additionally, YouTube is leveraged by healthcare professionals to educate patients on disease progression, prevention, and management (Johns Hopkins Medicine, 2019; Mayo Clinic, 2023).

Likewise in the field of construction, YouTube is increasingly becoming popular among students, researchers, and practitioners. YouTube is being adopted more increasingly to deliver useful content related to construction (Morris, 2020; Stephens & Cummings, 2021; Uddin et al., 2023). Additionally, YouTube hosts a large number of videos related to different construction activities and safety training. For example, there are countless videos that talk about the fatal four hazards of construction, which are responsible for over 70% of construction accidents. More specifically, there are numerous videos that talk about fall hazards and safety training which can be crucial in dealing with the ongoing fall hazard crises within the construction industry. Many of these videos are made available by reputed sources such as OSHA, NIOSH, AGC, etc., while others are from non-verified sources. While there is a clear indication that YouTube can and does play a crucial role in a non-traditional approach of construction safety training, the quality and reliability of these videos are still a big concern.

This study is one of the first attempts to assess the quality and reliability of YouTube videos pertaining to construction safety. More specifically, we chose to assess the videos related to fall hazards since falls is one of the leading causes of accidents within the construction industry. To achieve this goal, we adopted one of the most widely used video assessment tools, DISCERN. Additionally, a content analysis of the videos was also conducted. The findings of this study show that the videos available on YouTube cover a wide range of topics and they can largely be relied on for fall safety training.

Research Methodology

The research methodology of this study is divided into three phases. First, we extracted and filtered YouTube videos related to fall hazards in the construction industry and selected the 50 most viewed videos. Second, we modified the DISCERN tool to fit the scope of this study and assess the quality and reliability of the selected videos. And finally, the selected 50 videos were assessed by two authors independently and a content analysis was also conducted by the research team. The complete research methodology is described below.

Phase I: YouTube Video Extraction

The first phase is focused on identifying, extracting, and filtering the YouTube videos related to fall hazards in construction. In order to extract the videos and the related metadata, the research team leveraged YouTube API and developed a python code. Two search terms, *"construction fall"* and *"construction fall safety training"* were used to extract the relevant videos. The search was restricted to target videos that were published in the last 13 years i.e., from 2010 to 2023. The initial data extraction resulted in 1,276 YouTube videos related to construction fall safety training. Along with the videos, we also extracted the related metadata such as video title, video description, video ID, upload date and time, number of views, likes, dislikes, and comments.

After the initial data extraction, the research team targeted the 50 most viewed videos to assess their quality and reliability using the modified DISCERN tool. The 1,276 videos were first sorted based on their views. The next step was to conduct a thorough screening process to identify the videos that are actually relevant to the research scope since previous studies have demonstrated that YouTube often returns irrelevant results from keyword searches (Madathil et al., 2015; Uddin et al., 2023). To identify the most viewed 50 videos, first a set of inclusion and exclusion criteria was set. Then two of the authors independently went through the videos' title and description to identify the relevant videos. After combining the two authors' screened videos, if there were any discrepancies, the third author weighed in to identify the video as relevant or irrelevant. The screening process was stopped as soon as 50 relevant videos were identified. Figure 1 below shows the data extraction and screening process for better visualization.

