7. Where Do I Go from Here? A Rhetorical Analysis of Norwegian Wayfinding Signs

Nicole St. Germaine
ANGELO STATE UNIVERSITY

Abstract: This chapter examines the Norwegian use of wayfinding design and explores ways technical communicators can learn from this style of design to create more effective visuals. Norwegian wayfinding design encapsulates the clean, uncluttered design that is typical of Scandinavia, and it differs in several ways from that of the United States and many other Western countries. I examined 451 examples of Norwegian wayfinding signs from roads, city centers, busses, ferries, hotels, restaurants, and other public areas and compared them with equivalent signs in the United States for reference. Then I examined how the Norwegian signs matched up with the principles of effective wayfinding outlined by Anna Charisse Farr et al. (1997). I argue that American and Western technical communicators and graphic designers could utilize many of the techniques utilized by Norwegian wayfinding designers to make their signs more recognizable and readable.

Keywords: Wayfinding, Norway, visual design, usability, information architecture

Travel to an urban center, enter a public building, or drive along a roadway anywhere in the world, and you will likely be inundated with wayfinding signs. Signs, like many other elements of technical communication, tend to be ignored until the user needs assistance. However, these signs do much more than just help a traveler find the subway, indicate hazards in the road, or tell them on which floor they can find their dentist's office. Taken together, they also form the public narrative of the municipality and country in which they are located (Gibson, 2009, p.18).

Wayfinding is a sub-genre of information architecture, which is at the core of technical communication (Gibson, 2009, p.15). Although technical communicators rarely design wayfinding signs specifically, wayfinding is closely related to other fields within technical communication, such as web design, risk communication, and the design of safety information.

The exploration of wayfinding and its parallels to technical communication is not a new one, but it is one that is less often visited and deserves more attention. Saul Carliner (2001) explored wayfinding and other informational displays within museums to make suggestions for more effective web design. He found

that there are several marked parallels between museum exhibit design and how people navigate the web in terms of what made them stay at an exhibit and what attracted their attention. In more recent years, Brian C. Britt & Rebecca K. Britt (2021) examined the medium and narrative in the role of mobile wayfinding, in which they found that having a plausible narrative, or cohesive story about the wayfinding experience in a tour situation may help users to navigate the physical space more effectively. Gabriel Lorenzo Aguilar (2022) explored the redesigning of maps to help migrant women safely find water within the Arizona desert. In his article, Aguilar argued that some of the most important issues with designing visuals lies in the audience and what information about the user population is emphasized and what is minimized or not explored. Although each of these studies provide valuable information about wayfinding and its links to technical communication, particularly with usability studies, there are more applications that can be explored as we enter the age of augmented reality (AR) and virtual reality (VR).

Anna Farr and her collaborators (1997) described wayfinding as "The process of finding your way to a destination in a familiar or unfamiliar setting, using cues given by the environment" (p.716). Wayfinding design both affects outdoor spaces, such as city centers or roadways, as well as indoor spaces, such as airports, public transportation hubs, and public buildings. Similar to other types of visuals created by technical communicators, such as healthcare symbols and signs in medical facilities, safety information in instructions and manuals, wayfinding markers in augmented or virtual reality maps or tours, and symbols on websites, wayfinding information requires careful planning and knowledge of the audience as well as the physical or digital context of the visual.

Wayfinding consists of three processes: decision-making, decision execution, and information processing. At the decision-making phase, the user formulates a plan of action. For example, she may view a sign telling her that the museum she wants to visit is straight ahead. Then, the user executes the decision. In our example, the user then begins to walk straight down the road, as indicated by the sign. Finally, the user processes the information. She looks at environmental cues to determine where the museum is, such as navigating turns in the road and looks for the museum in the distance (Farr et al., 1997, p.716).

Wayfinding, according to Farr et al.'s definition (1997) is a process consisting of steps rather than just a type of sign. Any sign that helps the user complete these processes is considered a wayfinding sign. Specifically, according to David Gibson (2009), there are 4 main types of wayfinding signs:

1. **Identification signs:** Gibson states that identification signs are "visual markers that display the name and function of a place or space, whether it is a room, individual building, or gateway" (2009, p.48). An example of an identification sign would be the sign that shows the name and purpose of a building on a college campus.

2. **Directional signs:** These signs provide directional cues along a route (Gibson, 2009 p.50). An example of a directional sign could be a sign showing the direction in which a visitor must walk to get to certain departments in a hospital.

3. **Orientation signs:** Orientation signs show a user where they are in a physical space in relation to other routes, buildings, and so forth (Gibson, 2009 p.52). A mall directory sign is an example of an orientation sign because it shows the user where they are in a mall in relation to the stores and amenities located inside the mall.

4. **Regulatory signs:** Regulatory signs display the specific rules and laws governing a space (Gibson, 2009 p.54). A speed limit sign on a highway is an example of a regulatory sign.

Although wayfinding signs encompass an array of types of signs, both privately created, such as signage within a hospital, and also those created by a local, state/provincial, or federal government, not every sign is a wayfinding sign. Examples of signs that are not wayfinding signs include advertising billboards along highways, and signs that provide general information that does not fall in one of the types of wayfinding signs, such as a sign that announces that a city is the home of an exceptional sports team or birthplace of a famous person.

Like other aspects of usability, such as usability on the web, it is tempting for designers to blame the user for wayfinding errors. Wayfinding sign designers sometimes chalk up poor usability of their design to the user for having a poor sense of direction, for not paying attention to wayfinding markers, or even for not being intelligent enough to understand a "simple" sign (Passini, 1996). However, wayfinding difficulties are not usually caused by user inattention or lack of cognitive ability. Instead, these errors are most often caused by poor wayfinding signs (Passini, 1996).

