

A Content Analysis of Graphic Elements in 2D and 3D Animated Explainer Videos for 3D Laser Scanning in Construction

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ABSTRACT

This study attempts to perform a content analysis of the visual components used in animated explainer videos that are both 2D and 3D, with an emphasis on how well they explain 3D laser scanning in the construction industry. The utilization of 3D laser scanning technology in contemporary construction procedures necessitates excellent communication and understanding among stakeholders. This study attempts to find patterns, trends, and best practices in the depiction of 3D laser scanning concepts by a methodical analysis of graphic elements. This study used a qualitative content analysis study of 10 2D and 3D Animated explainer video for 3d laser scanning in construction. To ensure a rigorous analysis, a scoring system will be developed to objectively evaluate the quality and impact of the identified graphic elements. Data will be collected systematically, and the prevalence of different graphic elements will be analyzed using percentages or ratios. A comparative analysis will be conducted to discern any notable differences between 2D and 3D videos in terms of graphic usage. The goal is to draw meaningful conclusions about which graphic elements are most effective in explaining 3D laser scanning in construction. The comparative content analysis of graphic elements in 2D and 3D animated explainer videos for 3D laser scanning in construction reveals an interplay between visual storytelling and technical information dissemination. The utilization of both 2D and 3D animations allows for a comprehensive communication strategy, catering to diverse audience preferences and learning styles within the construction industry. Furthermore, the study underscores the importance of a balanced integration of graphic elements, ensuring that technical accuracy is not compromised for the sake of visual appeal. Striking this equilibrium is essential for maintaining the credibility of the explainer videos within the professional construction community.

Keywords: Graphic element, 2D, 3D, Animated, Laser scanning.



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1 INTRODUCTION

The construction industry has witnessed significant advancements in recent years, with 3D laser scanning emerging as a transformative technology for project planning and execution. The construction industry has been engaged in increasing productivity, efficiency, output quality, infrastructure value, and sustainability by implementing emerging technologies, such as Building Information Modelling and 3D laser scanners (Arayici et al., 2011).

As the complexity of 3D laser scanning in construction projects grows, the need for effective communication tools becomes crucial. Animated explainer videos, incorporating both 2D and 3D

graphic elements, have become popular for simplifying intricate concepts and processes. Videos are better at conveying messages because those messages become more memorable than other options such as written instructions or personal seminars. According to the article, "Messages conveyed in video are more engaging and they lead to a higher retention rate. 90% of information transmitted to the brain is visual and visuals are processed 60,000 times faster. Compared to email, video is far more engaging. Studies have shown that the average viewer retains 95% of the message if it is in video form" (Smiley, 2022).

Explainer videos have one of the highest recall rates of any information presentation method available today (Oentoro & Oentoro, 2023). This study explores existing research related to the use of graphic elements in animated explainer videos specifically for 3D laser scanning in construction.

2 LITERATURE REVIEW

2.1 Graphic Elements

Graphic element is the art of combining images, text, and ideas to create works that capture a viewer's attention to tell a specific message. The elements of design are best understood as being the building blocks of any design. There are seven elements of graphic design. Graphic design is a craft where professionals create visual content to communicate messages. By applying visual hierarchy and page layout techniques, designers use typography and pictures to meet users' specific needs and focus on the logic of displaying elements in interactive designs, to optimize the user experience. Graphic Designers create visual concepts to communicate information. They create everything from posters and billboards to packaging, logos, and marketing materials. Graphic Designers use elements such as shapes, colours, typography, images and more to convey ideas to an audience (Khan, 2022).

Graphic elements such as line, shape, form, texture, space, value, and colour can significantly complement textual information, making it more accessible and engaging for the audience. In a world where visuals are omnipresent, the importance of graphic design is magnified. In contemporary communication platforms, be it a social media post, a billboard advertisement, or the homepage of a website, the graphical component assumes a pivotal role in efficiently conveying messages. The process involves the text, images, colours, and symbols, constituting both an art and a science. The deliberate combination of these elements serves the overarching purpose of visually communicating a particular idea or message in a compelling manner (Fanning, 2015).

