Refining the intervention: qualitative study with authors

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## Introduction

Having defined intervention components and built a prototype (chapter 10) I wanted to refine the home page and SRQR guidance page (“the website”) by getting feedback from authors.

The MRC guidance on complex interventions, the Person Based Approach, and the Behaviour Change Wheel all stress the importance of including service users in the design of complex interventions [1]; [2]; [3]. Service users can help identify deficiencies which, if addressed, would make the intervention more successful [1]. Involving service users can also help researchers better understand barriers, and whether intervention components are functioning as intended.

In this study, I wanted to address limitations I had identified in my thematic synthesis (chapter 3), where I found testing reporting guidelines with users is rarely done, and often suffers from thin description and unrepresentative participants lacking diversity. In contrast, I wanted to obtain rich data from a diverse group of authors. In chapter 10 I positioned SRQR as a good guideline to test with users because its wide scope includes qualitative methods used by many researchers, from many fields, with varying levels of experience. Thus SRQR offered potential to recruit a diverse sample.

I did not aspire to perfect the website, as I did not believe an optimal design exists. Instead, I viewed the design process as iterative, and the purpose of this study was to collect evidence to inform future iterations. Instead of asking authors to suggest improvements (I suspect this strategy would have led to superficial suggestions or blank faces), I was more interested in identifying *deficiencies*. I defined a deficiency as any website element that, if modified, could better facilitate the website’s intended target behaviour (successful application of reporting guidance). I used the term *deficiency* over and above *barrier* or *facilitator* because it includes both (if a facilitator could be improved, it is deficient). In the future, EQUATOR and I will be able to identify modifications to address these deficiencies.

## Methods

The purpose of this study was to identify deficiencies in a redesigned reporting guideline and EQUATOR Network home page (“the website”).

My objectives were to:

* explore the experience of a diverse sample of authors,
* and to identify and understand deficiencies.

### Sampling strategy

My purposive sample of authors varied in their:

* years of academic experience,
* subject area,
* their first language,
* and their country of residence.

This variation was important because my thematic synthesis (chapter 3) suggested inexperienced authors may have the most to benefit from reporting guidelines, but also face the most hurdles. Inexperience may be due to early career stage, being new to a field or study design, or new to academic writing. My synthesis also suggested language barriers could hinder adherence, and my service evaluation of EQUATOR’s existing website (chapter 5) revealed a highly international userbase.

Authors were eligible to participate if they were currently engaged in research utilizing qualitative methods, and if they were able to attend an online interview conducted in English.

I recruited through four channels:

1. I posted on X (called Twitter at the time).
2. I advertised through Penelope.ai [4], the manuscript checker I created before starting my PhD. Many medical journals offer the tool to submitting authors. BMJ Open is the largest of these journals, and enjoys a large, international, author base.
3. I invited researchers from a research consultancy in the Philippines.
4. I wrote to Chinese researchers who had published qualitative research and about the experience of doing qualitative research in China, and I asked them to share my recruitment advert. One of the researchers I contacted posted the advert on internet forums used by Chinese students.

My recruitment advert is in appendix #TODO. The advert said I was “looking to speak with people performing qualitative research about a new website”. It did not specify what the website was about, who it was for, or whether it would help with their job, because I wanted authors to be naïve when first viewing the website. This mimics the real world, where authors might be sent to EQUATOR’s website by a journal with only minimal information on what to expect from it.

All channels invited authors to signal their interest by email. To check applicants’ eligibility as qualitative researchers, I asked them to describe their research methods in a few sentences over email. I excluded applicants if their descriptions made no reference of a qualitative method.

I sent all eligible applicants the participant information sheet and consent form. I used JISC Online Surveys #REF to obtain consent and ask the following demographic questions:

* How many years have you done research?
* Please describe your research in a couple of sentences
* What is your first language?
* What country do you work and live in?

I offered participants £50 reimbursement in return for an expected 2 hour commitment. This was a delivered as an Amazon voucher to UK participants, and a bank transfer to international participants. My information sheet, consent form, and email templates are in Appendix #TODO.

Time and money limited my target sample size to 10 participants. As argued by Nielsen and Launder [5], small samples (fewer than 10) are often sufficient to identify the majority of deficiencies. In chapter 8 I introduced information power [6] as a concept to guide sample size in qualitative research, and I drew upon it again in this study. I maximised information power firstly by using methods to elicit rich information from each participant. Secondly, I used my table of intervention components (9) as an analysis framework. Hence I anticipated a sample of 10 to sufficiently inform at least one design iteration at the end of data collection.

### Procedures

I wanted my study to resemble the ways authors will experience the website in real life. Firstly, interview sessions took place online using Microsoft Teams. This meant participants could view the website on their own computer, using their normal browser, in their usual place of work. This would allow me to identify problems with slow-loading over bad internet connections and display problems on different screen resolutions, whilst avoiding difficulties of asking a participant to use an unfamiliar computer or browser.

Secondly, I wanted to replicate the experience of encountering a new website as a naïve user, gradually exploring content, and then reading and applying guidance to one’s own writing. I did this by using a variety of methods:

1. 5 second test to capture initial reactions
2. Think aloud to capture exploration
3. Plus-minus task
4. A writing evaluation
5. Semi structured interviews throughout.

I have outlined the order of data collection methods in [Table 1](#tbl-process-interviews).

Table 1: Data collection methods and when they occurred.

| Stage | Method |
| --- | --- |
| Session 1 | 1. Five second test 2. Semi-structured interview 1 - prior experience of reporting guidelines 3. Think aloud 1 - the home page 4. Semi-structured interview 2 - the home page 5. Think aloud 2 - the top of the SRQR page 6. Semi-structured interview 3 - the SRQR page |
| At home, between sessions | 1. Plus-minus task 2. Writing using SRQR |
| Session 2 | 1. Interview covering the plus/minus annotations 2. Interview covering the writing sample 3. Semi-structured interview 4 - closing thoughts |

My interview schedule (appendix #TODO) included the verbal instructions for each task and topic guides for each semi-structured interview. I tested the interview schedule by doing a mock interview with a student at Oxford University.

I began sessions by introducing myself as part of team creating a new website. To encourage open and truthful feedback I reassured participants the best way they could help was by being honest, not to worry about critiquing the website or offending me, and to share positive *and* negative feedback. I asked participants to tell me a little about themselves to relax into the interview and help them feel comfortable talking, before moving on to the first task: the 5 second test.

#### Five second test

Until this point, participants had no idea what the website was about. My recruitment materials and interview introduction made no mention of writing nor reporting guidelines, and so participants were blind to the website’s purpose.

The five second test is an “in the moment” survey method [7]. By sharing my screen, I showed participants the top of the home page for five seconds before removing it and asking questions. The test limits exposure to five seconds because although a participant can absorb much information (colours, words, shapes), five seconds is rarely sufficient to make sense of everything as a whole. The aim is to capture participant’s immediate reactions to salient design elements (like images, large words) before they have a change to consider the content more critically. Furthermore, this five second limit was relevant because my website service evaluation found many authors leave EQUATOR’s website within five seconds without interacting with it.

This test was appropriate for the top of the home page because, as per best practice, the area has little text, all relevant content is visible in one frame, and I asked few questions:

1. What do you think the website is about?
2. How do you think this website may affect your work?

If participants answered the first question with “reporting guidelines”, I asked “what do you think reporting guidelines are?”. If participant’s answers did not mention writing, I asked what stages of research they might use the website.

I designed these questions to explore three intervention ingredients: describe what reporting guidelines are, how they can be best used, and their benefits. These are the main ingredients featured at the top of the home page.

#### Semi structured interview 1 - prior experience with reporting guidelines

After the five second test it was no longer necessary to keep participants blinded, and so I asked participants about their prior awareness of, or experience with, reporting guidelines. I asked which guidelines they had used and what they had used them for.

#### Think aloud 1 - home screen

Website designers often ask participant’s to “think aloud” as they complete a task or view a website as a way of exploring participants’ thought processes (e.g. [8]; [9]). Think aloud as a method was first described by cognitive psychologists Ericsson and Simon [10]. Their strict approach viewed verbalizations as “indicators of what information was heeded and in what order, a sort of time stamp of the contents of short-term memory” [11]. As user experience testers adopted the method, they used it more flexibly to additionally capture participants’ thoughts, feelings, and expectations [11]. Whereas cognitive psychologists use the method to understand cognitive processes, usability testers use it to “support the development of usable systems by identifying system deficiencies”. Because “building robust models of human cognition is not a central concern”, Ericsson and Simon’s fixed approach is less appropriate, and testers use a more flexible and pragmatic approach to data collection and interpretation [11].

As per best practice [11] I began by explaining the task, and giving instruction to continually verbalize a train of thought. I then demonstrated by sharing my screen, opening up a different website, and “thinking aloud” for a minute. Participants then shared their screen as they explored the home page. Whenever participants stopped talking, I would prompt them openly to continue by asking “What are you thinking?”. I acknowledged participants’ verbalizations with neutral sounds like “uh-hu” and “mmm”, which encourage further talk, but do not show agreement or disgareement. These verbalizations and prompts are also considered best practice [11].

#### Semi-structured interview 2 - home page

Once participants had explored the entire home page, I asked participants about any intervention components they had not talked about in the think aloud, about their overall opinions, and whether their understanding had changed since first viewing it.

#### Think aloud 2 - SRQR guideline page

I asked participants to find the relevant guideline for reporting qualitative research, and then to continue thinking aloud as they explored it. The top of the SRQR page included information about the guideline, such as its scope, and the number of journals endorsing it.

#### Semi-structured interview 3 - SRQR guideline page

Because the SRQR guidance is long, I stopped participants from thinking aloud once they reached the guidance itself. I then used semi-structured interview questions to explore any intervention components missed by the think aloud, and to explore participants’ expectations of four key features within in guidance: defined words (signified by a dotted underlines), footnotes (signified by a superscript number), links to discussion boards (signified by an icon), and drop down content (signified by a chevron icon). I pointed to an example of each and asked participants what they expected to happen if they clicked on it.

This marked the end of the first interview session. I then explained the plus-minus and writing tasks participants needed to complete before the second session.

#### Plus-Minus task:

In their review of methods to solicit text evaluations from readers, de Jong and Schellens [12] distinguish between evaluation goals: selection (whether readers will engage with the text), comprehension, application (being able to apply information in a real world setting), acceptance (including credibility), appreciation, and relevance and completeness. I was not interested in selection (participants had no option other than to engage with the text), and my study scope did not extend to SRQR’s relevence nor completeness. Instead, I was interested in participant’s experience of the design decisions I had taken in presenting the SRQR guideline, including the layout, structure, optional content, definitions, and tone of voice.

de Jong and Schellens describe methods to target comprehension, acceptance, appreciation in isolation, but because my interest included all three, I chose a nonspecific method, the Plus-Minus task. In this task, readers are asked to annotate a document with plus and minus signs to signify positive and negative reading experiences and then discuss annotations retrospectively.

I asked participants to select and annotate 2 or 3 reporting items relevant to whatever they happened to writing-up in the time between interviews. I created duplicates of the SRQR guidance page and gave participants unique URLs so they did not see each other’s annotations. I used a web annotation tool called Hypothes.is #REF. Participants could optionally add comments. Participants explained their annotations in the second interview.

As de Jong and Schellens note [12], the plus-minus method is advantageous over other nonspecific methods (reading think aloud #REF, and signalled stopping technique #REF) because it collect data without disturbing participants’ natural reading process. Additionally, it was useful in this study as participants could make annotations in their own time, as part of their normal work pattern.

Although the plus-minus task will detect text that participants consider incomprehensible, it cannot detect whether participants comprehend guidance correctly or whether they are able to apply it to their writing. To address this, I used a writing evaluation.

#### Writing Evaluation

In the plus-minus task described above, I asked participants to select a few reporting items relevent to what they happened to be writing at the time. For the writing evaluation, I asked participants to send me the paragraphs they had written before our next interview. I read the excerpts and noted reporting items (and sub items) as present or missing.

In the second interview, inspired by Davies et al.’s SQUIRE guidelines evaluation [13], I asked participants to identify parts of their writing pertaining to reporting items. When I considered an item (or sub item) to be missing, I asked the participant whether they had reported this information. If they felt they had, I asked them to point out where, and then explored any misinterpretations. If they had *not* reported information, I asked why.

