Improving ineffective instructions

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SUMMARY

Despite the availability of extensive guidance, many instructions, procedures, and other documents intended to control how work is performed fail to fulfil their primary role. Major incidents and day-to-day operational inefficiencies often reveal that written instructions are either misunderstood, ignored, or incorrectly followed. Style guides typically focus on aspects such as terminology, tense, and reading level, aiming to ensure clarity and readability. However, these guides rarely address the more critical question: what content should be included, or excluded, to make instructions truly effective.

Effective instructions go beyond simply describing how a task should be performed; they are tools that support users in completing tasks with greater accuracy, reducing errors, and enhancing overall consistency. The distinction between well-crafted instructions and poorly designed ones is not trivial; it can mean the difference between safe, efficient operations and incidents with serious consequences. This paper explores why many instructions fall short and how adopting a user-centred, task-focused approach can lead to better outcomes for individuals and organisations alike

KEYWORDS

Instructions, procedures, risk, safety, good practice, user centred

What is an effective instruction?

An instruction is a means of guiding someone to perform a task. When written, it defines the method to be followed. Other terms such as procedure, method statement, or guide are often used interchangeably. This paper primarily focuses on written instructions used in the workplace.

An effective instruction helps individuals perform a task correctly. In situations where safety is a concern, the chosen method should aim to reduce risks to As Low As Reasonably Practicable (ALARP). Even when several methods of performing a task are equally safe and efficient, there can be benefits in ensuring that everyone performs the task in the same way.

To be effective, instructions must be technically correct and up to date. However, that alone does not guarantee they will be used or followed correctly. People must be aware that the instructions exist and be able to locate them easily. Also, they must be willing to use the instructions as intended.

Everyday experience of instructions

Instructions are prevalent in everyday life. Supplied with items we buy and presented when using devices. Whether anyone actually reads them is another matter. We might skim through the instruction booklet the first time we use a new washing machine, but after that, it is set aside and only consulted if something goes wrong. While we probably use only a fraction of the available wash cycles on our sophisticated machine, as long as our clothes are clean, we are satisfied.

With flat-pack furniture we are likely to follow the instructions very closely, knowing there is little margin for error. Yet, if we are assembling multiple items, such as a set of dining chairs, we will pay far less attention as we become more skilled with the process.

Evidence that (some) instructions in the workplace are ineffective

The UK Health and Safety Executive's document Revitalising Procedures [HSE 2004] identified poor procedures as a contributing factor in major accidents, including Bhopal (1984), Piper Alpha (1988), and the Clapham Junction rail crash (1988). It stated, "The consequences of inadequate procedures, or operators not following procedures, can be disastrous."

A recent review of letters sent by the HSE to offshore oil and gas installations revealed that similar issues persist [Salus 2023]. The review highlighted numerous instances where procedures and instructions were described as "insufficient" and not reflective of how tasks are actually performed in practice. Underlying problems included a lack of monitoring evidence, inadequate auditing, and failure to update procedures following reviews and operational changes.

Gregory Smith, in his book *Paper Safe* [Smith 2018], argues that instructions have become entrenched in bureaucracy, where paperwork has become disconnected from its core purpose of managing risks. This creates an illusion of well-managed safety that workers are content to play along with, and management is prepared to accept, because it has become normalised. Implementing improvements, however, would require significant change, which is often met with resistance.

Underlying issues that make written instructions ineffective

Ambiguous instructions leave too much room for interpretation. Overly complex language and long-winded explanations exacerbate this by making it harder for people to understand and follow the steps. Simpler, more direct wording, cutting any content that doesn't directly support the person performing the task, must be a key objective for authors.

The human brain has limited working memory, and instructions that overwhelm with excessive information cause overload and confusion, leading to skipped or mistimed steps. A well-structured instruction with a mechanism for users to track their progress can help overcome these natural human limitations.