Despite our best efforts, wayfinding design, like any form of design, is not universal. Although technical communicators strive to create practical visual design that is as easy to understand by as broad of an audience as is possible, there are many factors involved in creating these designs, including wayfinding signage (Bloom-Pojar & DeVasto, 2018; Farr et al., 2012 p.720; Horton, 1993). In the field of rhetoric, Rachel Bloom-Pojar calls the gap between the need for a visual and the creation of the resulting visual or sign a "translation space," which is any space "where translation work is required for negotiating meaning across modes, languages, and discourses" (as cited in Bloom-Pojar and DeVasto, 2018). In this "translation space," the designer must account for the lived experiences, cultural understanding of the context and symbols, as well as their priorities and needs in the space where the visual is presented (1999). As Aguilar (2022) pointed out in his study of the use of maps with Mexican migrant women, discovering the information about the audience takes examining what we know about the audience in a systematic way.

Opinions differ on the minimum level of universal comprehensibility a symbol should have (Devlin, 2014, p. 430). The International Organization for Standardization (ISO) standard for understanding healthcare symbols, for example, is 67%, while the American National Standards Institute (ANSI) standard is 84% (Hashim et al., 2014, p.508). While healthcare symbols can be used in a variety of contexts, they can also be used as wayfinding symbols within a hospital or clinic. For example, a symbol of an infant may mark a maternity ward, or a currency symbol may direct a patient to the billing department (Horton, 1993). Similarly, many wayfinding functions have moved online to the realm of mobile applications and websites, which falls within the purview of technical communication (Britt & Britt, 2021).

No matter how carefully a designer works to create a "universal" sign or symbol, the visual is a cultural artifact and is created from the designer's frame of reference. Signs depend on specific cultural knowledge and frames of reference that may be unique to the country (Hall, 1993, p.86). How we interpret signs and other forms of "instructions" depends on "hidden assumptions, social customs, cultural norms, kinds of conformity, forms of training, traditions of use and educated propensities" (Hall, 2014, p.142). However, Derek Handley et al. (2022) posited that rhetorical fields like technical communication provide powerful creative (as well as analytical tools) which can help inform how best to use cultural identities in local and urban planning.

This study is an effort to examine wayfinding signage in Norway and extrapolate how Norwegian wayfinding design can better inform other areas of design in technical communication. In this chapter, I will discuss the importance of wayfinding signage design, the principles of designing effective wayfinding signage, the methods in which I collected and analyzed examples of wayfinding signs in Norway, and finally, I will discuss the results of my analysis and review the best practices for technical communicators planning visual design elements. In particular, I will explain how signs and symbols with minimal text, with graphics that closely match the hazard or concept being shown are beneficial for other areas of design in technical communication, as well as how the considerations of usability and accessibility permeate good wayfinding design, and how color and the consideration of the environment in which the graphics will be used is an important consideration for effective wayfinding.

■ Importance of Wayfinding

The importance of effective wayfinding signage cannot be overstated. Virtually every public and many private spaces require a wayfinding scheme (Gibson, 2009, p. 17). Urban accessibility, including wayfinding, is even included as a key initiative on the United Nations Agenda 2030 for Sustainable Development (Fogli et al., 2019). Wayfinding design is especially important in city centers; educational facilities such as schools and universities; transportation centers such as airports,

subway systems, public busses and ferries; healthcare facilities such as hospitals and clinics; sports arenas; mixed-use facilities, and hotels (Gibson, 2009, p. 18; Hashim et al., 2014).

Wayfinding signs are a key factor in the accessibility of a building or city. People tend to avoid areas with bad wayfinding schemes (Passini, 1996). In the past, architects have created shopping centers and other commercial buildings that were intentionally difficult to navigate in the hopes that people would spend more time there, and therefore, spend more money. However, modern architecture moved away from these labyrinthine plans because of consumer pushback (Passini, 1996). Instead, both architects and wayfinding designers have moved to make building navigation clear and accessible for the people who will frequent the building.

Good wayfinding design can also impact user behavior in positive ways. Oddrun Hagen and Maya Rynning (2021) found that effective wayfinding signs led to increased cycling in Norway, which is part of the nation's Zero-Growth Initiative to reduce greenhouse gasses. Similarly, Dea van Lierop et al. (2017) found that effective signage led to increased customer loyalty and satisfaction, and as a result increased usage of public transportation. In addition, effective signage can also increase recycling behavior, and help users deposit their waste in the appropriate receptacle. This is vital for companies and municipalities, as "A single piece of contaminated material can send an entire batch of recyclables to landfills" (Bell, n.d., n.p.). Perhaps most importantly, good wayfinding design facilitates building and city or highway safety during emergency evacuations. According to Robert Passini (1996, p.320), emergency evacuations arc much more difficult in confusing settings. Wayfinding decisions have to be made quickly and problem-solving behavior may be confounded by anxiety induced stress. It has been repeatedly observed that people in emergencies tend to use familiar routes rather than rely on fire exits exclusively reserved for these situations. When an emergency occurs, users need clearly-labeled, comprehensible signs to be able to exit the building quickly and safely.