The visual language that we use to interpret our world, understand information, and make connections. Good graphic design can convey a message or create an impact much more efficiently than words alone. As the saying goes, "a picture is worth a thousand words." For example, in graphic design, a well-crafted logo, a thoughtfully designed website, or a cleverly designed advertisement can convey a complex idea quickly and effectively.

Whether it's building a brand identity, explaining complex data, or guiding the user's navigation on a digital platform, graphic design plays an indispensable role. Graphic design agencies play a critical role in visual communication, serving as collaborators and problem-solvers.

2.2 Animated Explainer Videos

Explainer videos are short films that explain abstract concepts and relationships, usually in an educational context. They apply storytelling techniques and focus on relevant facts using different visualizations. Explainer videos are short films that explain abstract concepts. They apply storytelling techniques and typically last between one and three min, which usually comes with an increased speaking rate (Brame, 2016; Krämer and Böhrs, 2017, 2018).

Animated Explainer Videos can have a positive effect on engagement, particularly if associated with an enthusiastic performance (Findeisen et al., 2019). do not go into detail, and instead focus on the most relevant facts using animations, illustrations, graphics, photos, or text (Krämer and Böhrs, 2017). Animated explainer videos have proven to be a great asset for businesses seeking to produce effective video content. Such videos can transmit an understandable narrative that viewers are able to connect with, and studies show they lead up to 40% more people becoming customers than written words alone.

Explainer videos bring about increased involvement in the customer journey, allowing brands to display their products or services in a captivating fashion. Essentially helping companies stand out from other players on the marketing scene. (Everything You Need to Know About Explainer Videos (2023).

2.3 3-Dimensional (3D) Laser Scanning in Construction

3D scanners are very analogous to cameras. Like cameras, they have a cone-like field of view, and like cameras, they can only collect information about surfaces that are not obscured. While a camera collects colour information about surfaces within its field of view, a 3D scanner collects distance information about surfaces within its field of view. The "picture" produced by a 3D scanner describes the distance to a surface at each point in the picture. This allows the three-dimensional position of each point in the picture to be identified (Ebrahim, M. A. B. 2015). 3D laser scanning is a rapidly evolving technology that is revolutionizing the construction industry. In an era defined by technological advancement, the construction industry has witnessed a transformative shift towards innovative methods and tools. 3D laser scanning technology is a relatively new technique for quickly getting three-dimensional spatial information. It was hailed as another technological revolution in the field of surveying and mapping after global positioning system (GPS) technology which accurately reconstructs the scanned objects and builds high-fidelity, high-precision 3D point clouds (Xu et al., 2015). There are more benefits to deploying the technology on your next project.

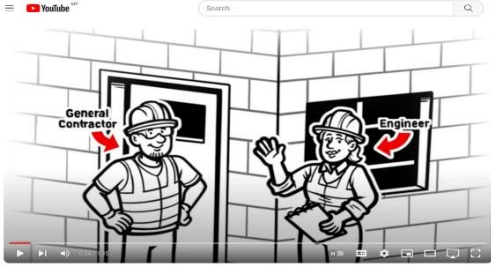



Most significant reasons projects could benefit from laser scanning. Improves quality and accuracy, laser scanning is accurate and allows construction teams to take planning and detail to a whole other level on site. Provides immediate information, Scans can be performed and accessed immediately, thereby improving operations, streamlining productivity, and reducing rework Cuts costs, laser scanning is much faster than conventional methods of project mapping.

Scanned data can be completed in minutes, which is far quicker than conventional methods, many of which can take hours or even weeks. The data scans created empower teams to develop more detailed workflows. Construction is a bottom-line business, so any cost savings that project teams can produce only go to increase profitability on a project. In fact, some estimate that using the technology versus conventional 2D scanning on a project can demonstrate a savings of up to 50%, with the most significant gains coming from an accelerated timeline (Ellis, 2023).

3 RESEARCH METHODOLOGY

The research methodology for the study used a qualitative content analysis of 10 2D and 3D animated explainer videos for 3D laser scanning in construction. To ensure a rigorous analysis, a scoring system was developed to objectively evaluate the quality and impact of the identified graphic elements. Data were collected systematically, and the prevalence of different graphic elements was analysed using percentages or ratios. A comparative analysis was conducted to discern any notable differences between 2D and 3D videos in terms of graphic usage. The goal was to draw meaningful conclusions about which graphic elements are most effective in explaining 3D laser scanning in construction.