#### Semi-structured interview 4 - closing thoughts

To end the second interview session I asked participants to describe their experience of using the reporting guideline, and to share any final thoughts.

#### Methods explored different intervention components.

Each method targeted multiple intervention components. For example, in the 5 second test, participants could only see top of the home page. The text, images, and design in this section are there to communicate what reporting guidelines are, when they can be used, and that they will benefit authors. These functions come from three intervention components defined in chapter 9:

* *Describe what reporting guidelines are where they are first encountered*,
* *Clarify what tasks (e.g., writing, designing, or appraising research) guidelines and resources are designed for*, and
* *Describe personal benefits and benefits to others where reporting guidelines are introduced (home page, on resources, in communications)*.

Components that required participants to read text could be best explored in the plus minus-task, and I hoped the writing evaluation would reveal how participants interpreted and applied instruction. I hoped the think aloud would capture opinions on salient features, and the semi structured interviews would allow me to explore remaining, un-noticed, features.

I did not attempt to explore three intervention components. I did not expect participants to know about or comment on search engine optimization, especially as a large amount of optimization occurs in the website meta data and is thus invisible. Although I built the website so as to allow guideline developers to make incremental updates, I did not expect participants to comment on this either. Finally, because I did not want to edit the *meaning* of the SRQR guidelines (just its layout), I did not want to add instructions aboutwhat to report when an item was not done, could not be done, or does not apply.

In table [Table 2](#tbl-methods-for-components) I detail the intervention components I expected each method to explore. The intervention componetns are defined in chapter 9, where I also list the web elements related to each component.

Table 2: Methods used and the intervention components they explore. Intervention components are defined in chapter 9

| Method | Intervention Components (defined in chapter 9) |
| --- | --- |
| 5 Second Test | * Describe what reporting guidelines are where they are first encountered, * Clarify what tasks (e.g., writing, designing, or appraising research) guidelines and resources are designed for, * Describe personal benefits and benefits to others where reporting guidelines are introduced (home page, on resources, in communications), * Include design, features, and language to foster trust |
| Think Aloud | * Clarify what tasks (e.g., writing, designing, or appraising research) guidelines and resources are designed for, * Instruct authors to cite reporting guidelines so readers may learn about them, * Links between related guidelines, * Centralised hosting, * Search function on website, * Describe the scope of a reporting guideline at the top of every resource, * Use if-then rules to direct authors to more appropriate and up-to-date guidance when available, * Explicitly state when no better guidance exists for a use case, * Provide translations, * Make guidance appear shorter by removing superfluous information, hiding optional content, splitting long guidelines, using concise language, and separating design advice, * Cater to different kinds of user (readers vs dippers) by structuring guidance with headings, itemisation, hyperlinking to particular sections, and with optional content, * Include testimonials from researchers who were nervous about being punished for reporting transparently, * Remove branding and messaging that may invoke feelings of judgement, complexity, or administrative red-tape, * Reassure that all research has limitations to encourage explanation over perfect design, * Educate authors about writing as a process, * link all resources to each other, * Gather and communicate evidence for benefits, * Include design, features, and language to foster trust, * Create spaces for authors to discuss reporting guidelines with others, * Use tone of voice and design to communicate personal benefits; confidence and simplicity, * Include testimonials from research users who benefit from complete reporting, * Explain importance of complete reporting to the scientific community, * Provide links to other resources that explain how an item can be done, * Structure guideline items to make them quicker to digest, * Tell authors how long the guidance will take to read, * Provide advice regarding how to respond if asked to remove reporting guideline content by a colleague, editor, or reviewer, * Reassure when guidelines are *just* guidelines, * Explain how the guidance was developed and why it can be trusted |
| Interview | * Describe what reporting guidelines are where they are first encountered, * Clarify what tasks (e.g., writing, designing, or appraising research) guidelines and resources are designed for, * Instruct authors to cite reporting guidelines so readers may learn about them, * Describe the scope of a reporting guideline at the top of every resource, * Include testimonials from researchers who were nervous about being punished for reporting transparently, * Address communications to authors, * Describe personal benefits and benefits to others where reporting guidelines are introduced (home page, on resources, in communications), * Create spaces for authors to discuss reporting guidelines with others, * Use tone of voice and design to communicate personal benefits; confidence and simplicity, * Include testimonials from research users who benefit from complete reporting, * Define key terms, * For each item, explain why the *information* is important and to whom (not just what constitutes “good” design), * For each item, provide clear instruction of what needs to be described, * For each item, provide examples of reporting in different contexts, * Structure guideline items to make them quicker to digest, * Tell authors when to use reporting guidelines, or that reporting guidelines are best used as early as possible, * Create tools to be used for early writing tasks, * Provide instruction as to how and where information can be reported without breaching word count limits or making articles bloated., * Explain when reporting guidelines do not intended to prescribe structure, * Provide advice regarding how to respond if asked to remove reporting guideline content by a colleague, editor, or reviewer, * Encourage explanation even when choices are unusual or not optimal, * Avoid patronizing language, * Explain how the guidance was developed and why it can be trusted |
| +/- test | * Decrease fear of judgement by making reporting guidelines design agnostic, * Use plain language, * Define key terms, * Provide links to other resources that explain how an item can be done, * For each item, provide clear instruction of what needs to be described, * For each item, provide examples of reporting in different contexts, * Structure guideline items to make them quicker to digest |
| Writing Evaluation | * Use plain language, * For each item, provide clear instruction of what needs to be described |
| Not Explored | * Search Engine Optimization, * Provide clear instruction of what needs to be described when an item was not done, could not be done, or does not apply, * Make it possible for guideline developers to make small edits without having to publish new articles |

### Data processing and analysis

I recorded video and audio transcriptions using Microsoft Teams. Because automatic audio transcription was not always accurate, I corrected them by rewatching the videos. I de-identified transcripts by replacing names with participant codes, before uploading them to NVivo for coding [14].

I used my intervention ingredient table (see chapter 9) as a framework to code transcripts line by line. I did this deductively; whenever a participant said anything about a component, I coded text to that component. Because some website features implemented multiple components (for example, an image can both educate and persuade), I sometimes coded text to multiple components. In this way, I created categories of codes, and each category was an intervention component.

Once all transcripts were coded, I grouped my categorised codes into deficiencies. If a single component was deficient in multiple ways, I created a code group for each deficiency. If there was disagreement about a deficiency (e.g. some people disliked a component, but others liked it), then I created sub-groups within each deficiency. Although positive feedback did not directly address my objective of identifying deficiencies, I kept these codes because they provided context and counter-evidence to deficiencies.

Some participants spontaneously suggested modifications. In these instances, I coded the proposed modification and the underlying deficiency. Because some participants spontaneously shared prior experiences using reporting guidelines I coded these using my list of barriers from 7 as a framework. I decided to create new codes for any barriers not previously identified.

In this way, I ended up with a list of deficiencies (my primary unit of analysis), and incidental lists of barriers and possible modifications.

### Trustworthiness

As with previous chapters, I used a number of techniques to ensure credibility, transferability, dependability, and confirmability [15]. I describe these in [Table 3](#tbl-trust-interviews).

Table 3: Techniques I used in this study for establishing trustworthiness. Based on Lincoln and Guba’s Evaluative Criteria [15]

| **Technique** | Implementation |
| --- | --- |
| **Techniques for establishing transferability** |  |
| *Thick description* | I aspired to report my results with context by indicating when ideas were common or rare, and who they originated from when I felt this was particularly relevant. I reported disagreements, provide quotes, and relationships between ideas.  Interview sessions were long and used multiple techniques to elicit lots of data. I reported findings alongside relevant context, including participant demographics, and used context to reconcile disagreements. |
| **Techniques for establishing confirmability** |  |
| *Audit trail* | I referred to video recordings when I needed to clarify parts of the transcript. I kept all raw data, and a record of modifications made. |
| *Reflexivity* | I kept a diary during data collection to note of ideas and my own feelings during. Because I created the website being tested, I felt it was important to reflect on any feedback that made me feel defensive, frustrated, or that I did not understand. In my previous experience, these moments of conflict are important as they often hint at a latent misunderstanding or deficiency.  Receiving negative feedback does not always hurt me. For example, sometimes I expect negative feedback because it reflects a limitation or trade-off that I already know about. Other times negative feedback can feel like an “aha” moment, as I discover a problem I immediately understand, agree with, and can see a solution to. In contrast, when feedback feels *bad*, in my experience that is because I have misunderstood something, and my internal model of the situation is off. Although I found it easy to remain professional and neutral within the interviews, having a “thick skin” is not enough. In these moments of friction I made sure to delve deeper into the issue with the same participant or future ones. |
| **Techniques for establishing credibility** |  |
| *Negative case analysis* | I purposefully explored negative feedback that I found unexpected or challenging (see reflexivity). |
| *Member-checking* | I invited participants to comment on my synthesised results, asking for feedback on my interpretation and conclusions. Lincoln and Guba argue that member checking is the most important way to the establish validity [15]. |
| *Peer debriefing* | CA acted as a disinterested peer throughout design, data collection, analysis and reporting . She questioned my reasoning she helped me become aware of biases, potential flaws, and assumptions I was making. |

### Ethics

Oxford University’s Medical Sciences Interdivisional Research Ethics Committee deemed this study to be a service evaluation, and so judged ethical approval unnecessary.

### Reporting

I used SRQR [16] when outlining this chapter, and again to check my reporting during revision.

## Results

### Recruitment

I recruited participants between 21/03/2023 until 9/08/2023. The number of people who expressed interest, were eligible, consented, and participated are shown in [Table 4](#tbl-interview-recruitment). Eleven people participated. Two dropped out before the second interview, without giving a reason. Participants’ characteristics are summarized in [Table 5](#tbl-interview-participants) and included variety in research experience (from 1 to 10+ years), subject area, country of origin, and first language. Six participants had never heard of reporting guidelines before. One had, but did not remember which. Three others had used a reporting guideline before, and one had used many reporting guidelines before. The first interview lasted between 45 minutes - 1.5 hours, and the second interview lasted 30-45 minutes.

Table 4: Recruitment and drop out of participants through different channels

| Channel | Told about the study | Expressed Interest | Eligible | Invited to consent | Consented | Completed first interview | Completed second interview |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Penelope.ai | Unknown | 144  (23 were excluded because they did not want to attend an online interview conducted in English. A further 78 did not describe using qualitative methods when asked to describe their research). | 43 | 43  (30 did not reply) | 13  (3 could not find a time for interview because of work commitments, 2 did not reply) | 8  (1 lost to follow up) | 7 |
| X | Unknown | 1 | 1 | 1  (1 did not reply) | 0 | 0 | 0 |
| Email invitation | Unknown  (2 emails sent, but were forwarded to an unknown number of recipients) | 4 | 3 | 3 | 3 | 3  (1 lost to follow up) | 2 |
| Total | Unknown | 149 | 47 | 47 | 16 | 11 | 9 |

Table 5: Participant characteristics

| ID | Job title | Subject area | Research experience (years) | First language | Country of origin | Previous experience with reporting guidelines |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | Research consultancy | Health policy | 4 | English | Philippines | None |
| 2 | Medical student | General qualitative medical research | 1 | English | Ghana | Had used PRISMA |
| 3 | Academic researcher | Clinical psychology and public health | 7 | Spanish | Ecuador | Had used COREQ |
| 4 | Academic researcher | Physiotherapy | 10+ | English | UK | Could not remember |
| 5 | Academic researcher | Medical ethics | 7 | English | India | None |
| 6 | Midwifery student | Sexual and reproductive health | 3 | Lango | Uganda | None |
| 7 | Academic researcher | Environmental Health | 10+ | English | South Africa | Had used JARS |
| 8 | Academic researcher | Physiotherapy | 10+ | English | Australia | Had used many reporting guidelines before |
| 9 | Pre PhD student | Public health | 1 | Chichewa | Malawi | None |
| 10 | PhD student | Child development | 7 | Chinese | China | None |
| 11 | PhD student | Child development | 4 | Chinese | China | None |

### Design Iterations

I had originally planned to finish data collection before making any changes to the website. However, the first five participants consistently mentioned similar deficiencies. After reflecting and discussing with UK EQUATOR staff, we agreed these deficiencies would likely affect many authors and diminish the website’s success, and so we decided to iterate our design.

Briefly, the changes we made included:

* Editing the text at the top of the home page for clarity and to emphasise benefits.
* Adding images to make the home page more attractive and to convey meaning of accompany text.
* Adding publisher logos to foster trust
* Reorganising the introduction to SRQR to make it appear shorter.

