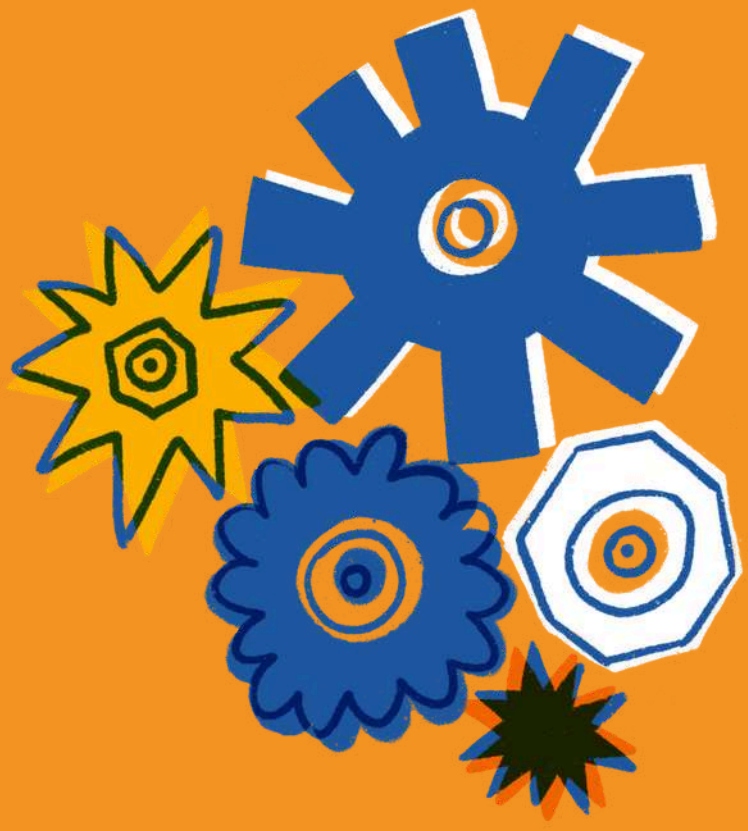

CHAPTER 7

Checks and Risks

INTRODUCTION

After designing and building the virtual museum, a crucial and indispensable stage is its verification. This is the last moment to ensure that everything works according to plan, and that the visitor experience will be positive, engaging, and seamless.

This chapter will guide you through the detailed process of user testing, systematic bug management, thorough verification of copyrights for all multimedia materials, and the preparation of a robust emergency plan. Careful execution of these steps is essential for your museum to be professional, legal, and resilient to unforeseen problems, which builds trust and project c redibilit y.

USER TRIALS

User testing is a fundamental step that allows you to verify whether the vir- tual museum is intuitive, engaging, and accessible to its target audience. The opinions and observations of future users are invaluable in identifying problems that the creators, immersed in the project, might have overlooked.

The main goal is to check how real users interact with virtual space.

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We want to find out:

Navigation and Orientation: Is the navigation simple and understandable? Do users know where they are and how to get to the content that interests them?

Functionality: Do all interactive elements (buttons, links, 3D models, video players) work correctly and as expected?

Understanding and Engagement: Is the message and content clear, interesting, and engaging? Is the story told by the museum coherent?

Accessibility: Is the museum accessible to people with different needs (e.g., text readability, color contrast, functioning video captions, screen read- er support)?

Overall Impressions: What are the general impressions and emotions accompanying the visit? Is it frustrating or satisfying?

How to conduct tests – detailed methods:

1 **Tester Selection:** Invite people from your target group (students of different ages, teachers of various specializations, parents), but also a few people from outside it to get a broader perspective. A group of 5-8 people is enough to identify about 85% of usability problems. Ensure diversity in your test group.

2 **Scenario Preparation:** Create a list of specific, open-ended tasks for the testers to perform. Avoid leading them by the hand.

Example of a bad task: *"Click on the menu, select '19th Century Gallery', and then find the painting 'Battle of Grunwald'."*

Example of a good task: *"Imagine you are interested in the history of medieval Poland. Find an exhibit in the museum related to this period and learn something more about it." Other example tasks: "Start the audio guide for the sculpture you like the most.", "Find out the opening hours of the physical museum.", "Try to share a link to the exhibition on social media."*

3 **Testing Methods:**

Moderated Test: You conduct the session with the user (live or remotely via screen sharing). You can ask additional questions and observe reactions. This is very valuable but time-consuming.

"Think Aloud" Protocol: Ask users to verbalize their thoughts, intentions, and feelings as they perform the tasks. This will help you understand why they make certain decisions and where they encounter cognitive barriers.

Unmoderated Test: Users perform the tasks on their own, and their interactions are recorded by special software (e.g., Maze, Lookback). This is faster and allows you to test a larger number of people.

Testing Method	Description	Key Advantages	Key Disadvantages
Moderated Test	Session conducted with the user live or remotely via screen sharing, led by a moderator.	Ability to ask supplementary questions, observation of non-verbal reactions.	Time-consuming, requires greater moderator involvement.
“Think Aloud” Protocol	User verbalizes their thoughts, intentions, and feelings while performing tasks.	Helps to understand cognitive processes and barriers.	Can feel unnatural for some testers, requires an experienced moderator.
Unmoderated Test	Users perform tasks independently, and their interactions are recorded by specialized software.	Fast, allows testing a larger group, lower cost.	Lack of opportunity to ask follow-up questions during the task.

4 Gathering Feedback and Measuring Satisfaction:

Post-test Interview: After the session, conduct a short interview. Ask open-ended questions: “What was the most difficult part for you?”, “Which element did you like the most and why?”, “Did anything surprise you?”, “Do you have any suggestions for improvement?”.