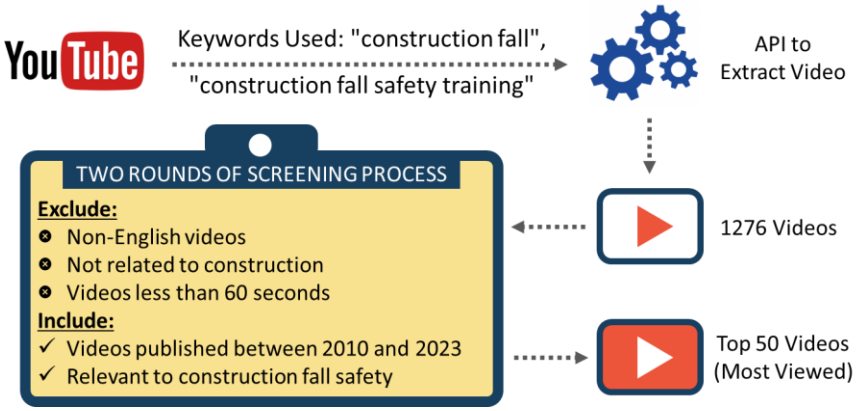

Figure 1. YouTube Video Extraction Methodology

Phase II: Modified DISCERN Tool

In order to assess the quality and reliability of the selected videos, the research team leveraged the widely adopted tool, DISCERN, to assess the videos. DISCERN tool was published in 1998 (DISCERN, 1998) and since then a plethora of studies have utilized this tool to assess the quality and reliability of different source of information (Eksi Ozsoy, 2020). The DISCERN tool consists of 15 questions divided into two sections. The first 8 questions are regarding the quality of the videos and the rest of the questions pertain to the reliability of the videos. Each question has a scale of 1 to 5 where 1 translates to NO, 3 translates to PARTIALLY, and 5 translates to YES to the asked question (DISCERN, 1998).

DISCERN tool primarily focuses on assessing the source of information in the field of healthcare. In order to make this tool usable to other fields, a plethora of studies have modified the questionnaire to fit their fields of study (Elangovan et al., 2021; Li et al., 2020; Radonjic et al., 2020). Following this practice, the research team modified the existing questions to better fit the construction industry, keeping the primary idea of the questionnaire intact. Table 1 below shows the complete list of questionnaires after modifying to fit the scope of this study.

Table 1. *Modified DISCERN Tool for Quality and Reliability Assessment*

SL	DISCERN Questions
	Quality Assessment (Question 1-8)
Q1	Are the video's objectives and goals for construction fall safety training clear?
Q2	Does the video effectively achieve its goals for fall safety training in a construction context?
Q3	Is the content relevant to construction fall safety training, addressing common risks and challenges?
Q4	Does the video provide information about its sources and references for fall safety training content other than the video creator?
Q5	Is it clear when the information presented in the video was last updated, especially regarding construction fall safety regulations and guidelines?
Q6	Is the video balanced and unbiased in its presentation of fall safety measures in construction?
Q7	Does the video offer information on additional sources of support and resources for construction fall safety training?
Q8	Does the video acknowledge and address areas of uncertainty or evolving safety practices in construction fall safety training?
	Reliability Assessment (Question 9-15)
Q9	Does the video describe how various fall safety measures work in a construction setting?
Q10	Does the video describe the benefits of implementing fall safety measures in construction work?
Q11	Does the video describe the potential risks and consequences of not following fall safety measures in a construction context?
Q12	Does the video outline what could happen if proper fall safety measures are not used in construction?
Q13	Does the video discuss how implementing these fall safety measures can affect the overall safety and quality of work in the construction industry?
Q14	Is it clear in the video that there may be different fall safety measures and approaches suitable for various construction scenarios?
Q15	Does the video promote the idea of shared responsibility and decision-making regarding fall safety measures among construction workers and their employers?

Since each question has a maximum point of 5, the total possible points that can be achieved by a video is 75. DISCERN tool follows a preset and established scoring technique to label the videos based on their total achieved points i.e., very poor (15 to 25 points), poor (26 to 37 points), fair (38 to 50 points), good (51 to 62 points), and excellent (63 points and above) (Charnock et al., 1999; DISCERN, 1998; Eksi Ozsoy, 2020).

Phase III: Assessment of the Videos

Once the modified DISCERN tool was established and the point distributions were set, two authors of this study independently watched each of the selected 50 videos and rated the videos for each question from the modified DISCERN tool. After the individual assessment, an inter-rater reliability test was conducted on the results to determine if both the raters were in agreement. The inter-rater reliability test showed a significantly strong agreement between the two independent assessors (Gisev et al., 2013). After the inter-rater reliability test, the results from both the assessors were combined to get the mean score for each question and a total score for each video. In addition to using the DISCERN tool, the research team also conducted an inductive coding technique to better understand the content of the videos (Saldaña, 2015). The content analysis revealed six topics that were predominantly covered in the selected fall safety training videos from YouTube.

Results and Discussion

Quality and Reliability Assessment of the Videos

As mentioned earlier, the most viewed 50 videos were selected from the list of extracted videos for assessment purposes. These 50 videos were published between 2010 and 2023 with a combined duration of over 660 minutes. The videos were viewed over 38 million times on YouTube garnering approximately 1 million likes and 0 dislikes. These metrics show a significant amount of user engagement to these videos pertaining to construction fall safety.

Once both assessors finished assessing the videos' quality and reliability using the DISCERN tool, their scores were combined, and the average score was taken for further analysis. A summary of the findings is presented in figure 2 below.