The results below include quotes and discussion pertaining to these changes.

### Main findings

I identified deficiencies. Table [Table 6](#tbl-deficiencies-by-component) shows deficiencies, quotes, and codes, for each intervention component. Seven intervention components received no mention. Three of these were purposefully not tested, three others were perhaps too subtle, and one was about *removing* aversive design, so it was good that no participants commented on the presence of ugly or judgemental design. These unmentioned components are also in table [Table 6](#tbl-deficiencies-by-component).

I have chosen to describe a few deficiencies in more detail, either because I deemed them important, they were frequently mentioned, or involved interactions between components.

#### Describe what reporting guidelines are where they are first encountered

*Relevant website features: Prominent definition on home page and guideline page.*

*Barriers addressed: Researchers may not know what reporting guidelines are*

Because it is important for website visitors to quickly realise the site contains resources for *writing up* research articles, as opposed to *designing* or *appraising* studies, I used the 5 second test to explore what participants understood the website to be about upon first impression. This was the first time participants saw the website. Before then, they had no idea what it would be about.

In the first iteration the heading was *“Research articles, made simple”*, but some participants thought this was about *reading* or *explaining* research articles as opposed to writing them. In the second iteration, we changed this heading to *“Want help writing up research?”*.

**On immediate impression, some participants quickly realised the website was about writing, but some did not, or thought it was about methodological guidelines**

All participants realised the website was about research. Some researchers realised the website was about writing within 5 seconds:

“From what I have seen, I think probably the website should be about, uh, helping you try to discover….identify the guidelines that you will use for writing your study quickly.” (Midwifery student from Uganda)

“how to go about writing something” (ECR from India)

However, other participants gleaned only vague understandings like “support for doing research” ((PhD student from China)) or “guidelines of some sorts, I think in relation to research” ((Pre-PhD student from Malawi)), and one expected the website to be about methodological guidance:

“methodology guidelines one can use or follow when conducting research” (Researcher from the UK)

Participants with previous experience using reporting checklists realised the website might be about reporting guidelines:

“Well, I hadn’t seen the the guide that I’m familiar with (that is the COREQ). But I think the other guides also are like COREQ. So that’s what comes to my mind. So I think it’s a [website] where you are going to find all the checklists or the guides for all the […] final stages of the research when we are, like, writing the paper, just to […] double check that everything has been included.” (ECR from Ecuador)

“That’s the EQUATOR guidelines, so that’s… consensus… expert consensus-developed guidelines for the reporting of different research.” (Researcher from Australia)

“[I read that] you can use reporting guidelines to try and help you [write research articles] more efficiently or quickly. And then I was thinking about, *what the heck are reporting guidelines*? And then I think it might be stuff like STROBE or like those checklists things or PRISMA, if you’re doing a systematic review or something. And that’s all I got” (Researcher from South Africa)

Given a few more seconds to explore the website on their own (during the think aloud task), all participants realised the guidelines were for writing and others gained more insight into what to expect from reporting guidelines.

“after reading this sentence I think you want to give me a framework, a framework about writing. Is that right?”

“I think the guideline would, uh, would clearly state the different sections of the research report or the manuscript and then whatever is required under a section like maybe under methods. Like what are the nitty gritties required under method.” (Midwifery student from Uganda)

Some participants found later, longer descriptions more informative. Referring to content half way down the landing page, one participant said:

“Why couldn’t this be further up? Why can’t that be at the top and then the that stuff here follow? Because then I’d have a better idea of what this is about.[…] I would have liked to have read this at the top and I would have known straight away what this whole website was about.” (Researcher from South Africa)

#### Include design, features, and language to foster trust

*Relevant website features: Professional design. EQUATOR’s Logo remains prominent. Citation metrics are presented at the top the reporting guidance. Information about who developed the guidelines, how they developed it, and why the guidance is credible is still provided, and easily findable from the top of the guidance.*

*Barriers addressed: Researchers may not believe stated benefits*

When participants talked about trust, they mentioned whether the website came across as professional, credible, and believable. This intervention component is complex because content and design throughout the entire website influenced judgements regarding trust. In particular, participants wanted to know who made the website and why they could be trusted, and identified some design elements that could look more professional.

**EQUATOR’s introduction could be more prominent**

Apart from its logo, EQUATOR was not mentioned at the top of the page. Participants who already knew about EQUATOR said that its brand lent credibility:

“and then I picked up the top my top left hand corner with the EQUATOR logo so it seemed from reputable source.” (Researcher from the UK)

“I already trust the website because I saw that… like this is legit and I see the credentials from EQUATOR network” (ECR from Ecuador)

Participants unfamiliar with EQUATOR expressed wanting to know who developed the website. Whilst looking at the top of the home page, one participant said:

“I really don’t get an idea of […] who’s responsible for the website […] would I trust the the developers of the website?” (Pre-PhD student from Malawi)

The home page introduced EQUATOR at the very bottom. Participants recommended moving this introduction (or parts of it) up to the top, using an updated photo, and adding EQUATOR’s affiliations and awards.

“So most places put the the *about* stuff at the bottom and I would have liked to have seen what [EQUATOR stands for] explained right at the top.” (Researcher from South Africa)

“And then this is the thing on the bottom that I want to look at on every website… because I want to see if they have an actual office. So usually I click this”about us” first” (Research consultant from the Philippines)

“Participant: Oh, so this is your mission. So here my question is *What is this group? What is EQUATOR?* So this is my first question because from my background, which is not from medicine, I’m not very familiar with this group. So I want to know what is this and the second feeling I have, I think I might want to see this information at the very first beginning…I want to know who this website is created by. Because I want to use a professional website, so I think the reason I read this paragraph is I want to find some evidence to prove that your group is very professional. Interviewer: Mmm. Participant: Well, maybe you can put [the section about EQUATOR] at the very first beginning and provide a little description about what the group is about, what it is, and what are those people where do they come from something like this.” (PhD student from China)

“I also did some research with my Chinese colleagues and sometimes some prestigious university’s logo will add trust, yeah.” (PhD student from China)

“I think sometimes it is useful […] to put some awards here. Just to make people think you are trustworthy.” (PhD student from China)

**The site’s design could be more professional**

A design intention was to make the website appear simple. The first iteration was apparently *too* simple and one participant explained how its simplicity made it less trustworthy:

“it looks kind of like a blog […] it’s a basic website” (Research consultant from the Philippines)

“I wouldn’t say [it looks] particularly trustworthy, but not particularly suspicious either. Kind of in the middle […] something that will be more trustworthy will be something which is more sophisticated because I know, ‘OK, this is someone who actually took his time to do a lot of work… put a lot of work in designing it’. Most of the time if it is a fake website, it’s usually much more simple.” (Medical student from Ghana)

One participant viewed both the first and second iterations of the home page (their second interview session occurred after the iteration), and they described the second iteration as better because “It’s like more trustable […] Scientific. Evidence based. Yeah, of course, legit.” ((ECR from Ecuador))

However, one participant still questioned the second iteration simplicity and trustworthiness, and drew a comparison with another website that she *did* trust:

“So I’m saying it’s kind of basic, that the format itself is kind of basic […] [When] I’m looking for information on PUB Med, just the outlet itself gives you the picture that, you know, somehow you can trust it. You know it looks as if there was more work put in it.” (Pre-PhD student from Malawi)

**Logos lend credibility and could be more prominent**

Participants noticed that the first iteration had no logos:

“I don’t know if this is just me, but I kinda want some logos. So I know who will vouch for [the website] right away. Like, usually […] there’s some, like, other medical societies that are, like,”We we are on the EQUATOR network” (Research consultant from the Philippines)

I added logos to the second iteration’s home page to show publishers endorsing reporting guidelines. All participants liked these, but some suggested they could appear at the top of the home page so they are immediately visible.

“Leading publishers….Wow, this is good…Nature. Really? Elsevier, BMJ. Yes, this is good. And this brings some sense of trust and authenticity in the website.” (Midwifery student from Uganda)

“[The publishers’ logos are] encouraging, because these are all publishing houses with mostly reputable journals, probably all reputable journals. […] You know, if these were higher up, then […] that would have made me feel a little bit more like ohh, this is good.” (Researcher from South Africa)

**Numbers showing reporting guideline endorsements and citations lend credibility, but may not be intuitive**

The top of the SRQR guideline page included widgets displaying the number of journal endorsements, and the number of times the reporting guideline had been cited. Some people commented that this information lent credibility:

“I think it is authentic. It’s robust. If it was endorsed by many journals and developed by experienced researchers, if I use it, maybe I’ll get a better quality work.” (Midwifery student from Uganda)

“I think citations here might be some people or some people’s work who has cited this page. So this this button […] might show people how many other words use this page.” (PhD student from China)”

“…understand […] that the SRQR guidelines is something that’s already widely used.”

“I didn’t pay attention before, but I think I like it (the citation information) […] if it is more cited, I think, like, I will believe it. I will believe it, like, much better, and also like the journal endorsements” (PhD student from China)

However, not everybody understood what these numbers meant.

“Is this [widget] telling me [something], or is it what I am supposed to click on?” (Pre-PhD student from Malawi)

“I was a bit confused there, OK” (Pre-PhD student from Malawi)

“I think the citation tab over here… What is the relevance of it? I mean, why I’m seeing that?” (ECR from India)

Others were not sure whether the citation information pertained to the website or an underlying article.

“I’m not sure if [it is about], you know, the website or connected paper.” (PhD student from China)

“Has it been cited 4000 times? I don’t understand that.” (Researcher from South Africa)

**Not everybody considered the image at the top of the home page to be trustworthy**

For the second iteration, I added an image to the top of the home page comprising of three icons to represent the process of writing a manuscript. One participant described this image as a “bit naff […] I actually think this [image] reduces [the website’s] score on the first impressions of trustworthiness kind of thing. Just because [the icons making up the image] are so, umm, ubiquitous, and, uh cheap?” (Researcher from Australia)

#### Describe personal benefits and benefits to others where reporting guidelines are introduced (home page, on resources, in communications)

*Relevant website features: Benefits are prominently and consistently displayed across the home page and guidance pages. Descriptions prioritize personal benefits to the authors above hypothetical benefits to others.*

*Barriers addressed: Researchers may not know what benefits to expect*

**Benefits are clear, but could be communicated quicker**

I wanted website visitors to immediately expect the website to benefit them as researchers and authors. The website headline is one of the first things visitors see, and so was an important feature for communicating benefits.

All participants talked about benefits or help. None talked about the opposite (e.g., rules, requirements, or red tape). In the 5 second test, participants generally talked about *help* in a general sense:

“I see research and writing. So i’m thinking. This is to help me with something with my job.” (Research consultant from the Philippines)

“so it’s going to assist me in research. It’s going to help me somehow. Make things easier for me.” (ECR from Ecuador)

Under the headline, we included a short statement: *‘reporting guidelines help you describe research quickly, confidently in completely’*. Two participants did not find this brief text meaningful in the five second test:

“I tried to read the sub headline just below the biggest one and it says help you blah blah confidently and blah blah. […] So I think this information maybe be meaningless for me […] because it sounds like it didn’t provide some concrete information. It’s just a sentence that tried to cheer me up.” (PhD student from China)

“And then there’s something to do with *‘reporting guidelines help you describe research quickly, confidently in completely’*. This information is not really telling me much” (Pre-PhD student from Malawi)

However, they seemed to understand the reported benefits after reading the top of the home page in more detail, and after viewing the section below where benefits are stated more clearly (e.g.,). Similarly, other participants began to understand the benefits and link them to their own experiences as authors.

“OK, I think this part is very great because when I when I see something like *”easy writing”*, *”smoother publishing”* I think *”Ohh, that’s great. That’s what I want.”*” (PhD student from China)

“Participant: Now I’m getting a sense of what the website is about. Now looking at the things down here…

Interviewer: OK.

Participant: I’m getting that it might be a useful resource. That actually, umm, because these are, I think, for… early career researchers like me, I’d say I’d be very interested to come in and see this.” (Pre-PhD student from Malawi)

Participants seemed to understand how reporting guidelines might make publishing “smoother”.