Insufficient or unclear wayfinding can also be expensive. Ralph Michels (2025) estimated that the total annual cost due to (adjusted to 2025) $556,000 with about 166,000 attributed to costs for staff giving directions (n.p.). These costs are known in industry as the "cost of confusion." Lost productivity is a major component of the costs a business or municipality incurs when workers have to take time out of their assigned work duties to help patients or visitors find their way. In addition, much like poor web design, poor wayfinding design can also contribute to missed appointments, missed flights, and user dissatisfaction with the organization responsible for the poor wayfinding design.

■ Principles of Effective Wayfinding

Like other aspects of visual design in technical communication, the discipline of wayfinding design is closely linked with semiotics, which is the "theory of signs"

(Hall, 2012, p. 5). All forms of communication are underpinned by semiotics. Symbols, gestures, and even words are all signs that convey a meaning to the user (Hall, 2012). In semiotics, signs are composed of two elements: the signifier and the signified. The *signifier* is the symbol. For example, Hall (2012) noted in wayfinding, the signifier could be a stop sign at an intersection. The *signified* is the meaning of the signifier. In this instance, the stop sign indicates to the user that she must stop the car and yield the right of way to any vehicles that arrived at the stop sign before her. A good match between signifier and signified occurs when the user is able to understand the meaning of the sign and perform the required action (Hall, 2012, p.26).

Many factors affect the quality of the match between the wayfinding sign and the user. As Carliner (2001) noted in his study of museum exhibit design, it is vital that the wayfinding sign designer clearly understands the stakeholders who need to be able to interpret their signs. As previously mentioned, culture can affect the user's perception of the wayfinding sign. The user must be familiar with the type of wayfinding sign and its context to understand what it means. The stakeholder's culture and even the effects of social distancing and government regulations in light of the COVID pandemic can affect how they perceive space and use spatial information (Hall, 1992; Vikas, 2020; Whorf, 1956/1941). In addition to culture, the user's reading ability and knowledge of the target language contained on the sign affects their ability to understand signs containing text (Horton, 1993). Age and visual acuity can also play a role in the user's understanding of a wayfinding sign because their eyesight may be affected, making some signs more difficult to read because of color contrast or the size of the text and symbols (Hashim et al., 2014). The education of the stakeholder may also play a role in how well they understand signs, particularly signs showing abstract concepts. Users with more education may be more accurate in identifying the meanings of signs (Hashim et al., 2014). In addition, the complexity of the environment and environmental conditions such as the presence of other signs, or "sign clutter," and the amount of light and visibility may affect the user's ability to see and interpret the sign (Farr et al., 1997; Gibson, 2009).

Gender can also play an important role in the perceived satisfaction in wayfinding. L. Brooke Keliikoa and their collaborators (2018) found that women may be more likely than men to use wayfinding signage when navigating in unfamiliar areas (p. 25). Further, Carol Lawton and Janos Kallai (2002) found that women in both Hungary and the United States showed a marked preference for wayfinding schemes that were related to routes marked by landmarks rather than routes using the cardinal directions. Lawton and Kallai also found that women in both Hungary and the United States tended to perceive the threat of attack or robbery from strangers as higher than the actual crime rate may warrant (p. 393). In the field of technical communication, Aguilar (2022) found that map design with women in mind plays an essential role in the safety of female migrants when seeking water in the Arizona desert. This difference in gender has been noted by

many studies across cultures, including in less developed cultures, and across urban versus rural settings (p. 389). These differences may be due to a cross-cultural tendency to allow boys more freedom of movement in childhood. These gender differences should be noted in wayfinding schemes as well as other situations, such as web design, in which users of all genders may be required to locate information and "travel" (whether virtually or physically) to places that are unknown or perceived as potentially dangerous.

Farr et al. (1997) outlined seven principles of effective design which can be applied to wayfinding design (pp. 719–720). Many of these principles mirror aspects of effective technical communication, including mobile wayfinding design and wayfinding in healthcare settings.

- Equitable use: the design can be used by stakeholders with varying abilities.
- Flexibility in design: the design accounts for a range of individual preferences and backgrounds.
- Simple and intuitive use: The design is easy to understand, "regardless of the user's experiences, knowledge, language skills, or current concentration level" (1997, p.719).
- Perceptible information: The sign's design provides the information to the stakeholder, regardless of the conditions in the environment or sensory abilities.
- Tolerance for error: The design accounts for, and minimizes, possible hazards or accidental actions on the part of the user.
- Low physical effort: The sign must be easily interpreted with a minimum of physical effort for the user.
- Size and space for approach and use: The size must have adequate space for the approach and use of the sign regardless of physical characteristics of the user such as posture and body size.

These guidelines seem simple and intuitive, but when applied to a complex environment with many stakeholders, they are much more difficult to apply.

■ Wayfinding in Norway

As previously stated, to understand the effectiveness of wayfinding signs, one must understand the potential stakeholders, or users, of these signs. Similar to the US, Norway has a diverse population in terms of age, disability, ethnicity, and immigration status (Modig 2021). Signs that seem simple and clear in one cultural context may be indecipherable in the next (Hall, 2012, p.26). Therefore, it is important to understand the characteristics of Norwegian graphic design as well as their cultural characteristics and the characteristics of the stakeholders utilizing these signs.