Small font sizes, dense blocks of text, and messy formatting discourage people from reading instructions in detail. They may skim for key points and assume they know the rest, a tendency fuelled by natural human biases that promote overconfidence. A clean, visually pleasing layout increases the likelihood that the content will be read and followed. Minimising word count and presenting the instruction in a clear, structured format makes this far easier to achieve.

Time pressure and perceived priorities strongly influence how people use instructions. Significant cultural issues must be addressed to ensure these factors don't affect how critical tasks are performed, allowing risks to be managed to ALARP. A well-designed system for managing instructions supports the development of a suitable safety culture. Attempting to change culture without good systems is rarely successful.

Instructions that are misaligned with users' competence, either too advanced for novices or overly detailed for experienced personnel, affect how they are perceived and used in practice. Language proficiency and cultural differences can create additional barriers. Understanding the user population is essential, and a one-size-fits-all approach may not be appropriate.

A lack of feedback to users may lead them to assume they are following the instruction correctly. Similarly, a lack of feedback to authors may leave them believing their instructions are fit for

purpose. A collaborative approach, including coaching for both users and authors, should be an integral part of the instruction management process.

Written instructions are inherently limited as a communication method for critical information. If users do not fully understand the task and associated risks, they are more likely to make assumptions and less equipped to handle unexpected situations. A semi-structured pre-task briefing can help ensure people understand the task they are about to perform. This briefing can be enhanced by written instructions that guide and support the topics to be discussed.

User-centred focus

Guidance often emphasises the importance of involving end users in the development of instructions. However, this can result in end users being tasked with writing the instructions themselves, often leading to ineffective outcomes. This is not the fault of those individuals, as they are typically neither trained for the task nor given adequate support.

End users may feel pressured to create idealised instructions, including every possible detail, to avoid criticism for omitting something important. While they may possess practical experience, their technical understanding is sometimes incomplete. One key purpose of instructions is to help users perform tasks in accordance with recognised good practices, which may require them to change current practices [Brazier, 2024].

Handing responsibility over to technical authors, who may identify as professional procedure writers, often results in well-presented documents. However, technical authors rarely have the technical expertise or hands-on experience required to create accurate and effective procedures. Although their involvement may improve KPI scores, the quality of the content can be lacking.

A collaborative, iterative approach should be adopted wherever possible. Perfection is unattainable, and attempting to achieve it can be counterproductive. The focus should remain on creating an instruction that is practical and genuinely useful to the user.

Name and number

Being able to find the correct instruction will reduce one of the barriers to use. Giving it a meaningful title using terminology the end users will understand will make sure they identify it easily. If there are similar procedures for different scenarios, indicating this in the title is better than in the main body because that requires the user to access the full procedure to decide which one they need to use.

A task numbering convention can be very useful. Using a unique number for each task and a code for different document types allows easy cross referencing and access to information. For example:

- OI and MI to indicate an operating or maintenance instruction;
- JA for job aids that may provide additional support (e.g. checklist, flowchart, diagram);
- RA for a risk assessment;
- SCTA for a safety critical task analysis.

The document number for an operating instruction for task 123, performed in area 01 of the NTH site may be NTH-01-123-OI, whilst the associated SCTA is NTH-01-123-SCTA.

Writing more effective instructions

While some instructions may be intended for use by the general population, most in an industrial setting are designed for individuals who possess a certain level of competence and either already

know how to perform the task or have experience with similar tasks. The primary purpose of these instructions is to reduce the likelihood of errors and enhance task consistency. Including unnecessary detail diminishes an instruction's effectiveness and may lead competent users to disregard it entirely. Those learning a task may require additional support, but this should be provided through other means, such as supervision or training guides, and should not justify overloading instructions with excessive detail.

Being clear about how an instruction is to be used is crucial. It should not be left to the discretion of the end user. For instance, if users are expected to print, follow, and sign a specific instruction each time it is used, this requirement must be explicitly stated. Conversely, it is acceptable for some instructions to serve only as guidance, as long as this is clearly communicated.