“it gives me an impression that maybe this website will help me write my work easily and it will also help me increase the chance of my work getting published […] Umm, just aligning myself to this standard that already many people use. And hopefully, In doing that, I’ll be up to standard and then I won’t stress myself too much later.” (Midwifery student from Uganda)

**Making a distinction between benefits to authors and readers may lead to confusion about the intended user**

Further down the home page, the section title *‘Helping authors and readers’* made one participant believe the website also hosts resources for readers.

“So this is a bit weird. So is the point here that this one is for the writers. And now it’s saying, OK, but we can also help readers. OK, I suppose that’s interesting.” PPT-CW

**The images depicting benefits could be clearer**

One participant said the icons describing writing and impact were appropriate (a blank page and an award, respectively), but the image depicting “smoother publishing” was not intuitive.

“looking at that icon, it doesn’t really tell me anything about smoother [publishing].” (Researcher from Australia)

#### Clarify what tasks (e.g., writing, designing, or appraising research) guidelines and resources are designed for

*Relevant website features: Clear instruction and differentiation of resources*

*Barriers addressed: Researchers may not know what reporting guidelines are; Researchers may not know when reporting guidelines should be used*

**Tools for drafting and checking were mostly intuitive, but could be more prominent.**

Half way down the home page, a section described how to use templates and checklists to draft and check manuscripts. Participants seemed to find this intuitive and appealing:

“I like that: different stages and different tools” (ECR from Ecuador)

“Yeah, writing templates is something I’ve recently come across, and I think that might be useful. I’ve tried it a bit when writing abstracts. And I guess, yeah, that would be something I’d be interested in looking into further.” (Researcher from the UK)

However, describing these tools further up the page might help visitors “get” what RGs are about

“[it] would actually be very good to appear [higher up the page] because then it would now start opening up one’s understanding as to exactly where this kind of guidelines might be applied.” (Pre-PhD student from Malawi)

“If any of these things: *writing research*, *checking manuscripts* and *planning research*, if these can be consolidated on [the top of] your landing page somewhere […] it might might be beneficial because my thought process is that I need to know what I’m doing and only then reporting guidelines can help me, right? So if I know that this website is gonna help me with writing the manuscripts, checking […] I think then, reporting guidelines can make a logical progression in that particular case?” (ECR from India)

Even though participants could not download templates or checklists, they had expectations of what these resources might look like.

“The checklist could be a pre-populated document that I can go through..it may have a table that I could go through as a tick box exercise ticking which of the [guideline reporting items] my study includes.” (Researcher from the UK)

“[Regarding templates] I would like to adjust this template by myself. Just like a semi structured interview. I don’t want this template be a structured interview. I want it to be semi structured so I can have the space to adjust it.” (PhD student from China)

**Using a reporting guideline “for planning” was not intuitive**

The same second described how to use reporting guidelines when planning or conducting research. The SRQR page had a button to download a “log book” where researchers could document the decisions and data they would later need to report. However, no participants understood what this log book might be:

“it’s not immediately intuitive what a log book might be” (Midwifery student from Uganda)

“OK, what’s a log book? Don’t know.” (Researcher from South Africa)

“nothing has been mentioned about the log book overhead. How [am I] gonna use the log book? Maybe you have mentioned about the template checklist, but uh, maybe we can add [something about] the log book.” (ECR from India)

The word “planning” was not intuitive either. One thought this meant planning a manuscript, and so confused the purpose of the log book with that of the template. Another interpreted it as guidance for writing a research proposal.

“When I when I’m reading planning research, I think maybe I have already done this when I design my own outline.” (PhD student from China)

“To write can help you plan a study. Yeah, I guess it’s… I I would have thought this might be useful if you’re writing a research grant or a research proposal.” (Researcher from the UK)

I had ordered the tasks and tools as “drafting”, “checking” and then “planning”. I put planning at the end because it is the least conventional way to use a reporting guidelines. Some participants questioned this ordering:

“Why is planning at the end? You have to plan first before you write.” (Researcher from South Africa)

#### For each item, provide examples of reporting in different contexts

**Many participants said they wanted more, varied examples**

Each reporting item in SRQR comes with one or more examples from published literature. All participants stressed the usefulness of these examples. The attention examples received was notable because I did not ask about them; all comments about examples came spontaneously from the participant in the think aloud and plus minus tasks.

“Oh, and you have examples that could be really helpful, yeah.” (ECR from Ecuador)

“the most important thing I would say is the examples” (Midwifery student from Uganda)

“I found [this section] very useful as they give more detailed explanations on each specific section, and particularly the examples.” (Medical student from Ghana)

However, many participants said they wanted more examples, and greater variation in style, length, and conciseness.

“need further explanation and examples” (Midwifery student from Uganda)

“it would would have been useful or helpful for me to to have more than just one example.” (Pre-PhD student from Malawi)

“illustrations of how to [report] this information in a concise manner, that would be very helpful as well.” (Pre-PhD student from Malawi)

“you may as well put a whole discussion in there, or at least just sort of three or four paragraph discussion” (Researcher from South Africa)

“And here if there could be more examples, because when I […] started to read through and understand the the PRISMA guidelines and use the official explanation file to try to understand exactly what I’m required to write about and the examples particularly helped me a lot.” (Medical student from Ghana)

Many participants wanted examples from their own field, or even entire publications that have used the guideline:

“So I want something more relatable, [because] when I was reading these examples they were not relevant to my work.” (Researcher from South Africa)

“…if you can list some […] papers who use the SRQR, you can put it here.” (PhD student from China)

“I’ve searched and pubmed to find an example of a research article that’s used these standards so I could copy or check how they’ve laid it out, which subheadings they’ve used.” (Researcher from South Africa)

**Citations may be less credible if they are old or not referenced**

In the original SRQR publication, all examples are referenced. I had not included references for the examples when putting them onto the website because of time constraints. This bothered one participant.

“Well, there’s no references there, so is that a very good example? No, I don’t know the source of these things. […] You know, I don’t know, where did it come from? Where’s the reference?” (Researcher from South Africa)

When I asked about hypothetically labelling examples as fake if they were made up, the participant said “Yeah, I guess that would be alright”.

The same participant also noted that an example was quite old (10 years).

**Citations could be more useful if explained or annotated**

Because some reporting items contain multiple sub-items, one participant said annotating examples may be helpful. Taking a discussion item about transferability and integrating findings, they suggested “if you could underline or maybe indicate [in the example] that *this* [sentence] is now how they are trying to say the result can be transferable, umm, this is another [sentence] trying to say how they’re trying to integrate…. something like that.” (Midwifery student from Uganda)

### Other findings

Table 6: Intervention components, relevant website features, the barriers they address, and deficiencies identified with supportive quotes.