Norwegian Graphic Design Characteristics

Norwegian graphic design shares many characteristics with Scandinavian design as a whole. According to Scandinavian Standard, an online design magazine, Scandinavian design is "is characterized by a minimal, clean approach that seeks to combine functionality with beauty. Its focus is on simple lines and light spaces, devoid of clutter" (2022). Similarly, Norwegian design focuses on minimalism and strong, clean lines. Norwegian graphic design, led by the Oslo School of Architecture and Design, has focused on problem-solving and accessibility (Innovative Design, n.d.) Graphic design is also the largest discipline in design in Norway. Fully 1/3 of design workers are employed in a graphic design field (DOGA, n.d.). Because graphic design with a focus on accessibility and minimalism is a hallmark of Norwegian design, we could reasonably expect their wayfinding design to be accessible, clean, and devoid of clutter.

Norwegian Cultural Characteristics

The Norwegian people highly esteem their history and value civic engagement. Tolerance, respect, and equality are core Norwegian values (AFS Intercultural Programs/USA, n.d.). The social norms in Norway can best be described by *Janteloven,* or "Jante's Law." This social standard was developed from the literary works of Aksel Sandemose, a Danish-Norwegian author who was active in the early to mid-20th century (Couto, n.d.) Jante's Law consists of 9 "rules" that govern appropriate thought in Norwegian society, including "You are not to think you are anything special," and "You're not to think you are smarter than we" (AFS Intercultural Programs/USA, n.d.). In essence, these "rules" state that no one person should hold themselves above any other person in Norwegian society.

The desire for equality is also evident in Norwegian communication. "Communication is direct, participative and consensus orientated" (The Culture Factor Group, n.d., n.p.). Mondå Forlag (2022) stated that Norwegians use concise, simple, and direct communication and dislike vague statements and figures of speech. This is in line with Edward T. Hall's description of a communication from a low-context culture, "a low context communication is [. . .] the mass of the information is vested in the explicit code" (Hall, 1989). Given that Norwegian culture values direct, explicit communication, we could expect that information contained in their wayfinding signs would be similarly direct and explicit.

Norwegian Stakeholders

Norway today is a very diverse nation because of its history of accepting immigrants (Modig, 2021). In 2021, one of every three Norwegians living in Oslo was either an immigrant or a first-generation Norwegian. Most of these immigrants arrived to fill labor shortages or as refugees, with the largest numbers coming

from Poland, Lithuania, Sweden, Syria, Somalia, Germany, Eritrea, Iraq, the Philippines, and Thailand (Modig, 2021, p.3). Immigration has slowed somewhat in recent years due to COVID, but the overall immigration rate is expected to stay steady through 2060 (Modig, 2021, p.3).

Like many other industrialized nations, Norwegians are also a rapidly aging population because of a longer-living population and declining birth rates (Modig, 2021, p.5). Currently, the population that is age 67 and over hovers around 16%, but by 2050 this percentage is expected to increase to over 20% (Modig, 2021, p.5). Despite the fact that the "grey tsunami" is not quite as pronounced in Norway as it has been in other European countries, the labor shortage resulting from the state-supported retirement at age 55 for Norwegians has contributed to many senior workers exiting the workforce, reinforcing the need for immigrants to fill labor shortages in many fields (Eikeno & Oserud, 2022).

A significant number of Norwegians also live with a disability. According to The Norwegian Directorate for Children, Youth, and Family Affairs (n.d.), 15–20% of Norwegians are disabled. For comparison, this number is less than the current United States Centers for Disease Control and Prevention (CDC)(2025) estimate that 26% of Americans live with a disability. However, the Norwegian Government has addressed the large number of disabled Norwegians and their legal accommodations in the Equality and Anti-Discrimination Act of 2018 (Lovdata, n.d.). Included in its provisions, the Act stipulates that "Public undertakings and private undertakings focused on the general public have a duty to ensure that their general functions have a universal design" (n.p.). The Act defines universal design as "accommodating the main solution with respect to the physical conditions, such that the general functions of the undertaking can be used by as many people as possible, regardless of disability" (n.p.). Wayfinding signs are part of the public infrastructure, and therefore, should accommodate the disabled.

Methods

Sample

In the summer of 2022, I was fortunate to have been awarded a Fulbright-Hayes fellowship to study Norwegian culture and governmental systems. I spent a month in Norway, dividing my time between Oslo, Bergen, and Tromsø. As a group, the Fulbright scholars spent the majority of their time attending lectures in various locations around these cities. Perhaps because I had spent a frustrating layover in Amsterdam trying to navigate the train system from the airport to my hotel with no data access on my phone and only the Dutch textual description of the route to assist me, I became sensitive to wayfinding signs when I arrived in Norway. Because of my elevated attention to wayfinding signs, I immediately noticed that the design of the wayfinding signs was markedly different in Norway from the wayfinding design in the United States. For example, the signs

often had visual symbols instead of text, and they sometimes included more color than similar signs in the United States. As a result, I began to wonder if the Norwegian method of wayfinding design better matched the known principles of effective wayfinding design than those of the United States, and what lessons technical communicators in the US could take from the Norwegian practices.

To investigate this question, I began taking photos in public spaces around Norway. In all, I took 216 photos on city streets, buses, ferries, airports, hotels, government buildings, commercial spaces, and museums. I focused only on places that were publicly accessible, and that were related to travel and public sites rather than healthcare, as those were the places that were accessible to me. When I returned to the United States, I located a comprehensive cache of all approved Norwegian road signs from Trafikkskilt, a Norwegian website produced by The Norwegian Public Roads Administration. Although I had taken photos of many of the signs contained on this website, added together I now had a sample of over 450 wayfinding signs. I focused on publicly available wayfinding signs because I theorized that these signs were most likely to be the signs that the average Norwegian encountered on a daily basis. These were also the signs that I, as a visitor, had regular access to, which may better simulate a traveler's experience navigating unfamiliar areas in Norway.