It is also important to acknowledge that following an instruction exactly as written may not always be possible or desirable. However, deviations must be managed through a clearly defined process. Furthermore, it should be emphasised that blindly following an instruction is not inherently safe.

The first pages of many instructions are often filled with background and generic information that holds little relevance for the end user. In most cases, a good title makes the instruction's scope and purpose clear. However, when a standard template includes headings for these, authors often feel compelled to fill them with unnecessary content, increasing the overall word count and making it more likely that users will skip the entire preamble.

A Personal Protective Equipment (PPE) section is often mandated, which at first glance makes sense due to safety implications. However, in many cases, the requirements listed are not task-specific. If special PPE is required for a particular task, it is usually controlled by another mechanism, such as a Permit to Work.

However, a preamble that supports a pre-task briefing could significantly enhance the effectiveness of instructions by preventing people from diving straight into tasks without thinking and creating a forum for discussion and information sharing. Useful information may include:

- Main task stages;
- Major accident hazards associated with the task and associated risk controls;
- Parts of the task vulnerable to human error or where human actions are relied on to control the risk;
- Unique aspects that require different approach from other similar tasks.

The aim should be minimisation. Standard preamble sub-sections in a template often encourage authors to add content, even if it provides little value. Technology is now offering excellent opportunities to support preparation. For example, 3D-scanned images of work areas and smart drawings allow people to virtually walk through a task from a safe and comfortable location.

Warnings, cautions and supporting information

Current guidance for writing instructions often emphasises the use of warnings and cautions as a key safety feature, specifying that they should appear before the associated step, since reading a warning after encountering the hazard is too late. However, implementation is often poor. In some instructions, warnings and cautions outnumber the actual task steps, with the provided information frequently duplicating or even contradicting the steps that follow. In practice, warnings and cautions are rarely as important or useful as they seem.

More fundamentally, including warnings and cautions can suggest that some steps are more important than others. If certain steps are unimportant, why include them at all? It can also imply that steps without warnings are optional. Covering hazards and controls during a pre-task briefing,

supported by the instruction preamble, is a far better way to ensure that workers understand the risks they will encounter. The only situation where a warning or caution might be advisable is when a task step relies entirely on human vigilance to avoid a significant consequence, something we usually try to eliminate. When such steps are identified, it is crucial to review whether the hierarchy of risk controls has been applied correctly.

While warnings and cautions have questionable value, a mechanism for providing additional information for complex or critical steps can be highly beneficial. It allows task step descriptions to remain concise and to the point, while the supporting information is especially helpful for less experienced individuals. A second column alongside the task steps is a simple and effective way to achieve this. Not every step will require additional details, and the text should be kept as brief as possible.

Diagrams, photos, and other visual aids can also provide valuable support and are encouraged by existing guidance. However, practical implementation is often poor, and the significant effort required to embed visuals directly into instructions is rarely justified. It is usually more efficient to include them as appendices or capture them as separate job aids linked by the task number.

Keeping place

When skipping or duplicating steps during a task can have serious consequences, it is essential to provide users with a reliable way to track their progress. This becomes especially important if the task extends beyond a shift handover or involves a change in responsibility.

A misplaced focus on accountability has often led to instructions requiring every step to be signed and dated upon completion. This process can be laborious and may encourage users to sign off all steps at the end, defeating the purpose of keeping track. A simple tick box for each step is usually sufficient. However, users may sometimes be reluctant to rely on tick boxes, fearing that someone else could mark them on their behalf. This may reflect deeper cultural issues that warrant investigation. To address this concern, providing a box next to each step and allowing users to mark it with a tick, signature, or other symbol can meet the primary goal of place keeping.