| Intervention component and their relevant features and barriers | Deficiencies |
| --- | --- |
| **Intervention component: Include design, features, and language to foster trust**  *Relevant website features: Professional design. EQUATOR’s Logo remains prominent. Citation metrics are presented at the top the reporting guidance. Information about who developed the guidelines, how they developed it, and why the guidance is credible is still provided, and easily findable from the top of the guidance.*  *Barriers addressed: Researchers may not believe stated benefits* | See text |
| **Intervention component: Describe what reporting guidelines are where they are first encountered**  *Relevant website features: Prominent definition on home page and guideline page.*  *Barriers addressed: Researchers may not know what reporting guidelines are* | See text |
| **Intervention component: Use tone of voice and design to communicate personal benefits; confidence and simplicity**  *Relevant website features: A clean, simple interface for the home page and guidance pages. Text uses phrases like “confidence”, “quick”, “maximum impact”.*  *Barriers addressed: Researchers may not believe stated benefits* | See text |
| **Intervention component: Describe personal benefits and benefits to others where reporting guidelines are introduced (home page, on resources, in communications)**  *Relevant website features: Benefits are prominently and consistently displayed across the home page and guidance pages. Descriptions prioritize personal benefits to the authors above hypothetical benefits to others.*  *Barriers addressed: Researchers may not know what benefits to expect* | See text |
| **Intervention component: Clarify what tasks (e.g., writing, designing, or appraising research) guidelines and resources are designed for**  *Relevant website features: Clear instruction and differentiation of resources*  *Barriers addressed: Researchers may not know what reporting guidelines are; Researchers may not know when reporting guidelines should be used* | See text |
| **Intervention component: For each item, provide examples of reporting in different contexts**  *Relevant website features: SRQR already had some examples. No more examples added*  *Barriers addressed: Researchers may not know how to report an item in practice* | See text |
| **Intervention component: Define key terms**  *Relevant website features: SRQR now has a glossary, and text is marked-up with definitions that appear upon click.*  *Barriers addressed: Researchers may misunderstand* | **Participants wanted more definitions within the guidance *and* on the rest of the website**  Some complex words in the redesigned SRQR guideline had blue dotted lines underneath. When participants clicked them, a definition would pop up. Participants stressed usefulness of this feature, and everybody liked that the definitions appeared in a popup, and not on a new page.  “I got great help there for me as a writer.” (ECR from Ecuador)  “One feature that I really found to be very useful was where you [described] different kind of kinds of terms there […] When I’m not quite sure about the term there was. If I clicked on it, there was a description and that was very clearly written out and it made it quite easy to use the information that was there.” (Pre-PhD student from Malawi)  Participants wanted more definitions within the guidance (some struggled with words like “transferability” or “generalizability”) and other areas of the website. For example, when reading about the scope of SRQR and related guidelines, participants struggled to understand terms like “qualitative evidence synthesis”  “A qualitative evidence synthesis. What’s that? Is that like a review?” (Researcher from South Africa)  When reading a list of guidelines for different study types on the home page, one participant explained how not understanding terms like “cohort study” led her to feel anxious and worried.  “Actually, I feel a little anxious because I’m not sure whether it shows that I am not good at something or I am ignorant or something. So when I saw all of these and, like half of them, I didn’t know. I may feel anxious and maybe, like, lose confidence sometimes.” (PhD student from China)  **User experience might be clearer if definitions were signified by a different colour (not blue)**  Because I wanted to know whether future users would discover this functionality by themselves, I asked participants what they expected the dotted lines to signify. Most participants guessed correctly.  “Interviewer: What do you expect those dotted lines to mean? Participant: Umm, I think dotted lines would mean that it will give me a definition.” (Researcher from Australia)  “It’s not exactly a hyperlink, but it might give you a definition or something like that” (Researcher from the UK)  However, a couple of participants thought the lines might signify hyperlinks, and another thought it was a misspelt word because it looked like Microsoft Word’s autocorrect feature.  “I’m honestly not sure whether I see just a highlight or it’s a link. Usually links are in blue, completely in blue.” (Medical student from Ghana)  “I think uh, there are some misspelled words” (ECR from India) |
| **Intervention component: Cater to different kinds of user (readers vs dippers) by structuring guidance with headings, itemisation, hyperlinking to particular sections, and with optional content**  *Relevant website features: SRQR items are structured consistently, making information easier to find. Itemisation is used consistently, content is hyperlinked when useful.*  *Barriers addressed: Researchers may expect the costs to outweigh benefits* | Overall, participants welcomed the structure and navigation features, including headings, consistent subheadings for each guideline item, navigation menus, and links to sections.  “I find the guideline more interactive than simply, you know, a PDF document. So I really appreciate that it was more structured and the guide was more easy to follow. And somehow having all these other, umm options, you know that the web offers, yeah […] For me it was very useful for moving around more easily and more quickly” (ECR from Ecuador)  **Participants liked having extra content as notes, but footnotes might not be optimal implementation**  When an SRQR item contained extra context or explanation not relevant to all users, I moved this information to a footnote, but participants expected the footnote identifiers (superscript numbers) to be references, and did not like how reading the footnote took them to the bottom of the page, away from where they had been reading:  “I think it’s a citation. So uh linked to a reference. But I think it may also be foot note.” **?var:pilot.participants.PPT-**  “[Superscript numbers are] always a link to, like, a reference. If not a reference like some…[clicks it]…okay, so it’s telling me things. It’s probably not a reference like in Wikipedia. It shows you it’s a link. This one is telling me more things. So it’s a footnote.”  “I worked hard to scroll down. I’m not gonna go back up. So, whatever, i’m not reading [it].” **?var:pilot.participants.PPT-**  **Menu navigation was useful but could be more prominent and go one level deeper**  The redesigned SRQR guideline has a side navigation menu so users can easily navigate to the Introduction, Methods, Results, and Discussion guidance sections, or to the FAQs and citation information. A few participants did not notice the menu, or suggested it could be more prominent, and one suggested it would be useful if the menu listed all reporting items (ie. not just *Methods*, but also the item titles within).  “when I scrolling I forgot to pay attention to the menu on the side. So […] I suddenly realized it was a menu there […] Maybe make it much more, like, the characters larger or, like, the colour, maybe change it, because now it is so light and I didn’t pay attention to that. But this menu is useful if I pay attention to this.” (PhD student from China)  Each reporting item has its own menu within the collapsible content, so users can jump to the item’s justification, examples, or related resources. The same participant described these item menus as a useful way to help “find the detailed part” they desired.  **Section URLs could be more intuitive**  When the mouse hovers above a reporting item heading, a button would appear to allow users to a copy the URL to that section. One participant did not find this intuitive, and thought the button would take them to more information instead.  **Participants may desire a summary of the guidance**  In the think aloud, one participant said they would prefer to browse the checklist above the full guidance because “in my head, like the checklist probably has these things already” (Research consultant from the Philippines). They expected the checklist to act as a summary. This expectation may explain why another participant said “I just want to see what this thing is and at the moment I don’t know. Should I read the guidelines or checklist?”, perhaps because they desired an overview (Researcher from South Africa).  “So maybe not the full guideline, but I’m not sure how how you can present it. Maybe one paragraph, or, uh, or you could present a mind map. Maybe you can present a mind map and you can put the keywords of this guideline. So if people want to see, for example, […] introduction, literature review, methodology, blah blah. Something like this.” (PhD student from China)  **Participants found item titles hard to spot when scrolling**  “The names of the sections are, like, black and a little plain. So I think […] the name of each section should be somehow highlighted” (ECR from Ecuador)  “And they don’t really stand out in my opinion, like, just about the layout of the page themself. You see, this [heading] doesn’t stand out so much from the rest, just the font is a little bigger. For example, if I’m scrolling through it very fast, it may be I might miss it. So if those headings or subheadings could be made more visible…” (Medical student from Ghana)  **Some participants did not expect / want all guidance on one page**  “I didn’t expect it to be part of the same page because, just looking at the side [menu] here, it makes it a very long page to scroll through. So I guess what I’m a bit more familiar with is, you know, you click on something, it takes you to the guidance and then each of [the items] might be on a separate page […] So it’s less of a scroll and more of a click.” (Researcher from the UK) |
| **Intervention component: Explain how the guidance was developed and why it can be trusted**  *Relevant website features: Brief description included on home page and at top of reporting guideline, links to full to development information*  *Barriers addressed: Researchers may feel patronized* | **The relationship between the website and publication could be clearer**  The top of the guideline page references the original SRQR publication. Some participants said this helped them trust the website, but others voiced confusion about the relationship between the publication and webpage, whether the guidance matched, and which they should cite.  “I know I have the information to look for the paper and I could find it. So yeah, it inspires trust and it’s amazing to have it here.” (ECR from Ecuador)  “Is this [content on the website] now this article? Because if it is the article then I’m not clear on that […] [After reading through the item titles] Do they match?…Yes, they match.” (Researcher from South Africa)  The FAQs helped clear up this relationship, and some participants recommended they be signposted (or briefly explained) at the top of the guidance page.  “[The FAQ section about development] gave me more information about how [the guideline] came about. You know, I was asking [for] that when we first spoke, and here it was. It was nice to be able to see [that] somebody put this together. […] I like that I could get more information about the background. So in a way it’s not really a frequently asked question. It is actually the background.” (Researcher from South Africa)  “I think it’s very fine to put it here [in the FAQs], but I’m just thinking about, like, could we put a link or a summary at the very beginning of the website? Because it may make me trust it much more quickly.” (PhD student from China) |
| **Intervention component: Make guidance appear shorter by removing superfluous information, hiding optional content, splitting long guidelines, using concise language, and separating design advice**  *Relevant website features: SRQR has been edited. The only text presented immediately is instruction on what the author needs to describe. Additional information is hidden at first and can be expanded. Text is shortened through editing and by using active voice. In the case of SRQR, this reduced the text length by 60%.*  *Barriers addressed: Researchers may expect the costs to outweigh benefits* | **On first impression, the guidance may appear too long**  Participants spoke positively of the various features to hide optional content (like collapsible sections and pop-ups). Nobody expressed wanting all information up front, and all preferred to have it only when needed.  “If you want to, you can extend and read through [the extra information]. I think that’s very useful.” (Medical student from Ghana)  “but if you don’t need [the extra information], uh, you can’t see it. But if you need it, you may click on it and just show it very directly.” (PhD student from China)  However, some participants still felt the guidance appeared very long, and this could be off-putting upon first impression.  “So I kind of know how long this page is based on seeing [the scroll bar] move. I don’t want to read the whole thing […] I don’t want to spend 17 min on that” (Research consultant from the Philippines)  In the first iteration, the page was even longer because of content in the introduction before the guidance began (e.g. information about the guideline’s scope, development, or how to use it).  “There’s so much going on [at the top of the page, before the guidance]. […] Yo, this is getting annoying. All I want is the guideline or the document” (Researcher from South Africa)  In the second iteration, I moved some of this introduction information into a collapsible box, but some participants still described the page as very long. |
| **Intervention component: Create spaces for authors to discuss reporting guidelines with others**  *Relevant website features: Each reporting item has its own discussion board.*  *Barriers addressed: Researchers may not believe stated benefits; Researchers may misunderstand; Researchers may not know how to report an item in practice; reporting guidelines can become outdated; Researchers may feel patronized* | Each reporting item had a link to its own discussion page. Participants welcomed the opportunity to post comments, ask questions, and suggest edits on this page.  “So you do not want to just show people how to do it, but you want to provide a platform for the readers to discuss and to create their own ideas. I think that’s great.” (PhD student from China)  “Maybe what helps is if you can, say, share your thoughts here, […] you feel a little bit more [that] *I’ve got a voice* instead of *I’m just being told that it’s a great place to be and it’s got all the answers*.” (Researcher from South Africa)  “Maybe if I identify something that I know is not useful for me. Yeah, in that case, maybe I would write something, you know, to other researchers to read it and maybe give feedback about it, but also for developers of the guideline.” (ECR from Ecuador)  **The button could be clearer**  The link to the discussion page was a button with an icon of a speech bubble, no text, and not all participants knew what this button would do or where it might take them. One participant said this button would be easier to understand if it used text, and recommended it be placed at the end of the expandable content for each item.  “Maybe the blog? No, I don’t know.” (ECR from Ecuador)  “I thought it might be, uh, like a frequently asked questions or a or a further explanation”  “I think you can just put [a button] after all the [extra] content you have seen [in the expandable box], because if if people haven’t seen this content they will have nothing [to discuss].” (PhD student from China)  **The discussion page could be easier to use**  The discussion page requires users to sign in before they can post. This deterred some participants.  “Ohh I see I need to sign in. Ah, usually that is something that discourages me immediately.” **?var:pilot.participants.PPT-**  “I would comment, if I didn’t have to log in” (Research consultant from the Philippines)  Additionally, one participant did not understand the discussion page’s purpose.  “Am I doing this to myself? Is it comments about my research that I’m completing the guidance for or is it for the website for other people to see these comments that I’ve made perhaps?” (Researcher from the UK) |
| **Intervention component: Address communications to authors**  *Relevant website features: All resources and website copy are directed predominantly at authors.*  *Barriers addressed: Researchers may feel that checking reporting is someone else’s job.* | **Participants expected the target audience was researchers, but the target could be more specific**  Everyone recognised the website was for researchers, as opposed to editors. Most realised it was for *health* researchers.  “It can be useful for academics. It can be useful for people who do research on daily basis or as a regular part of their job” (ECR from India)  Some participants specified the target might be *early career* researchers or university students.  “those who are just getting started in the career journey in research….[pause]…definitely students?…umm…. people who don’t really have that much experience in writing.” (Pre-PhD student from Malawi)  “Maybe like master research or higher degrees and also for some junior scholars” (PhD student from China)  “But I think your your target audience is completely different than the very basic student…because it’s more for the expert researchers, right… for the expert researchers” (ECR from India)  Some participants hinted that seeing terms specific to their field signalled that the website was for them:  “If I know any of these terms, then clearly I’m gonna make use of it” (ECR from India)  Ohh then maybe if it sounded like “Want help writing up **Qualitative research** or something like that, so that I know that this is actually addressing me. It’s relevant to me. Yeah, but [the way it is written now] way is kind of open. So it’s not kind of, it’s not relating to me. (Pre-PhD student from Malawi) |
| **Intervention component: Structure guideline items to make them quicker to digest**  *Relevant website features: Items have consistent structure and use bullet points consistently*  *Barriers addressed: Researchers have limited time* | Participants welcomed items’ structure and said they preferred it to unstructured text.  “It was more structured and and the guide was more easy to follow.” (ECR from Ecuador)  One participant questioned whether they might prefer full sentences over bullet points. They used SRQR’s item 12 as an example, where the text says:  “If the actual sample differs from the target sample, describe:   * the difference, * why these differences may have occurred, * how this might affect the findings.”   The participant suggested changing this to “Why the difference has occurred and how it might affect the findings. So one line and you’re done with it”, instead of taking up four lines of text.” (ECR from India) |
| **Intervention component: Describe the scope of a reporting guideline at the top of every resource**  *Relevant website features: The intended scope of a guideline is clearly & prominently described. This definition includes contexts in which the guidance should not be used.*  *Barriers addressed: Researchers may not know whether a reporting guideline applies to them* | **Not all participants found the scope clear**  One participant was not clear whether SRQR applied to survey studies, and said they wanted a definition of what *qualitative research* meant. Another participant wondered why the guidance discussed patient outcomes when the scope had not specified health research. |
| **Intervention component: Search function on website**  *Relevant website features: Search function is easier to find as a recognizable icon in the navigation bar of every page. The home page includes additional ways to access search functionality.*  *Barriers addressed: Guidance may be difficult to find* | The website featured search buttons (one in the navigation menu, one at the top of the home page), but the search buttons did not work, so participants could not explore the search functionality. However, many participants commented on the search buttons and instinctively knew what they were. |
| **Intervention component: Include testimonials from research users who benefit from complete reporting**  *Relevant website features: SRQR includes dummy testimonials and quotes from research users*  *Barriers addressed: Researchers may not care about the benefits of using a reporting guideline* | **Quotes helped participants believe items were important, but some participants questioned their credibility**  The redesigned SRQR guidance featured quotes in the margin of some items from people that use research, like evidence synthesisers, editors, or other researchers. These quotes were made up, as I didn’t have time to collect real ones just for testing. Some participants said they liked these quotes:  “I think it makes this….how can I say?…practical from a different point of view. Like why exactly you need this [reporting item]. So now this person [in the quote] is telling from her own perspective how useful it is that you have [the item] described clearly, so it makes it such that if I’m trying to describe [this item], I’ll try to keep that in mind that.” (Medical student from Ghana)  “I like it because each of them tells me the why…umm…you know, kind of gives a plain language reason for […] why it’s a useful thing. […] That’s gives it, you know, humanity.” (Researcher from Australia)  However, some participants questioned whether these quotes were from real people.  “Maybe they’re real…maybe it’s legit” (Research consultant from the Philippines)  **Quotes may not be valuable enough to be prominent**  Some participants didn’t find the quotes useful, or described them as distracting.  “I don’t care what people think.” (Researcher from South Africa)  “I didn’t really pay much attention to it. I saw a few quotes and read through a few quotes, but I was like, *OK, so what does that add to me?*” (Pre-PhD student from Malawi)  “sometimes when I have to read [something complicated], but I don’t want to, [distraction] may be a big problem for me because, like, these comments are what people say, so it’s, like, more easy to read than the [reporting item]. So it may attract a lot of attention from me” (PhD student from China) |
| **Intervention component: Include testimonials from researchers who were nervous about being punished for reporting transparently**  *Relevant website features: Quotes included alongside guideline*  *Barriers addressed: Researchers may expect the costs to outweigh benefits* | Some of the fictitious quotes contained reassurance from researchers who had felt nervous when using a reporting guidelines because they felt unsure about being so transparent about parts of their work they knew were not perfect. There were only a couple of quotes of this kind, and few authors noticed or commented on them.  “That makes it relatable to a user, particularly a new user, because we can see that all of these people are, you know, they were first time users once.” |
| **Intervention component: Instruct authors to cite reporting guidelines so readers may learn about them**  *Relevant website features: Consistent instruction to cite reporting guidelines*  *Barriers addressed: Researchers may not know what reporting guidelines exist* | **The title *How to cite* was misleading to one participant**  Participants expected citation instructions and most were not surprised to see them in a section called *How to cite*. However, one participant questioned whether the section would tell them how to cite the guidance, or how to cite resources in general.  “I want to see, like, if it says right away, a certain citation style like, are you talking about Chicago?” (Research consultant from the Philippines)  **Some participants did not know whether to cite the website or the publication**  One participant said they had sought the original paper because they “wanted to add the citation” ((ECR from Ecuador)) to their article. Another asked “Do you reference the EQUATOR network or do you reference the original article?” ((Researcher from South Africa))  **Some participants recommended the citation instruction be more prominent**  “I think you can put citation in a in a box in a [coloured] box to make people notice it.” (PhD student from China)  “It is helpful of course, umm, but I think it got lost in the page.” (ECR from Ecuador) |