My exploration of Norwegian wayfinding would be incomplete without a contrastive element. For this sample, I turned to wayfinding signs from the United States that displayed a similar message or use to tease out the differences in design and explore the lessons in Norwegian design that technical communicators could then apply to wayfinding in other physical or virtual spaces. Because the United States is much larger both in terms of population and physical space than Norway, it was difficult to narrow down and conduct a systematic study of representative cities, such as I was able to do in Norway. As a result, I examined road signs that were approved in the US by the Manual on Uniform Traffic Control Devices (MUTCD) 2012 Supplement, which at the time of this writing is the most current version of the MUTCD available. Other signs, such as wayfinding signs on U.S public transportation systems, or even signs indicating road hazards, appeared to be more variable and were not regulated by the U.S. Department of Transportation Federal Highway Administration. To find examples of these signs, I turned to signs that were available on the for sale via American commercial websites, as well as conducted web searches of the American sign that corresponded to the Norwegian example, making sure to disregard any outliers or unusual examples. When possible, I then tried to locate an example of the American sign in actual use, such as the examples in Portland, Oregon and New York City included later in this article.

■ Analysis

To analyze the Norwegian wayfinding signs, I utilized Farr et al.'s (1997) seven principles of effective universal design as well as several criteria mentioned in

the literature as being factors influencing the effectiveness of a wayfinding sign (Hall, 2014; Horton, 1993). Examples of parallels in Farr's principles and the literature in technical communication include the use of literal figures (Horton 1993; Kostelnick 2019), the simplicity of the design (Tufte 2001), and the use of color (Horton, 1993). Although Farr's principles are, at the time of this writing, more than 20 years old, the principles of wayfinding in a physical space have remained relatively stable. Furthermore, these principles of effective wayfinding were easy to understand and mirror the principles that we use in technical communication to facilitate effective visual design and wayfinding in virtual spaces, such as web sites and mobile apps.

I then related the findings to lessons that technical communicators could extract and apply to other aspects of visual design for a physical or virtual space, such as augmented reality (AR) or virtual reality (VR) spaces, in a similar way to Saul Carliner's (2001) analysis of museum exhibit and wayfinding design. Carliner (2001) used comparative analysis within a grounded-theory methodology framework to compare the wayfinding signage in museums to wayfinding methods used in web design. In addition to being a foundational work in technical communication, Carliner's (2001) methods and direct examination of effective wayfinding methods offered a direct match to what I hoped to achieve when comparing Norwegian and U.S. wayfinding signs.

The world of technical communication is fast-paced and frequently updated as technology changes, but the principles of effective physical wayfinding can still apply to other aspects of design that are more familiar to technical communicators.

■ Results

As a whole, Norwegian signs matched up with Farr et al.'s (1997) characteristics of effective wayfinding design, as well as the additional characteristics from technical communication literature. Because many of these characteristics overlap, I will discuss the individual attributes of Norwegian wayfinding design and link these attributes to the corresponding principles of effective design that they encompass. I will also provide appropriate examples of wayfinding signs that display each characteristic from the sample of Norwegian signs that I used in this study, as well as an image of its corresponding sign from the US

■ Signs that Rely on Graphics and Use Minimal Text

Similar to web design and design in health care facilities, wayfinding signs often rely on visuals to facilitate understanding with as much of the public as is possible. As Bloom-Pojar and DeVasto (2019) point out, "Visuals are not necessarily transparent, objective, or universally understood. However, because visuals can be more readily understood by a wide variety of cultures than text, graphics can be a

useful way to convey important information when a wide variety of cultures are being addressed."

Because 419, or 93% of the Norwegian signs in my sample of 451 signs did not include

text, they did not rely on the user's language or reading abilities. When the signs did include text, they often used both Norwegian text as well as English text, and the only signs labeling streets were text-only. This is in stark contrast to signs in the US, none of which in my exploration included a language other than English. All U.S. signs approved for federal use in the Manual on Uniform Traffic Control Devices for Streets and Highways (United States Department of Transportation, 2012) were also strictly in English when text was included on the sign. Of the Signs included in this manual, 364 of the 398 signs included text, or approximately 91.5%. The remining 8.5% of the signs used graphics only, which is in stark contrast to the 93% of Norwegian signs that only used graphics (United States Department of Transportation, 2012). Refer to Table 7.1.

Graphics-only signs match Farr at al.'s (1997) principles of equitable use, which states "the design can be used by stakeholders with varying abilities." as well as their principle of simple and intuitive use, "The design is easy to under-stand, "regardless of the user's experiences, knowledge, language skills, or current concentration level" (p.719). The graphics can be used by stakeholders with no reading ability in the main nguage or languages of a country or region, or who are illiterate in any language. As William Horton (1993) proposed, signs with limited text are more likely to be understood by residents or visitors from a variety of cultures and with varied reading and language abilities (p. 682).

Figure 7.1 shows a Norwegian sign intended to warn travelers about a draw-bridge ahead in the road. The image shows a drawbridge spanning a body of water with no text and minimal detail. In contrast, drawbridge signs approved by the U.S. Department of Transportation Federal Highway Administration must be diamond-shaped with a "black legend and border on a yellow background)" (U.S. Department of Transportation, 2009, p.103). Figure 7.2 shows an example of such a sign in Portland Oregon, United States.