Critical hold points should be clearly identified and provide a good opportunity to record date, time and who was involved at different stages of a task. At a minimum, a hold point should appear after confirming preconditions at the start of the task and at the end task. The concept of ‘postconditions’ from computer programming could be useful for critical tasks to define the system state on completion.

Open-ended steps such as monitoring a condition while other steps are performed or contingent steps that cannot be predicted with precision present a subtle challenge for place keeping. In these cases, the requirement should be for the user to acknowledge awareness of the action rather than confirm its immediate completion. A tick in the box can indicate that acknowledgment rather than execution. A subsequent critical hold point may provide a useful opportunity to confirm that the monitored condition has remained within limits and whether any contingent step was performed.

Whenever possible, tasks should be completed by the same person or team. If that is not feasible, the goal should be to hand over responsibility at a critical hold point defined in the instruction. If these are impractical a method for indicating the transfer of responsibility should be provided. Drawing a line and noting the change of responsibility is often sufficient.

Effective text

Guidance consistently emphasises that the wording of instructions should be clear and concise. However, these are subjective qualities that authors often find difficult to achieve in practice.

Wording is not trivial and should be subject to greater scrutiny than is typically the case. Formal task analysis is a useful tool for this but it is not practical to analyse every task requiring an instruction.

Accurately identifying items of plant and equipment is critical. Redundancy in information helps reduce the likelihood of confusion. For example, using both a description and a tag number for each item of equipment should be mandatory so that users have at least two ways to confirm identity of the correct item.

Another way to minimise confusion is to use consistent terminology throughout the instruction. It is common for the same valve to be referred to as both ‘pump suction’ and ‘pump inlet’ in different steps of the same instruction. A practical solution to address both issues is to list all items (e.g., valves, instruments, equipment) with their specific descriptions and tag numbers at the start of the instruction, ensuring consistency throughout.

Each line of the procedure should be reviewed to minimise word count while maintaining clarity. Standard guidance to use the active voice greatly improves readability. Simple changes, such as removing unnecessary words like ‘the’ and using symbols (e.g., ‘&’ instead of ‘and’), can also help. Although guidance often warns against using abbreviations and acronyms, they are perfectly acceptable if they are familiar to the instruction’s users.

Consistency and redundancy in equipment descriptions also offer opportunities for further word reduction. For example, the step "Ensure that the acid pump suction valve V101 is closed" can be simplified to "Ensure acid pump suction V101 is closed." Reducing the word count from ten to seven is useful, but more importantly, the focus it brings to the wording improves clarity and reduces cognitive load.

Using a hierarchical structure helps convey why a task must be performed in a particular way without needing to explain it. There are typically up to four levels of hierarchy as follows (task is to start oil export to pipeline):

1. Sub-task - Start export P101
   1.1 Sub-sub-task - Line-up export P101 discharge to pipeline
      1.1.1 Task step - Open discharge V1212
         1.1.1.1 Sub-step - Turn valve wheel anti-clockwise to full extent.

Each level of hierarchy in an instruction defines how the level above it is performed. The fourth level of hierarchy (sub-step) represents a level of detail that may be necessary for novices. This level of detail may be appropriate in everyday situations such as flatpack furniture instructions specifying that a screw should be turned clockwise to tighten. But in a workplace setting, it would be concerning if complete novices were expected to follow an instruction without some relevant skills or training.

It is important to recognise that technical perfection in an instruction is both unattainable and often counterproductive. Instructions are just one component of a broader system for controlling risk, and an imperfect instruction is far better than having no instruction at all.

Presentation

Current guidance on the presentation of instructions is generally sound. Using an appropriate font type and size, adequate line spacing, and ensuring plenty of white space on the page all help users read and comprehend the content more easily. However, consideration of neurodivergence may not have received enough attention. For example, highlighting keywords in capital letters or bold text

can be very distracting for individuals with dyslexia. Similarly, the use of colour can be problematic for those with colour blindness.

There is no clear evidence that these emphasis techniques significantly improve comprehension for most users. Therefore, sticking to standard sentence structure and black text is a more sensible approach.