| **Intervention component: Explain when reporting guidelines do not intended to prescribe structure**  *Relevant website features: Explained at top of guidance*  *Barriers addressed: Researchers may struggle to reconcile multiple sets of guidance* | **Some participants included sub headings for each reporting item in their writing sample**  Many participants noticed and welcomed the clarification that SRQR does not prescribe structure. Nobody objected to it.  “I think this is very clear. If you say that did not prescribe order nor structure. […] Yes, that’s great. […] I like it very much because I think it helps me understand that the guideline is not a standardized one, but it depends on the user. To use this kind guide in their own context. So I think this one this sentence is is very important.” (PhD student from China)  In the writing task, two participants used subheadings for the items they wrote. When asked about these subheadings in the second interview, both said they intended to remove at least some of the subheadings. One participant replied “One of our reviewers wanted more structure, so of course we leave some [subheadings] in, but not all” (ECR from Ecuador). Another said “I’ll probably not include them [in my final article], but the information, that’s what I’m I’m going to maintain, yeah.” (Pre-PhD student from Malawi) |
| **Intervention component: Provide links to other resources that explain how an item can be done**  *Relevant website features: Links included when relevant.*  *Barriers addressed: Researchers may not know how to do an item* | **Participants mentioned needs that are not addressed by the current links**  Most participants voiced support for links to helpful resources. None were against them.  “I wasn’t really expecting this here. But then it’s useful. These two [links] seem useful.”  However, participants wanted links to other resources, including resources to help them with “flow charts” (ECR from Ecuador), “writ[ing] in a concise manner” (Pre-PhD student from Malawi), “sample size calculations” (Researcher from the UK), and more item-specific “training” (Medical student from Ghana), possibly including “videos” (Midwifery student from Uganda). |
| **Intervention component: Links between related guidelines**  *Relevant website features: Guidelines prominently link to other relevant guidelines and explain when they should be used.*  *Barriers addressed: Researchers may not know what reporting guidelines exist* | The top of the guideline page included information on SRQR’s scope and links to other, related guidelines. Participants said they liked these links. Most found the explanations clear, including the instructions of when *not* to use SRQR.  “This part, *when I should not use this guideline*, I think it is much useful for me to understand whether I use the right guideline or not. Yeah. […] I need this judgment.” (PhD student from China)  “[Reading out loud] *Do not use it for writing a qualitative evidence synthesis. use this instead*. OK, that could be useful.” (Medical student from Ghana)  **Not all participants understood the term ‘related guidelines’ or differences between similar reporting guidelines**  “why would you put *related* if if you’re saying *use this one, but then you could also use this one*… I think that really starts to get confusing.” (Researcher from South Africa)  “Initially it seemed confusing which guidelines to use when doing mixed methods research” |
| **Intervention component: Educate authors about writing as a process**  *Relevant website features: Some SRQR items now link to relevant EQUATOR materials and courses.*  *Barriers addressed: Researchers may not consider writing as reporting* | **The website did not sufficiently address participants’ need for writing training**  The top of the SRQR guideline page had short instructions about how to apply the reporting guideline whilst writing but for many participants, this was not enough. Many participants expressed desire for training on *how* to write an article (as opposed to *what* to write).  One participant wanted training on how to “write in a concise manner” (Pre-PhD student from Malawi)  Another talked about their struggle to apply training and guidance to their own writing process.  “When I try to look at your guidance on your website, I really want to use it in my own writing, but it is very strange because when I try to, uh, connect the information on the website with my own writing, I found there there might be a great gap because I think everything on your website is very clear (actually they are very specific, those suggestions), but when I try to connect those information with my own writing, I found it just a little bit difficult to to generate some some specific ideas to start my writing.  So I’m thinking if that’s because the problem of my writing is not the lack of specific guidance but some other thing like my motivation or, I don’t know…it’s just a little bit strange.  And I also talk about this with my friends because lots of my friends, they are also PhD students and they are struggling at writing too. So ask them if they have some guidance, uh, if they have looked at some guidance and if [they] have put those guidelines in [their] own writing and and their answers were, like, quite similar with me and and they all talk about that, *‘yes, we we look at lots of guidance we try to look at lots of those writing books to teach you how to write, to teach you how to structure your writing. But it’s still very hard’*. When you really sit down and start writing, actually you couldn’t, uh, call up [the information].” (PhD student from China) |
| **Intervention component: For each item, explain why the *information* is important and to whom (not just what constitutes “good” design)**  *Relevant website features: Information added when necessary*  *Barriers addressed: Researchers may not know why items are important* | **The labels *Justification* and *Why readers need this information* were ambiguous to some participants**  Each reporting item included a section within its expandable content called *Why readers need this information* alongside examples of writing and links to other resources. Participants found the information useful but were less enthusiastic than they were for the examples.  “So yeah, this this section, justification, examples and resources. I found them very useful as they give more detailed explanations on each specific section, and particularly the examples” (Medical student from Ghana)  However, a few readers interpreted the title of this subsection differently.  “I thought it might give you an example of how to justify [the choices you made in your study]” **?var:pilot.participants.PPT-**  “I was asking myself: *which readers?*…. the one like me who is using the platform or the readers of my paper?” (Midwifery student from Uganda)  **Not all participants found the justification compelling**  Whereas many participants spontaneously said how useful examples were, none said the same about the justification section.  “[It was] one of those things that you just read and go, like, *ohh OK*. But not, like, something which I requested or you sit down and think through.” (Pre-PhD student from Malawi)  Interviewer: Maybe this section could do a better job of reminding authors who is going to be reading their research, and how different those people might be. Or their different perspectives or experiences. Do you think if it had done that you would have found it a bit more convincing and motivating?  Participant: Umm. Definitely, definitely. From your explanation, I think it kind of puts it in context, [as to] why this section is more important. So I didn’t read it at first, but I think it did not come up very clearly as compared to how you’ve explained it. And so, after hearing that explanation, I’d say that this the way the readers need information.” (Pre-PhD student from Malawi) |
| **Intervention component: For each item, provide clear instruction of what needs to be described**  *Relevant website features: Writing instruction occurs first for each item.*  *Barriers addressed: Researchers may not know how to report an item in practice* | **One participant felt the instructions could be a little longer and less ambiguous**  Each reporting item began with instructions of what to write. Participants welcomed these instructions, as articulated by one participant when describing how they used the guideline for the writing task, “I used it specially for understanding what kind of information, you know, apart from the obvious ones, every section wants me to to write, so it it was really helpful in that respect” (ECR from Ecuador).  However, one participant suggested the information could be a little longer: “I guess just a few more words to kind of, articulate [the instruction] better or give it a bit more detail [because it may be ambiguous to] somebody less experienced” (Researcher from the UK). |
| **Intervention component: Gather and communicate evidence for benefits**  *Relevant website features: Dummy quotes provides evidence for experienced benefits.*  *Barriers addressed: Researchers may not believe stated benefits* | **Participants questioned whether quotes were credible**  The website included (fake) quotes from authors exalting the personal benefit reporting guidelines have brought to their job (e.g. easier writing, smoother publishing). Some participants found these compelling, but others worried these quotes were biassed, fake, or vague.  “This is encouraging because it’s a feedback from a person working at the journal with responsibility for publishing. The editor.” (Midwifery student from Uganda)  “If you’re using quotes on a website, my first thought is you could be biasing, you know, how useful the website is, because you’ve picked out great quotes so, you know, until I’ve looked at this and used it myself, I might not agree” (Researcher from South Africa)  “Maybe you can put some concrete stories, because for me I like to read stories instead of just reading some uh, broad words like I like it. Yeah.” - (PhD student from China)  “Yes, I think it’s much more useful [to] have some timelines to show when people say [things], yeah, because if I could see the time, I may also check like how long the company or the website may [have] last[ed] for […], how many people use that and how they are feeling like from one year ago or two years ago to now.” (PhD student from China) |
| **Intervention component: Provide advice regarding how to respond if asked to remove reporting guideline content by a colleague, editor, or reviewer**  *Relevant website features: Advice given in FAQ*  *Barriers addressed: Researchers may be asked to remove reporting guideline content* | **Many participants did not notice the advice**  The FAQ section included some advice on what to do if a colleague or editor asked you to remove content from your manuscript pertaining to one or more SRQR items. Only one participant noticed this advice. When talking about what they would do if asked to remove content by “a reviewer or, even a co-author, it was amazing for me that you give these tips, you know, to what to do in those cases and what you can do to, umm, make it or to highlight the importance of have each section within your paper.” (ECR from Ecuador)  Another participant, who had not noticed the advice, nevertheless said they would return to the website should they be asked to remove content:  “I think first I will ask his or her reason why he or she want me to delete that if I think, I don’t agree with that. I may try to make some formal explanation to explain that and also I may come back to this website to double check some reliable things which can support my view to let them believe that I should also I I need this paragraph.” (PhD student from China) |
| **Intervention component: Use plain language**  *Relevant website features: SRQR is edited to use plainer language.*  *Barriers addressed: Researchers may misunderstand* | **Participants did not understand all words**  I had tried to use plain language on the home page and introduction to SRQR, but participants still questioned the meaning of some words (e.g. “synthesis”), including words commonly used by EQUATOR staff (e.g. “transparency”). Even the term “reporting guidelines” confused some participants, especially when used at the start of a sentence, where some participants interpreted the word “reporting” to be a verb, instead of part of a compound noun. |
| **Intervention component: link all resources to each other**  *Relevant website features: Guidance links to all tools and development article*  *Barriers addressed: Researchers may not know what resources exist for a reporting guideline* | Participants noticed links to resources, such as the buttons to download checklists and templates. |
| **Intervention component: Reassure that all research has limitations to encourage explanation over perfect design**  *Relevant website features: This reassurance appears on the home page and all guidance pages*  *Barriers addressed: Researchers may expect the costs to outweigh benefits; Researchers may feel afraid to report transparently* | Two participants spoke about content that reassured authors to be honest about limitations. After noticing a reassuring quote from an editor, one participant agreed, saying:  “sometimes when we don’t report limitations and the reviewer identifies the limitations [instead] then then we lose credibility. So it’s better we report [limitations](#limitations) so that the the reviewers say *ohh this person has acknowledged this limitation, then then this is a good study*. So I just liked it.” (Midwifery student from Uganda)  Another voiced support for the SRQR reporting item about limitations, saying “no study is ever done perfectly or done in a way that the next person would do it. And so we’ve become really, really good, I think, in my team, at making quite long limitation sections to try and avoid peer reviewers from finding everything that’s wrong”. (Researcher from South Africa) |
| **Intervention component: Tell authors when to use reporting guidelines, or that reporting guidelines are best used as early as possible**  *Relevant website features: Stated prominently*  *Barriers addressed: Researchers may not know when reporting guidelines should be used* | Upon realising reporting guidelines are for writing articles, all participants naturally thought about using them in the drafting/writing process (as opposed to retrospectively check manuscripts that are already written). Sometimes this was immediate:  “From what I have seen [after the 5 second test], I think probably the website should be about, uh, helping you try to discover… identify the guidelines that you will use for writing your study quickly.” (Midwifery student from Uganda)  For some participants, using the guidance for the writing task reaffirmed their opinion that the guidelines would help them in early stages of writing.  “I saw it as very important for me at this stage that I’m at. I’m writing a manuscript. But I’d say that it can be usable at any level, only that I found it very important at my level, which is at my paper writing stage.”  **No participants talked about consulting reporting guidelines when planning a study**  Perhaps because participants did not intuitively understand how they could use a reporting guideline to plan research, none talked about using them in that way. |
| **Intervention component: Use consistent terms**  *Relevant website features: SRQR uses consistent terms across items.*  *Barriers addressed: Researchers may misunderstand* | **Participants were confused when different words referred to the same thing**  Two participants questioned why the home page referred to “guidelines” *and* “reporting guidelines” and asked whether there was a difference. Another asked whether “guidance” and “guideline” were the same. Another participant noticed that an SRQR item 18 uses the word ‘integration’ in two different contexts: whereas the item asks authors to integrate their work with others’, the example uses the word ‘integrating’ differently when discussing how their study combined modes of teaching. |
| **Intervention component: Avoid patronizing language**  *Relevant website features: Continue to avoid using patronizing language*  *Barriers addressed: Researchers may feel patronized* | No participants mentioned feeling patronized.  When asked, one participant described the tone as “suitable” and said “simple comments” and “explaining like this, [is not patronizing] because I also need a lot to learn.” (PhD student from China) |
| **Intervention component: Centralised hosting**  *Relevant website features: A core set of frequently accessed guidelines are now presented on a single website.*  *Barriers addressed: Guidance may be difficult to find* | That the website contains many different reporting guidelines was rarely mentioned, but one participant said “to have a repository where all those things are, instead of having to go and search for them. That makes sense.” (Researcher from South Africa) |
| **Intervention component: Provide translations**  *Relevant website features: Translations are prominently listed above the guidance*  *Barriers addressed: Researchers may not understand the language; Researchers may misunderstand* | **One participant noticed that their language was missing**  “So what about, you know, all the researchers that speak Spanish?” (ECR from Ecuador) |
| **Intervention component: Tell authors how long the guidance will take to read**  *Relevant website features: Estimated reading time given*  *Barriers addressed: Researchers have limited time* | **Not all participants liked being told how long the guidance would take to read**  The guidance advises readers that it may take 16 minutes to read. One participant liked this: “Oh, I know how it’s going to take. It’s helpful when you are performing research you have like tight deadlines and not much time.” (ECR from Ecuador)  But another felt like 16 minutes was too long, especially if you only found the guideline as part of manuscript submission “Uh, it will be frustrating. Now again, you waste a lot of time.” (Midwifery student from Uganda).  And a third (not a native english speaker) worried they would feel bad if the guidance took them longer than the stated time:  “I think this is, like, useful, but I’m not sure whether some… when some people read it, they may feel stressful because, from my teaching experience before, some of my students may say to me if, like, there is guidance saying that you may need, like, 60 minute to read it, sometimes, if they take longer, they may feel confused, or lose a little bit [of] confidence [and worry that] they read it so slow or they are not, like, normal one. I think this [estimated time] *may* be a good [information] because, like, nowadays I found, like, many websites use it. But actually, for me sometimes this part is useful, but sometimes it is not.” (PhD student from China) |
| **Intervention component: Encourage explanation even when choices are unusual or not optimal**  *Relevant website features: Added to items*  *Barriers addressed: Researchers may feel afraid to report transparently* | **Only one participant noticed this instruction**  Some reporting items in SRQR ask authors to explain their reasoning behind design choices. Only one participant noticed one of these sentences. They reflected that researchers often “follow this path of only mentioning [what we did] but not explaining how we did it and why it was important to apply this strategy” ((ECR from Ecuador)). |
| **Intervention component: Explicitly state when no better guidance exists for a use case**  *Relevant website features: Reporting guidelines warn authors when no better guidance exists for a use case, and how the current guidance can be adapted instead*  *Barriers addressed: Researchers may not know what reporting guideline is their best fit* | **Only one participant commented on this instruction**  In the introduction to SRQR, where its scope is explained, the instruction mentions that there are no better reporting guidelines for writing *protocols* for qualitative research, and instead recommends authors use certain items from SRQR. One participant annotated this explanation and said they liked it ((PhD student from China)). |
| **Intervention component: Provide instruction as to how and where information can be reported without breaching word count limits or making articles bloated.**  *Relevant website features: Added instruction at top of reporting guideline and in some items where most useful*  *Barriers addressed: Researchers may struggle to keep writing concise* | **Only one participant commented on instructions of where content can be reported**  Very little of the guideline text deals with *where* content can be reported (e.g. in the article body, in an appendix, a table, a figure). Only one participant noticed it and said “I like the reminder” (Researcher from South Africa). |
| **Intervention component: Reassure when guidelines are *just* guidelines**  *Relevant website features: Prominently displayed at top of reporting guideline*  *Barriers addressed: Researchers may feel restricted if reporting guidelines prescribe design* | **Only one participant drew the distinction that reporting guidelines are not rules**  Throughout the homepage and SRQR page I had tried to convey that reporting guidelines are recommendations, and I took care not to use words like *rules* or *standards*. Only one participant commented explicitly about this, but no participants talked about the guideline as if it were a set of rules.  “So I think this explanation here is very clear that it helps researchers to know that definitely they can have their own ideas and this guideline is, it is kind of like a supporting one, but not a rule, not a standardized rule.” (PhD student from China) |
| **Intervention component: Ensure all resources and tools (e.g., checklists and templates) are in ready-to-use formats**  *Relevant website features: No changes made*  *Barriers addressed: Researchers have limited time; reporting guideline resources may not be in usable formats* | Even though the links to the checklist and template were not live, participants expected the resources to be in ready-to-use formats. |
| **Intervention component: Communicate why reporting is primarily the responsibility of the author**  *Relevant website features: Clear explanation of why guidelines and tools should be used by authors primarily, although can also be used by others.*  *Barriers addressed: Researchers may feel that checking reporting is someone else’s job.* | No participants commented on this. |
| **Intervention component: Decrease fear of judgement by making reporting guidelines design agnostic**  *Relevant website features: SRQR explicitly states that it makes no assumptions about design. Inadvertent design assumptions were edited.*  *Barriers addressed: Researchers may expect the costs to outweigh benefits; Researchers may feel afraid to report transparently; Researchers may feel restricted if reporting guidelines prescribe design* | No participants commented on this. |
| **Intervention component: Explain importance of complete reporting to the scientific community**  *Relevant website features: Continue to do this*  *Barriers addressed: Researchers may not know why items are important* | The website explains the societal and community importance of complete reporting in a few places: the justification subsections of each item, quotes in the margin, and briefly on the home page.  Although participants commented on the quotes from research consumers, and on the *Justification* sections within each reporting item, nobody talked about the negative impact of poor reporting on the scientific community at scale. |
| **Intervention component: Make it possible for guideline developers to make small edits without having to publish new articles**  *Relevant website features: Developers can make small updates any time*  *Barriers addressed: reporting guidelines can become outdated* | This component was not tested and no participants commented on this. |
| **Intervention component: Provide clear instruction of what needs to be described when an item was not done, could not be done, or does not apply**  *Relevant website features: Instructed where relevant*  *Barriers addressed: Researchers may not know what to write when they cannot report an item* | This component was not tested and no participants commented on this. |
| **Intervention component: Remove branding and messaging that may invoke feelings of judgement, complexity, or administrative red- tape**  *Relevant website features: A clean, simple interface for the home page and guidance pages. Text makes less use of to judgemental phrases and fewer references to the negative consequences of poor reporting.*  *Barriers addressed: Researchers may expect the costs to outweigh benefits* | No participants described the design as unpleasant or judgemental. |
| **Intervention component: Search Engine Optimization**  *Relevant website features: The site has additional meta-data. Each reporting guideline page has its own meta-data. The site is optimized for mobiles.*  *Barriers addressed: Guidance may be difficult to find; Researchers may not encounter reporting guidelines early enough to act on them* | This component was not tested and no participants commented on this. |
| **Intervention component: Use if- then rules to direct authors to more appropriate and up-to-date guidance when available**  *Relevant website features: Reporting guidelines clearly and consistently point authors to more appropriate guidance when appropriate, using if-then rules. These links can be updated any time.*  *Barriers addressed: Researchers may not know what reporting guideline is their best fit* | Although participants commented on the links to related guidelines, they did not comment on the “if…then…” structure of these links. |