Table 7.1. Contrast Between the Use of Text on Norwegian Versus U.S. American Wayfinding Signs

	Norwegian Wayfinding Signs	U.S. Wayfinding Signs
Sample Size	491	398
Graphics only	419 (93%)	34 (8.5%)
Monolingual text reflecting the nation's most-used language	4 (11.7% of the signs using text used Norwegian only, which represents (0.008% of the total sample)	364 (91.5%)
Bilingual text	30 (88.3% or 0.06% of the total sample used Norwegian and English text)	0 (0%)

Figure 7.1. Norwegian drawbridge road sign (Norwegian Public Roads Administration).

Figure 7.2. Drawbridge sign at Broadway Bridge in Portland, Oregon, United States (Wikimedia Commons).

The Norwegian penchant for minimal or no text on public signs also extended to locations other than roadways. Figure 7.3 was taken on a public bus in Bergen, Norway. This sign is intended to warn the reader about the gap between the bus steps and the platform. The sign contains no text, but only a clear image of an adult and child crossing from the platform to the bus with an arrow indicating the gap between the two. In contrast, Figure 7.4 shows a warning sign in the New York City subway, which is text-only and states "Watch the gap." When I rode the New York City subway for the first time as a young adult from an urban setting without a robust transportation system, I had no idea what "Watch the gap" meant and discerned the warning information from the yellow stripe near the platform rather than the warning sign, offering a personal illustration of the point that visual indicators of a warning can be more powerful than textual information.

Figure 7.3. Public transportation platform warning sign, Bergen Norway. (Taken by author.)

Figure 7.4. Subway platform warning sign in New York City (Champeny, 2023).

■ Pictures on Signs Should Match the Object Being Depicted

When a designer creates signs, they must be careful to depict concrete concepts or objects rather than abstract concepts when possible (Hashim et al., 2014). The research in wayfinding literature matches research within technical communication about using the human figure with simplified details (Horton, 1993) and using the human form and simple figures to humanize visuals and make them more relatable to the user (Kostelnick, 2019). For example, rather than trying to depict the abstract danger or hazard the object presents, effective wayfinding design principles would recommend showing a graphic of the actual hazard. The U.S. Department of Transportation (2009) mirrors the need for a physical representation of an abstract hazard, such as showing a depiction of the animal in a non-vehicular warning sign in which a particular type of animal may be present (p.130). Wayfinding should be literal to be effective across cultures (Hall, 2014, p. 11). None of the Norwegian signs in my sample showed an abstract concept such as "danger" or "caution." Instead, they showed the hazard and allowed the user to draw the conclusion themselves that the hazard represents danger. In contrast, American road signs often show text or a symbol such as "P" to indicate parking which have no direct relationship to the concept being displayed to the stakeholder (Hall, 2014, p. 32).

Figure 7.5 is a Norwegian traffic sign used to show the danger of rockslides on the road. Because the image shows rocks falling off a mountainside (the danger) onto a flat surface, the sign would clearly indicate to stakeholders of most cultures that they must watch for rockslides on the road or path. In contrast, figure 7.6 shows a rockslide sign approved by the U.S. Department of Transportation (2012, p.185). The rockslide sign from the United States matches the guidance offered by the MUTCD, for hazard signs, which, to reiterate, states that warning signs must be diamond-shaped with a yellow background and a black legend and border (U.S. Department of Transportation, 2009, p.103).

Figure 7.5. Norwegian Rockslide Road Sign (Norwegian Public Roads Administration).

Figure 7.6. American Rockslide Area sign (Roadtrafficsigns.com).

Figure 7.7. Do not throw garbage overboard sign, taken by the
author on the Hurtigruten coastal ferry, Norway.

Examples of Norwegian signs found on public transportation also bore out their preference for making the graphic match the action as closely as possible. Figure 7.7 depicts the prohibited action of throwing trash over the side of the boat. This sign, taken on the Hurtigruten, the Norwegian coastal ferry, shows a person dumping objects overboard, with the red "X" over it. The text beneath reads, "Do not throw trash overboard" in both Norwegian and in English, but the literal rendering of the prohibited action may make the sign more readily understood by passengers who cannot read the caption.

In contrast, Figure 7.8 shows a sign offered for sale for use on ferries and other marine transportation by the company Campground Signs, which despite the name, offers signs for a wide variety of public and private settings. In this figure, there is no visual depicting the prohibited action. Instead, the text describes the law prohibiting the action of throwing trash overboard (Annex V of the MARPOL Convention as well as U.S. Law) and concludes with a vague threat of "heavy fines." This sign, both because of its lack of a visual and its heavy use of legal text, would be impossible to understand if the user could not read legal English. As a result, the sign has limited usefulness.

Yet again, the Norwegian style of literal graphics is in line with Farr et al.'s (1997) principle of equitable use and principle of simple and intuitive use because the graphics literally depict the item or hazard rather than relying on a cultural construct of a symbol that represents danger or caution. In addition, by showing a literal, yet simple image of what the danger is, the signs reduce the possibility of a user from a different culture misconstruing what the image on the sign depicts. In this way, Norwegian signs also reduce the possibility for error, which matches Farr et al.'s (1997) guideline of tolerance for error, which states, "The design accounts for, and minimizes, possible hazards or accidental actions on the part of the user" (pp.719–720).

Figure 7.8. Do not throw trash overboard sign, offered for sale in the United States (SmartSigns).

Color on Signs Should be Culturally-Appropriate, High-Contrast and Should Reduce the Physical Effort to Read Signs

The use of color, and the perception of colors, can vary from culture to culture (Gibson, 2009, p. 90; Horton, 1993). Norwegians, similar to Americans, view the colors red, white, and blue as symbolizing their flags, as well as the concepts of freedom and peace. In addition, the colors red, white, and blue have historical context in Norway, as blue is recognized by its association with Sweden, and red and white by their association with Denmark. At various times in history Norway has been part of both of these countries (Gundersen, 2019).