Table 1 Animated explainer videos for 3D laser scanning in construction

No.	Sample video 2D/3D	Year published	Duration
1.	 <p>What is 3D Laser Scanning Explained TruePoint Laser Scanning</p>	2022	1:35 minute
2.	 <p>What is 3D Laser Scanning Explained Challenges</p> <ol style="list-style-type: none"> 1. Initial cost 2. Training <p>Scanning</p>	2021	10:43 minute
3.	 <p>WHAT IS SCAN-TO-BIM</p> <p>have heard the term "scan-to-BIM", but what does this actually mean?</p> <p>What is Scan to BIM? The BIM</p>	2017	6:50 minute
4.	 <p>POINT CLOUD (LASER SCAN) +/- 4 mm Scan Accuracy</p> <p>Scan to Revit BIM Model for Renovation Existing, Demo and New</p>	2020	2:59 minute

Scan to Revit | BIM Model for Renovation Existing

5.



How A Laser Scanner Works by Leica

2021

1:21 minute

6.

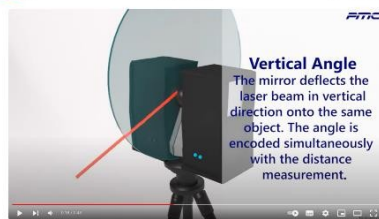


Trimble Field Technology - 3D Laser Scanner

2018

1:17
minute

7.



How Does a Laser Scanner Work?

2021

0:43
minute

8.



Benefits of 3D laser scanning surveying for complex projects

2019

1:43
minute

9.



3D Laser Scanning

2013

0:42
minute

10.



3D scanning Animated Video

2019

:36 minute

4 RESEARCH DESIGN

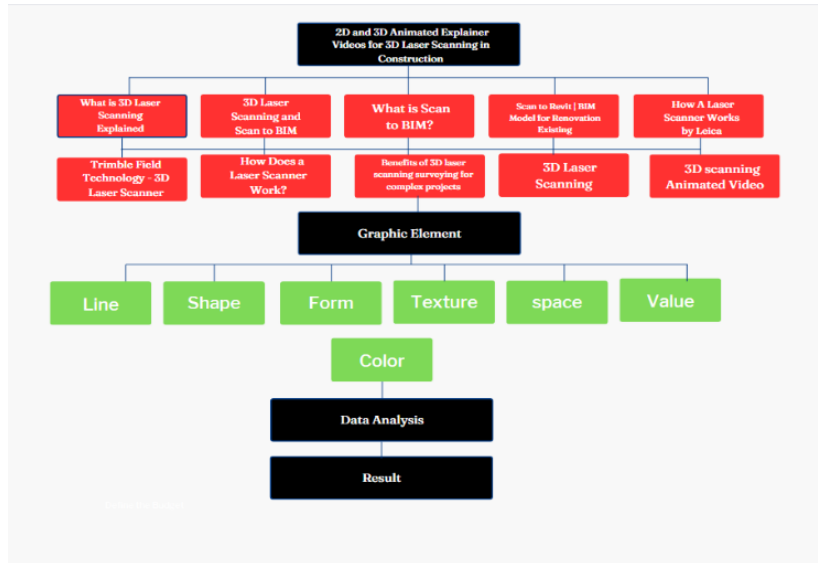


Figure 1 Research Process

This research was designed to investigate how graphic elements in both 2D, and 3D animated videos contributed to the explanation of 3D laser scanning in the context of construction. To achieve this, a diverse selection of animated videos related to 3D laser scanning in construction was gathered for analysis. The primary focus of the study was on identifying and categorizing graphic elements, such as line, shape, form, texture, space, value, and colour used in these videos. A systematic content analysis approach was employed, wherein each video was carefully watched, and observations regarding the types of graphics utilized were recorded. These observations were then categorized based on their purpose, clarity, and overall effectiveness in conveying information about 3D laser scanning.