#### Barriers

Participants naturally discussed barriers and facilitators they encountered when applying guidance, either during this study or in their previous experience. These factors were external to the website being tested, and beyond the scope of my intervention components and hence I did not code them as deficiencies. I had identified many of them in my previous work (chapters .

One barrier involved authors feeling frustrated when asked to use a reporting guideline or checklist when they have already finalised their manuscript and are submitting to a journal. Using a checklist so late in publishing causes frustration because authors are short of time, consider the work finished, and are trying to get their job done. One participant articulated this concisely ((Researcher from South Africa)), when reflecting on their first interview session, when they felt “annoyed by stuff” because they were “working on something at the time” and so instead of “exploring” the website they were “just trying to get to where [they] wanted to be so that [they] could finish the work [they were] doing”. They wanted the reporting guidance as a short checklist “didn’t want all the additional stuff”, referring to the longer reporting item explanations, the guideline introductory text, or the persuasive home page content.

However, after using the reporting guideline in their own time their opinion had totally changed by the second session: “when you specifically asked me to look at this and I used it [to write my] discussion, I was embracing it in a different way”. They found the guideline “really helpful” for writing, and then “enjoyed looking at all the different checklists and reporting guidelines”, ultimately deciding that “in a new journal that I’m a deputy editor [of], I’ve just said that in our in our scope and guidance for authors, we have to say that we require the use of reporting guidelines”. This change of heart came after a shift in context: whereas in the first session the participant was looking to get a job done quickly, by the second session, they had given the guideline time and used it in its intended way.

Other barriers participants mentioned included:

* Not having known what reporting guidelines were earlier in their career
* (Previously) finding the checklist, but not the full guidance
* Being limited by journal requirements and word limits
* Struggling to keep writing concise and fluid
* Needing more guidance
* Being unable to report an item because it is their colleague’s responsibility, or because they had not done what was being asked when designing their study or collecting data.
* Paywalls
* Using reporting guidelines for teaching students
* Wanting guidance for funding applications
* Funders enforcing reporting guidelines

Participants also mentioned barriers I had not identified previously. These included:

* When guideline author names appear Western, some (non western) participants expected the guidance to be less relevant to them.
* Describing a guideline as “version 1.0” might make people feel like the guidance is (too) new, and therefore less trustable.
* The loading speed of websites (thankfully, this was not an issue for the website being tested)
* Not understanding reviewer feedback
* Not wanting to read on a screen
* Not understanding the relationship between the EQUATOR Network and the guidelines or guideline developers.

#### Comparisons between the website being tested and the old EQUATOR website & guideline publications.

A few participants ended up exploring the *original* EQUATOR website and the *original* SRQR publication during their interviews. Participant’s instigated these unplanned explorations and comparisons for different reasons. One wanted to retrace their steps to show me the guideline they had used previously. Two others wanted to continue using reporting guidelines in the future and asked me where the original SRQR guidance could be found. Some others spontaneously reflected on their previous experience.

Recounting their experience of seeing the original EQUATOR website for the first time between interview sessions, one participant (ECR from Ecuador) said “Ohh no I didn’t like it. The [new] one is much, much better” because it looked more “trustworthy, more organised” and they preferred the font and colours. Another participant described the original website as “boring”, “outdated” and “text heavy” before recounting their experience of using it:

“Not that long ago I went on to the site because I was looking to complete a reporting checklist and it seemed clear to find the checklist that I wanted. But when I went through the checklist, it wasn’t appropriate. And then I just ended up feeling a bit unsure about what it is, which was the best one to go for.” (Researcher from the UK)

I witnessed another participant (Pre-PhD student from Malawi) experience similar confusion. They wanted to find the original SRQR guidance to continue using it after the study finished. Sharing their screen and thinking aloud, they started on the EQUATOR Network home page and tried to find the original SRQR guidance without my help. Although at first they thought EQUATOR’s home page looked “full” and “rich”, they were quickly “confused” by both EQUATOR’s website and the SRQR publication. After eight minutes and giving up three times, they eventually found the checklist but not the supplement containing the full guidance.

A second participant (Researcher from South Africa) achieved the same outcome a few minutes faster. Because examples only appear in the (unfound) supplement they instead looked through “the reference list to see if there was potentially an example paper” and then planned to “go back to PubMed and search for an article that used these guidelines”. The participant appeared to have little interest in the article’s text, saying they did not “care what [the guideline developers] did to come up with it”.