Because of Norway's strong identification with red, white, and blue, it isn't surprising that the majority of the Norwegian wayfinding signs in my sample use red, white, and blue, as well as black for text and to frame images. In contrast, wayfinding signs in the United States often use green and white for highway signs, but orange and black for wayfinding signs within a city or to indicate potential hazards. According to the Builder Space website, green is typically used in the United States to indicate wayfinding information that is less important because green is less distracting to drivers on the road. In contrast, yellow or orange hazard signs are meant to draw the user's attention immediately (Valle, 2021).

While neither the Americans with Disabilities Act (ADA) nor does the Norwegian Equality and Anti-Discrimination Act of 2018 make recommendations in regard to the colors used in public signage, the ADA does recommend a 70% or greater contrast between the colors used on signage, particularly between the ground color of the sign and the text or figure colors (Gibson, 2009, p. 90). The contrast percentage of colors can be checked using luminance checkers, such as the one provided online by the Accessibility Developer Guide's online relative luminance tool. The color contrast doesn't just depend on the colors used; they also depend on the intensity of the colors. The green and white and black and yellow/orange color combinations of American signs have an appropriate color contrast, as do the blue and white and red and white of Norwegian signs. As a result, the color schemes used in wayfinding design by both countries are appropriate for most people with visual disabilities such as color blindness. Because of the judicious use of color, Norwegian signs are again in line with Farr et al.'s (1997) principles of perceptible information, as well as their principle of low physical effort, which states "The sign must be easily interpreted with a minimum of physical effort for the user" (pp. 719–720).

One method in which Norwegian designers reduce the physical effort needed to interpret a sign is through the use of red and green to indicate prohibited versus permitted, or desired, actions. Norway, like the United States and many other countries, uses a red, yellow, and green stoplight system on roadways. This indicates that red is recognized as a color meaning "stop" or

"prohibited," while green is interpreted as "go" or "permissible." The position of the lights reinforces these differences, even for users who have red-green color blindness. Figure 7.9 shows an example of the use of red and green on a Norwegian sign to indicate prohibited versus permissible actions. This sign was located next to an elevator in a public building in Oslo, Norway. The user's eye is drawn to the photos on the right, showing first a figure running in green, then a visual of people on an elevator with a large red X over it, and finally, a figure of people taking the stairs in green. While the contrasting red and green colors will not be helpful to someone with red-green colorblindness, the explanatory text serves to clarify the meaning of the graphic, which may be necessary for the color-blind. The explanatory text to the left explains the meaning of these visuals in greater detail, stating in both Norwegian and in English "in case of fire do not use elevator, use the stairs" (Refer to Figure 7.9). While this sign arguably may have benefitted from a graphic indicating fire rather than relying on the text to indicate that the purpose of the graphic was instructions in the case of fire, the visuals clearly indicate that one should take the stairs instead of the elevator.

In contrast, signs indicating that elevators should not be used in the case of fire often do not use color at all, or do not use red and green to indicate prohibited versus preferred actions in the case of a fire. Figure 7.10 shows a typical example of a sign found in public buildings in the United States. While the sign does show a person fleeing a fire by going down the stairs, because it only has one visual showing the stairs and not one indicating that a person should not use the elevator, a non-English reader may not understand that they should avoid the elevator during a fire.

Figure 7.9. Fire emergency visual in Oslo, Norway. (Photo taken by author.)

Figure 7.10. Elevator out of service sign from the United States (ADA Sign Depot).

Figure 7.11. Polar bear warning sign in Svalbard,
Norway (Texarkana Gazette, 2023).

The environment in which the wayfinding signs are used also has an impact on the legibility and readability of the sign (Gibson, 2009, p. 90). Most outdoor wayfinding signs in both Norway and the United States rely on reflective paint to be readable at night, but Norway's red, black, and white signs are more visible regardless of reflection. The light in the Arctic regions, including Norway, can

vary significantly from season to season. The summers in Norway are bright, with the sun setting for only a few hours in most of Norway in the summer, while the Polar night in the winter takes on a blue cast rather than the black of night that most sub-Arctic people imagine (Northern Norway Film Commission). As a result, the red and white signs with black figures and lettering stand out even in the blue winter light in Norway in a way that the green and white or even orange signs in the United States likely would not (see figure 7.11, which was taken during the Polar night period in winter in Norway). However, American green and white wayfinding signs depend on reflective white paint to make the letters and figures stand out at night. Without the reflective paint highlighting the white lettering, the American signs are very difficult to read in low light (See figure 7.12, which was taken at night). This paint tends to wear out over a period of 5 to 15 years, making older signs virtually unreadable after sunset (Turken, 2021).

Norwegian design considers the environment and the qualities of the light whereas the United States and many other countries consider color mainly as it relates to the purpose of the sign when they develop color schemes (Valle, 2023). The result is that Norwegian wayfinding schemes match Farr et al.'s (1997, p. 719) principles of low physical effort to read. The Norwegian signs also provide more equitable use, as outlined by Farr et al.'s effective wayfinding design principles (1997). On the other hand, the readability of American wayfinding signs may depend on where you are in the country, the time of year if outdoors or the ambient lighting if indoors, and the age of the sign.

Figure 7.12. Faded highway signs in Texas, United States (Hogan, 2019).