Table 2 Element of design in each animator explainer video sample

Video Sample	Element of Design								
	2D	3D	Line	Shape	Form	Texture	Space	Value	Color
Sample 1	✓		✓	✓	✓		✓		✓
Sample 2	✓		✓	✓			✓		✓
Sample 3		✓	✓	✓	✓	✓	✓	✓	✓
Sample 4		✓	✓	✓	✓	✓	✓	✓	✓
Sample 5		✓	✓	✓	✓	✓	✓	✓	✓
Sample 6	✓		✓	✓	✓		✓	✓	✓
Sample 7		✓	✓	✓	✓		✓	✓	✓
Sample 8	✓		✓	✓				✓	✓
Sample 9		✓	✓	✓	✓	✓	✓	✓	✓
Sample 10	✓		✓	✓	✓		✓	✓	✓

5 RESULT

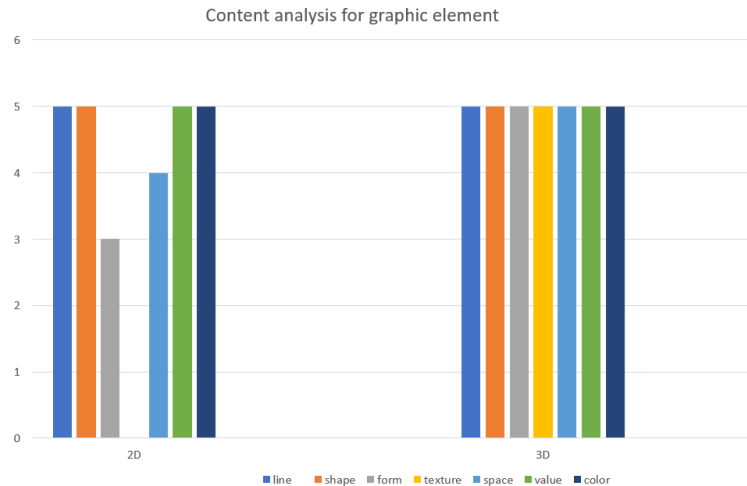


Figure 2 Content analysis of graphic elements in 2D and 3D animated explainer videos

6 DISCUSSION

The study's findings demonstrated the use of a content analysis of graphic elements in 2D and 3D animated explainer videos for 3D laser scanning in construction. To transmit types of graphic elements commonly used in 2D and 3D animated explainer videos for 3D laser scanning in construction, they would look at 2D, 3D, and the elements of design, such as line, shape, form, texture, space, value, and colour are design elements.

6.1 2D

The findings show that 2D animations simplify complex concepts and establish a foundational understanding of 3D laser scanning principles. These graphic elements, such as infographics and simplified diagrams, prove effective in conveying key information about the technology's benefits and applications. Moreover, the use of vibrant colours and engaging visual metaphors enhances viewer retention and comprehension.

6.2 3D

The finding for 3D, 3D animations play a pivotal role in providing a more immersive and realistic depiction of 3D laser scanning processes. The dynamic visualization of scanning equipment, point clouds, and construction sites adds a layer of authenticity, aiding in bridging the gap between theoretical knowledge and practical application. The depth and spatial awareness afforded by 3D animations contribute significantly to a more profound understanding of the intricacies involved in 3D laser scanning within the construction context. Through this study, researchers could learn more about the most effective and engaging graphic elements observed and how the elements contribute to conveying complex information.

6.3 Comparative analysis of 2D and 3D

The comparative content analysis of graphic elements in 2D and 3D animated explainer videos for 3D laser scanning in construction reveals an interplay between visual storytelling and technical information dissemination. The utilization of both 2D and 3D animations allows for a comprehensive communication strategy, catering to diverse audience preferences and learning styles within the construction industry.

Furthermore, the study underscores the importance of a balanced integration of graphic elements, ensuring that technical accuracy is not compromised for the sake of visual appeal. Striking this equilibrium is essential for maintaining the credibility of the explainer videos within the professional construction community.

7 CONCLUSION

In conclusion, the synergy between 2D and 3D graphic elements in animated explainer videos for 3D laser scanning in construction emerges as a powerful tool for knowledge dissemination. This finding data provides valuable insights for content creators and instructional designers, guiding them in crafting effective and informative visual narratives that contribute to enhanced understanding and implementation of 3D laser scanning technologies within the construction industry.

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CONFLICT OF INTEREST / KONFLIK KEPENTINGAN

There is no conflict of interests.

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