Another participant (ECR from India) echoed this opinion when comparing the original SRQR publication with the redesigned version. They said they “don’t need” to know how SRQR was made when they are trying to use it, and they felt the redesigned guidance is “a bit more precise and to the point”. When I showed them the original SRQR full guidance (the supplement), they said:

“Participant: That’s too heavy on the content.

Interviewer: So if if the option was between this this version that you’re looking at now [the original supplement] and the the website that you saw first, which do you think you prefer to use?

Participant: I think [the website] is far better than the [supplement]. Yeah, this one [the website] is far better.”

Another participant reflected on their previous experience of using the PRISMA guidelines and explanation document. They said:

“I rather prefer this form of guidance [the website] than the other one [the publication]. There can be a lot more information presented in this way. […] That’s better because it’s more (how can I say?) well presented, well laid out, so that where I need to go deeper, I can go easily. Where I need just surface information or the parts that I’m already familiar with, I can just scroll through […] So I think I’ll prefer something presented in this way than the than the document that I read” (Medical student from Ghana).

## DIscussion

The purpose of this study was to identify deficiencies in a website for disseminating reporting guidance. I interviewed **?var:counts.pilot.participants** and used multiple qualitative methods to identify 53 pertaining to intervention components.

Most intervention components on the website’s home page aim to communicate what reporting guidelines are, that they are best used early in writing, and how they will benefit the author. The results demonstrated most of these components to be somewhat successful, but not yet optimal. For example, some participants needed more than 5 seconds to realise the website was about resources to help them write. Participants often found later, longer content more useful than the short text at the top of the page. In seeking to balance brevity and clarity, perhaps I had been too mean with my word count. If “easier writing” is vague, “faster first drafts” might be concrete. If “complete reporting” isn’t intuitive, perhaps “describing research so that everyone can understand, repeat, apply, and synthesise your work” is.

I had sought a similar balance between clarity and brevity when trying to organise the full SRQR guidance (35 pages in its original form) onto a single webpage, in a way that made it appear shorter and less intimidating. Again, the current design was somewhat successful. Participants liked the web features I had used to make the guidance more digestible, like expandable content, navigation menus, subheadings and consistent structure. However, some still felt the guidance looked too long, whilst others wanted to add content that would make it longer still; more examples, more information, more definitions, more signposts to other help. One solution may be to display reporting items on separate pages, as the ARRIVE developers have done on their website #REF. Another may be to display a summary of the guidance at the very beginning.

Many participants commented on the website’s design. Whereas I had been somewhat successful in projecting simplicity, for some participants, this crossed the line to basic-ness, especially in the first iteration. Many intervention components use design as a way to persuade and communicate with authors: I wanted pictures to depict tools, benefits, and purpose; layout and colours convey a feeling of ease and openness. Sadly neither I nor my colleagues possess expert design skills. Images took a long to create and, unlike text, are hard to iterate. This is a pity, as design was often more salient to participants than text, and bad design misled participants and put them off.

Design was also linked to another theme important to this study: credibility. For some participants, the website’s basic design eroded its trustworthiness. I mitigated this partially in the second iteration (e.g. by including logos), but future design iterations would ideally seek professional design input. Participants also wanted assurance that the guidance (text) could be trusted, which necessitated understanding the relationship between EQUATOR, guidelines developers, the original guideline publications, and the content of the website.

### Barriers

Understanding the relationship between guidelines, developers, and EQUATOR was one of six new barriers participants mentioned that could, in theory, affect whether they successfully adhere to reporting guidelines. In chapters and 4 I argued the need for more, in depth qualitative exploration of barriers. Although I did not aim to solicit barriers, that I found novel barriers incidentally suggests I have contributed towards filling that gap. Participants also mentioned eleven barriers that I *had* previously identified in my earlier work. Therefore, this study adds credibility to my previous findings whilst also building upon them.

### Strengths

Finding novel barriers is testament to the strengths of this study. I recruited authors with diverse backgrounds and writing experience. My methods solicited rich information. My thorough analysis used my intervention component table as a framework to draw as much information as possible for the data. In contrast, many studies I reviewed in chapters and 4 recruited homogenous samples, solicited thin description through surveys, and described their analysis techniques poorly. The few studies that elicited rich information focussed on content (e.g. #REF PRISMA 2) or application (SQUIRE 2 #REF) of a reporting guideline but not the design or the website/publication hosting the guideline. By focussing on diverse recruitment, rich exploration of the guidance text and surrounding platform, and thorough analysis and reporting, I have strengthened my study and addressed limitations seen in others.

### Limitations

However, other limitations remain. I will now discuss how 1) this study lacked contextual realism and diversity and 2) not all intervention components were explored.

#### Context

My web audit (chapter 5) found only half of EQUATOR’s current visitors view the home page. Many arrive to the website directly on a reporting guideline page, often as a referral from a journal or a search engine. Because so many visitors never view the home page, many intervention components need to placed on the home page *and* the reporting guideline page. For instance, naïve visitors should be able to tell what reporting guidelines are whether they arrive on the home page or directly on a guideline page. Some participants noticed this duplication and a few suggested removing or minimising it. However, because all participants viewed the home page first, this study did not capture experiences representative of website visitors that never see the home page. Therefore, future studies should explore the experiences of participants viewing the guideline page before the home page.

Many authors discover reporting guidelines as they are submitting to a journal, whereas authors in this study were not. Because authors described manuscript submission as an inconvenient moment to intervene (see chapter 3), this may influence how authors experience the website. Once the website is live and journals are directing traffic to it, future studies can explore the experiences of authors using the website in contexts that are more true-to-life, as part of their journal submission journey. Similarly, if funders or ethics boards begin asking applicants to use reporting guidelines this context should be explored too.

#### Not all intervention components explored equally:

Some intervention components received little to no discussion. The five second test, think aloud, plus minus test, and writing evaluation all examine *salient* intervention components and will not elicit discussion of un-noticed components.

Sometimes this was useful and expected. For example, one component was to *remove* aversive design, and another was to remove patronizing language. That nobody spontaneously described the website as off-putting nor patronizing was a success. Similarly, another component was to use terms consistently. This component was only salient when it had not been applied properly, for instance, where I had used the terms “guidelines” and “reporting guidelines” interchangeably. For components like these, a good outcome is to go unnoticed.

However, some components still deserve evaluation even though they are purposefully not salient. For example, inconspicuous website features or information within blocks of text. My semi structured interview questions addressed this limitation to some extent by asking participants directly about less salient features. My interview schedule could be adapted in future to include other lesser-noticed components. Another option would be to use a task based protocol #REF. For example, future studies could ask participants to find particular information or resources.

Some components received some attention but could not be fully explored until the website is further developed. For example, although participants recognised the search button, they could not explore the search functionality. Although participants *said* they liked the links to related guidelines, I could not explore participants’ ability to find and select guidelines because the website only included SRQR. Once other guidelines are uploaded, future studies could use task based protocols #REF to explore how participants find, compare, and select appropriate guidelines.

### Future studies

Whereas the limitations above affected my success in reaching my objectives (identifying deficiencies), my objectives were themselves limited and further work is needed to develop the website into a fully functional resource.

I will now discuss potential future studies, including 1) prioritising deficiencies; 2) further iterations to address deficiencies; 3) extending the website with other guidelines, checklists, templates, examples, and resources; 4) evaluating components that could not be evaluated in this study; 5) comparing authors’ preference between the new and existing website and guidelines; 6) real world evaluations and 7) evaluating reporting guideline content.

#### Prioritising deficiencies

I made no attempt to prioritise deficiencies. Although some were more commonly raised than others, this was because of saliency and because of the methods I chose. For example, by choosing to use the 5 second test, I encouraged participants to focus on components featured at the top of the landing page. Similarly, my semi structured interview questions drew attention to particular components. Therefore, code frequencies should not dictate deficiencies’ priority and I purposefully have not reported them.

Instead, de Jong and Schellens #REF suggest ranking deficiencies according to their likelihood and severity. Liklihood refers to the number of users that may be affected by the deficiency, and severity means the degree to which the deficiency will block the desired behavioural outcome. I made no attempt to estimate these factors systematically in this study. Instead, I judged them instinctively when deciding what I could feasibly change in the first iteration.

#### More iterations are needed to fix deficiencies

Once prioritised, the remaining deficiencies need addressing and it is my intention, funding permitting, to design and evaluate new iterations after my PhD. Testing future iterations with an identical protocol would offer continuity. It may be more prudent, however, to adjust the study protocol to target particular components or contexts.

#### Future evaluations are needed after extending the website

Future evaluations will also be required after the website is extended with more guidelines, search functionality, and with checklists, templates, and links to training and resources. Because different reporting guidelines cater to different research communities, and because these communities may have their own nuances and needs, future evaluations should recruit participants from these communities. For example, CARE may be more commonly used by clinical academics, and ARRIVE authors may come from the life sciences and medical sciences. One reason I chose SRQR was for its diverse user base. As the website grows and its audience expands, recruitment should diversify further.

Once checklists and templates are added, future evaluations should explore participants experiences of using these resources with and without prior exposure to the website. Just as some authors will bypass the home page land directly on a guideline page (see Context section within limitations), some authors may receive a checklist or template directly from a colleague or journal without first visiting the website. Therefore, these resources should be evaluated in isolation *and* within the context of the website.

#### Evaluating components not explored in this study

Some components could not be explored in this study. Optimizing the website for search engines can only be assessed by an audit #REF or by monitoring the website’s rankings using a tool like Google’s search console #REF once the website is live. Another component was to allow guideline developers to make small, incremental updates to guidelines without having to publish new articles. As this targets authors indirectly, it should be evaluated amongst guideline developers.

Thirdly, one component involved adding information to items to instruct authors what to do if a particular item was not, or could not be done. This item was more applicable to reporting guidelines for quantitative research, many of which make assumptions about design choices. SRQR is fairly agnostic to design choices, and I only added information to one item (item 5, regarding qualitative approach). In the writing evaluation, I asked participants to describe what part of their manuscript they were working on and I then recommended 2 or 3 reporting relevant reporting items. Item 5 was not relevant to any participants, and so no participants noticed nor commented on the component.

#### Comparing preferences

This study did not aim to explore whether participants preferred the revised reporting guideline and website over the existing ones. The few participants who made this comparison naturally all expressed preference for the redesign, but future studies could explore preferences in detail. Doing this qualitatively would limit the sample size but reveal *reasons* behind preferences. A larger survey could confirm whether authors prefer one version above another.

#### Real world evaluations

Once the new website and redesigned reporting guidelines are live, real world evaluations should continue to monitor, understand, and improve authors’ experiences. This will include using google analytics to monitor how authors use the website, online surveys and other feedback channels, and opportunistic recruitment of authors engaged in their day-to-day work.

Some important metrics include the proportion of authors that return to use the website, the proportion who access resources for drafting vs checking (we would hope to see more authors use the former), and the length of time authors engage with guidance.

Because journals will probably continue to be an important dissemination channel, one possibility would be a mixed methods feasibility study, in collaboration with a journal, similar to the study EQUATOR executed with BMJ Open before my PhD [17]. Such a study could combine google analytics data with author interviews and writing evaluations of manuscript submissions.

#### Evaluating guideline content

This study did not attempt to evaluate the SRQR recommendations themselves, but rather the guidelines’ presentation. I was interested in what participants thought of the structure, order, and layout of the guidelines, but not of its content. I was trying to look at the guideline on a macro level, and I was not interested in whether participants took issue with particular instructions.

I hope that guideline developers will begin evaluating their content in more detail. They could make use of de Jong and Schellen’s advice, which suggests a range of methods to explore the criteria needed for text to be effective: selection (whether readers choose to engage with it), comprehension, application, acceptance, appreciation, relevance and completeness [12]

### Conclusions

This study aimed to identify deficiencies in a redesigned version of the SRQR guideline and EQUATOR Network home page. Intervention components were deficient if they could more successfully drive authors towards our target behaviour: appropriate adherence to reporting guidelines. In identifying deficiencies, I met my objective, but this success comes with disappointment. This is the final research chapter of my thesis, and it would have been satisfying to conclude with “I’ve done it! The website is perfect!”, but the results of this study prove otherwise. Unfortunately, the realities of iterative design and limited funding force me to end with unfinished business. Nevertheless, I have suggested further studies to continue and extend the work presented here. In the next chapter, I will discuss my thesis as a whole, directions for future work, and implications for guideline developers and other meta-researchers interested in changing the scholarly system.

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