Conclusion

Current guidance on writing instructions has not succeeded in eliminating ineffective practices. While the guidance itself may not be fundamentally flawed, it often fails to focus on what end users actually need. The key to improving instruction lies in shifting the mindset from simply describing a task to genuinely supporting the people performing it. This change in focus significantly alters the content and structure of instructions, making them more practical and user-centric.

An effective instruction should prioritise usability, be concise, and avoid unnecessary detail. Being ruthless with wording, stripping away anything that does not directly aid task completion, results in clearer, more accessible instructions. It is also crucial to recognise that perfection is unattainable; striving for it often leads to bloated, overly complex instructions.

Thoroughly understanding the task and engaging in meaningful collaboration with end users allows authors to write instructions that align with real-world practices. This collaborative approach assists continuous improvement by bridging the gap between documented instructions and actual work practices.

Instructions should support users to perform tasks safely and consistently, not overwhelm them with unnecessary complexity or create a false sense of security through bureaucratic box-ticking. A user-centred approach that involves task analysis, ruthless editing, and practical collaboration is essential for improving the effectiveness of workplace instructions and reducing the risk of human error.

Although the terms have been used interchangeably in this paper, it may be concluded that there is a distinction worth recognising. The following definitions highlight different uses, which may affect both content and presentation:

- Instruction – A document created by one person or party to direct another on how to perform a task.
- Procedure – A document written to support a competent person in performing a task.
- Method Statement – A document prepared by one person or party to explain to another how a task will be performed.

Often, changing the style of an instruction to a procedure results in a simpler document that is more useful to end users with a defined level of competence. Instructions are better suited for novices, but whether we should be writing for novices in a hazardous workplace is debatable. The value of method statements, typically created by contractors on the insistence of the client is a topic beyond the scope of this paper.

Summary table

The table is a convenient summary of issues observed with written instructions (and procedures), and how they may be resolved.

Problem	Solutions
Not aware instruction exists	Make sure they only developed when necessary / useful. Delete / archive others. Ensure good communication with end users for new / changed.
Cannot identify correct instruction	Use clear / unambiguous titles. Be consistent with end users' terminology.
Cannot find instruction	Organise and index following a consistent structure. Use multiple methods of identification (e.g. description and number).
Cannot access instruction	Understand how end users access in practice. Ensure end users have the necessary permission to access. Provide controlled hard copies where necessary.
Not sure of correct version	Apply robust version control. Make sure superseded versions are removed / archived. Make sure the correct method of access is efficient / discourage local copies.
No instruction for task	Focus resources where necessary / useful. Develop at the earliest possible stage of projects and task planning. Acknowledge not required for every task.
Out of date instructions	Make sure updated as part of management of change. Make sure reviews are focused on how tasks are performed. Ensure review and authorisation of new / changes occurs promptly.
Instruction not consistent with way task performed	Modify plant / equipment so that the method preferred by end users is the safest / most efficient. Involve end users in development / review. Ensure feedback identifies when updates needed. Be aware that end users may follow unsafe methods and preferred method needs to be better communicated / enforced.
Instruction does not describe safe method	Involve technical experts in development / review Use task analysis to identify safe and practical methods. Cross reference safety studies.
Instruction not used as intended / expected	Clearly define intended use. Make sure expectations are realistic for end users. Implement a deviations process to cater for real world scenarios. Accept that blindly following instructions is not safe. Develop safe compliance culture.
Instruction misinterpreted	Be ruthless with wording. Use hierarchical structure to convey understanding. Make sure presentation is accessible for neurodivergence (autism, dyslexia, colour blindness). Accept procedures always open to interpretation and must have flexibility to cover uncertainty.

Problem	Solutions
Key messages overlooked	Only include content that helps people understand. Minimise use of warnings / cautions. Accept written communication is relatively poor at conveying meaning.

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