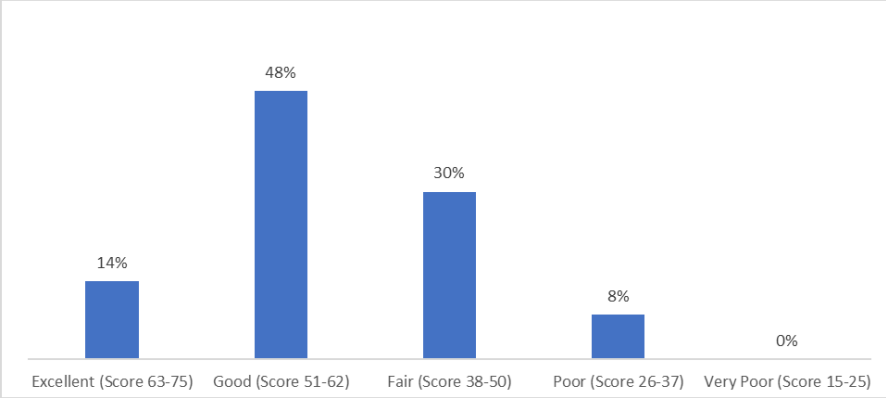

Figure 2. Summary of Quality and Reliability Assessment

As can be seen in figure 2, 14% of the videos were labeled as excellent since they received a score of above 63 on the DISCERN scale. 48% of the videos were labeled as good, receiving a score between 51 and 62, and 30% of the videos were labeled as fair receiving a score between 38 and 50. While only 8% of the videos were labeled as poor and none of the videos were labeled as very poor. This analysis reveals that the majority of the videos that were assessed can be relied upon and the quality of the videos in terms of fall safety training is satisfactory.

In order to get more insights into fall safety training videos available on YouTube, the research team segregated the score obtained by the videos for each of the questions from the modified DISCERN tool. Figure 3 below shows the points for each question.

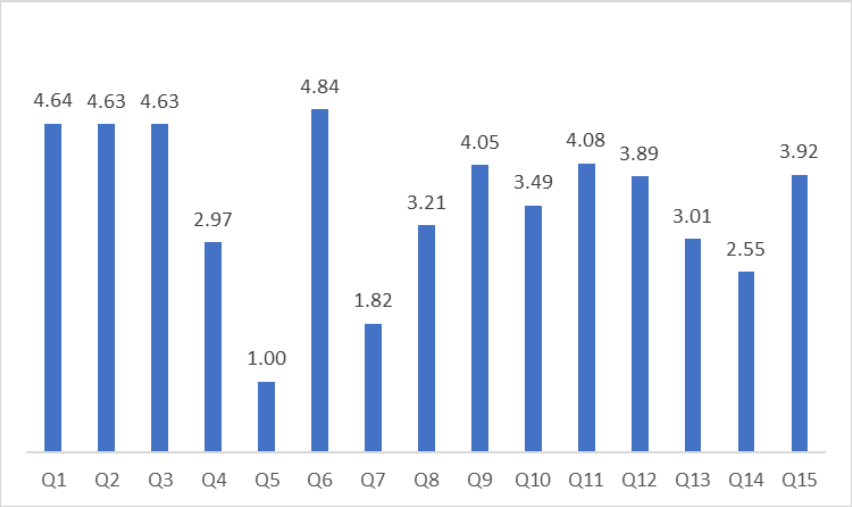

Figure 3. Breakdown of the DISCERN Scores

As mentioned before, questions 1 to 8 pertain to the quality of the video while questions 9 to 15 pertain to the reliability of the videos. The mean score for the first 8 questions was found to be 3.37 and for the last 7 questions were found to be 3.58, which demonstrates an above average score for both quality and reliability of the videos. However, taking a deeper look at the questions that received the lowest scores, it can be deduced that the majority of the videos got low scores for Q5, Q7, Q4, and Q14.

The low average score of 1 for question 5 indicates a concerning lack of transparency in communicating the recency of information. This oversight is crucial as construction safety regulations are dynamic, and outdated information can lead to hazardous practices. The average score of 1.64 for question 7 reveals a notable deficiency in providing supplementary resources. A lack of supplementary resources may hinder the audience's ability to delve deeper into specific topics or seek clarification on complex concepts. Similarly, the score for question 4 indicates a moderate but suboptimal performance in acknowledging external sources. And the average score of 2.55 for question 14 indicates a modest but insufficient coverage of the alternative fall safety measures. Having comprehensive understanding of alternative solutions is crucial for proper adherence to safety protocols among construction workers.