Discussion and Implications for Technical Communication

This study has the potential to be of practical use to wayfinding designers, as well as of use to technical communicators. As the United States and other countries update aging infrastructures, they would do well to consider Norway's practical and effective use of wayfinding design to replace their less effective wayfinding schemes. In addition, technical writers could apply many of these design

principles and findings to a variety of visual design genres, such as websites, mobile apps, augmented reality (AR) programs and virtual reality (VR) programs, safety and risk communication, and health information such as patient information materials and infographics.

▉ Lesson 1: Use Signs and Symbols with Little to No Text

The use of graphics-only, text-based, or both graphic and text-based information is still often debated. On one hand, graphics are more easily understood in an international context and when the audience is diverse (Horton, 1993). On the other hand, when legal aspects enter the picture, such as in health care settings or emergency scenarios, a certain amount of text may be necessary to reinforce the meaning of the graphics (St. Germaine, 2016). Further, the use of graphics alone may be confusing (Horton, 1993).

Norwegian wayfinding design illustrates how graphics with limited text can function well according to both effective wayfinding principles as well as the conventions of effective technical communication, even in a multicultural setting or situations where the graphic or sign is used in an emergency scenario, such as Figure 7.10 in which the sign gave instructions to avoid the elevator and use the stairs in the case of a fire.

▉ Lesson 2: Graphics Match the Object Being Depicted

Signs and symbols, as well as infographics and websites, should use figures that represent the concept or hazard in a literal way to account for differing reading skills, differing language skills, and for multiple cultural frames of reference. Even international websites with a great deal of traffic, such as Google, tend to create arguably ambiguous symbols and graphics that reflect more of their branding than effective wayfinding to represent areas of the website, and as technology expands and the need for new services, such as video chat, cloud storage, AI functions, and augmented reality features expands on websites, technical communicators could design symbols and graphics that correspond with the feature and will indicate to a wide demographic where exactly clicking on the symbol will take them.

▌ Lesson 3: Consider Usability and Accessible Design When Designing Symbols and Graphics

Audience analysis is at the core of technical communication (Johnson-Sheehan, 2018). Usability and accessibility have increasingly become a concern in website design as organizations strive to meet the guidelines set forth by the Americans with Disabilities Act (ADA), or the analogous disability laws in their own countries. As Carliner (2001) demonstrated when he applied lessons from museum

exhibit design and applied them to web design, the current research in the field of usability and accessible web design should continue to inform other areas of technical communication involving graphics and public information.

Lesson 4: The Use of Color and Physical Effort to Read Signs and Symbols

As discussed, American wayfinding designers sometimes seem to use color haphazardly or without a clear understanding of the audience to whom they are addressing. Although the field of technical communication does discuss the use of color and the environment in which the sign or symbol will be seen in more detail, especially when it comes to websites and safety information, cultural conventions in the use of color deserves more consideration.

Additionally, technical communicators should continue to examine the role of disability and the amount of physical effort needed to view physical signs, infographics, and AR and VR wayfinding symbols and schemes, Instead of reacting to ADA guidelines and retroactively redesigning websites and physical information to accommodate this need, technical communication should continue to advocate for universal design, which allows users of all abilities to participate in the design process (Edelberg & Verhulsdonck, 2021). Implementing universal, participatory design from the beginning of the design process will proactively address accessibility issues for all users, including design issues discussed in this paper such as creating color schemes that are accessible and readable under a variety of environmental conditions, as well as for users with visual disabilities such as color blindness.

Limitations of the Study and Further Research

Although American signs were remarkably similar in design and other characteristics, such as the amount of text and use of color, the sheer number of possibilities for public signs in the United States, with the exception of the signs by U.S. Department of Transportation (2012), make this lack of systematic data collection a limitation of the study. Further research could examine subsets of American visual design in various genres, or even in public wayfinding in a particular city or region.

Additionally, Norwegian graphic design is an aspect of Scandinavian design, and other countries and even German and Dutch design have also received accolades in various fields. However, because my fellowship limited my experience to Norway, I could only consider Norwegian design. Further research might explore other aspects of Scandinavian design or European design, as well as design in the global south and other less-explored areas. Further research could also be conducted to ascertain whether the wayfinding schemes typical of each country appealed more to a particular gender.

Sign clutter surrounding wayfinding signs or pages in virtual environments can also impact the user's attention. Because I was only studying the characteristics of individual signs, I did not have the opportunity to explore the impact of the presence of surrounding signs and its impact on the user. However, this is an area that may merit further research, especially since it has parallels to Edward Tufte's research on "chart junk," or clutter on charts and graphs that does not add new information (Tufte, 2001).

Further research could also continue the discussion about the shapes of wayfinding signs and other information may also have an impact on the user's ability to perceive and understand the information. For example, the triangular shape of many of the warning signs approved by the Norwegian Public Roads Administration contrasted with the diamond shape chosen by the U.S. Department of Transportation such as in Figures 7.1, 7.3, and 7.7. I was not able to locate an explanation for this design choice, nor an explanation of if the rationale for this choice of shape other than aesthetics. However, exploring the shapes of icons, symbols, and signs may inform not only wayfinding, but also web and app design choices.

Finally, it would be valuable to study the connections between physical wayfinding and other aspects of visual design more specific to technical communication in more detail. For example, future research might address designing symbols in a cross-cultural context for new services on the web, or study the design of symbols in other more specific settings, such as in emerging genres of mobile apps such as mobile learning, augmented reality, and AI-based apps.

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