While these four questions show the deficiencies in selected fall safety training videos available on YouTube, the videos performed rather well in other aspects. Notably the videos got higher points in delivery clarity of objectives and goals (Q1), effectiveness in achieving goals (Q2), relevancy of the provided information (Q3), and balance and unbiased presentation (Q6). These high-scoring questions play a crucial role in the effectiveness of fall safety training videos on YouTube. Clear objectives provide a roadmap for both content creators and viewers, guiding the learning process. A balanced and unbiased presentation ensures that the information is perceived as credible and trustworthy, enhancing the likelihood of viewer engagement. Effectiveness in achieving goals is the ultimate measure of the video's impact on the audience, determining whether the training has successfully influenced behavior and improved safety practices.

Content Analysis of the Videos

In order to achieve a deeper understanding of the content of the selected videos, the research team watched all the videos individually and conducted an inductive coding technique to reveal the topics that are covered in the selected videos.

Ladder Safety

Ladder safety is consistently underscored throughout the training videos, emphasizing the severe consequences associated with neglecting safety measures. The videos revealed detailed insights into various types of ladders, including single, extension, and stepladders. Comprehensive instructions cover ladder components, proper setup procedures, transportation guidelines, and safe climbing techniques.

Harness and Fall Protection

A focal point of the training videos involves thorough instructions on inspecting and donning a full-body harness. The videos delve into critical discussions on fall protection programs, hazard identification, and preventive measures. Demonstrations elucidate the proper use of fall protection equipment and Personal Protective Equipment (PPE), emphasizing their role in ensuring worker safety.

Accident Examples and Real-life Scenarios

Real-life accidents and injuries related to improper ladder and fall protection usage are showcased in the videos, creating a tangible understanding of potential consequences. The incorporation of animations and live demonstrations serves to illustrate specific scenarios and outcomes, underscoring the paramount importance of fall protection in preventing injuries and fatalities.

Scaffolding Safety

Scaffolding safety is meticulously addressed in the analyzed videos, covering aspects such as proper setup, thorough inspection protocols, and safe utilization. Common challenges and hazards associated with scaffolding are identified, providing valuable insights into scaffolding components, positioning considerations, and modification guidelines.

Fall Arrest Systems

The videos explain in detail the mechanics of fall arrest systems, encompassing crucial elements like anchorage points, connectors, and rescue plans. Demonstrations offer a practical guide on correctly wearing and inspecting a full-body harness. The discussion extends to calculating fall clearance and strategies for minimizing associated risks. Also detailed discussions on fall clearance requirements and the benefits of trauma straps contribute to a thorough understanding of minimizing the impact and trauma in the event of a fall.

Hazard Identification, and Safety Measures

Identification of fall hazards on construction sites is a crucial aspect of any training. In-depth discussions on prevention methods are integrated, emphasizing the significance of a comprehensive fall protection system. The training videos comprehensively covers fall hazard identification and safety measures across various scenarios, encompassing the safe transport of items and strategies to avoid overload.

Conclusion

Falls is one of the leading causes of fatal and non-fatal accidents in the construction industry despite the application of existing safety training strategies. A non-traditional approach that has been more popular recently is watching YouTube videos to get the required knowledge on a specific subject matter. Although YouTube hosts a large number of videos related to fall safety training in construction, the quality and reliability of these videos have been questioned in the recent past. To address this issue, this study focused on assessing the quality and reliability of the 50 most viewed videos on fall safety training from YouTube. The results indicate that the majority of the videos performed above average on DISCERN scale for their quality and reliability. In other words, the videos can largely be used by construction industry stakeholders for fall safety training purposes. Additionally, the study also conducted a content analysis to explore the topics of discussion within the videos. The results revealed that the videos covered a comprehensive range of topics including ladder safety, scaffolding safety, fall protection systems, and hazard identification, among others.

This study is one of the first attempts to assess the quality and reliability of YouTube videos related to fall safety training. Future efforts can focus on assessing other safety training programs and materials following a similar protocol. Additionally, a comprehensive database of YouTube videos can be prepared to guide the relevant stakeholders to select useful videos on specific safety training.

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