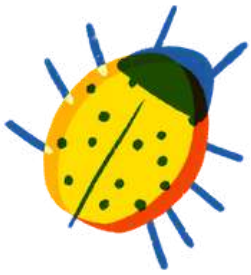
Satisfaction Surveys:

- System Usability Scale (SUS): A standard, 10-question questionnaire that provides an overall usability score on a scale of 0-100. It is quick to complete and allows for comparing results between different project versions.
- Simple Survey: If SUS seems too complicated, create your own short survey with questions rated on a 1-5 scale (e.g., “How do you rate the ease of navigation?”, “How do you rate the visual appeal of the museum?”).
- Best Practices for Receiving Feedback: Be open to criticism – remember, you are testing the project, not yourself. Listen actively, do not interrupt. If you don’t understand something, ask for clarification: “Can you show me where that was?”

5 Analysis of results:

After collecting the data (notes, recordings, surveys), analyze it for recurring patterns. If three out of five users had trouble finding the exit from a room, it means the navigation signage needs urgent improvement. Create a list of problems and prioritize them – from those that prevent users from using the museum to minor inconveniences.

BUG LISTS AND FIXES



Systematic bug management is key to ensuring the technical quality of the project. Creating a central bug list allows for effective tracking and prioritization of repair work.

Tools for creating a bug list:

Simple: A shared Google Sheet or Microsoft Excel is a great start for small projects.

Visual: Trello or Asana allow for the creation of Kanban boards, where "cards" with bugs are moved between columns (e.g., "New," "In Progress," "For Verification," "Done").

Advanced: Jira is a professional tool used by development teams, offering extensive tracking and reporting options.

Creating a detailed bug list: Each identified bug should be recorded as a separate entry and include:

Bug ID: A unique number (e.g., MUSED-001).

Title: A concise description of the problem (e.g., "Video in 'Modern Art' room does not play on Firefox").

Description: A more detailed description, including what happens versus what should happen.

Steps to Reproduce: A numbered list of steps that allows the bug to be reliably triggered.

Priority:
Critical (Blocker): Prevents the use of a key feature or the entire application (e.g., the page does not load).
High: Seriously disrupts a major feature, but a workaround exists (e.g., the main navigation button doesn't work, but you can navigate from the sitemap).
Medium: Causes inconvenience but does not block the main user flow (e.g., an image is displayed incorrectly on a mobile phone).
Low: A minor visual glitch or a typo.

Status: The current state of work (e.g., New, In Progress, For Verification, Done, Rejected).

Assignee: Who is responsible for the fix.

Attachments: Screenshots or a short video recording showing the bug.

Repair process and example solutions:

Reporting: Encourage the entire team and testers to report bugs precisely.

Prioritizing: Regularly (e.g., once a day) review the list and set priorities

Fixing: Assign tasks to the appropriate people.

Verification: After a bug is fixed, the person who reported it (or a dedicated tester) must check if the problem has been resolved on different devices and browsers.

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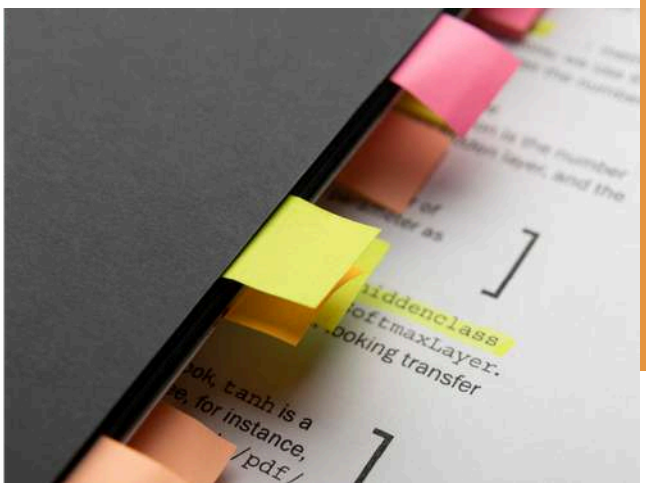


Photography on Freepik

Common problems and suggested solutions:

Problem: Users get lost in navigation.

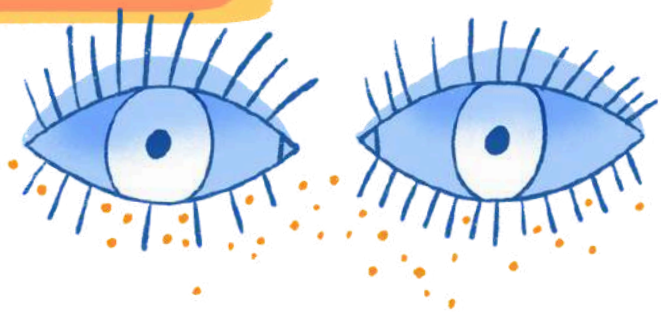
- **Solution A:** Add an interactive museum map with the user's current position marked.
- **Solution B:** Introduce a system of "hints" or a virtual guide that suggests the next steps.
- **Solution C:** Simplify the navigation menu by reducing the number of options.

Problem: The page loads too slowly.

- **Solution A:** Compress all images and 3D models without a visible loss of quality (use tools like TinyPNG, Blender).
- **Solution B:** Optimize videos – make sure they have the appropriate resolution and format (e.g., MP4 with H.264 codec).
- **Solution C:** Check if the hosting is powerful enough.

COPYRIGHT CHECKS FOR IMAGES/AUDIO/VIDEO

Every multimedia element used in the virtual museum must comply with copyright law. Neglecting this aspect can lead to serious legal and financial consequences.



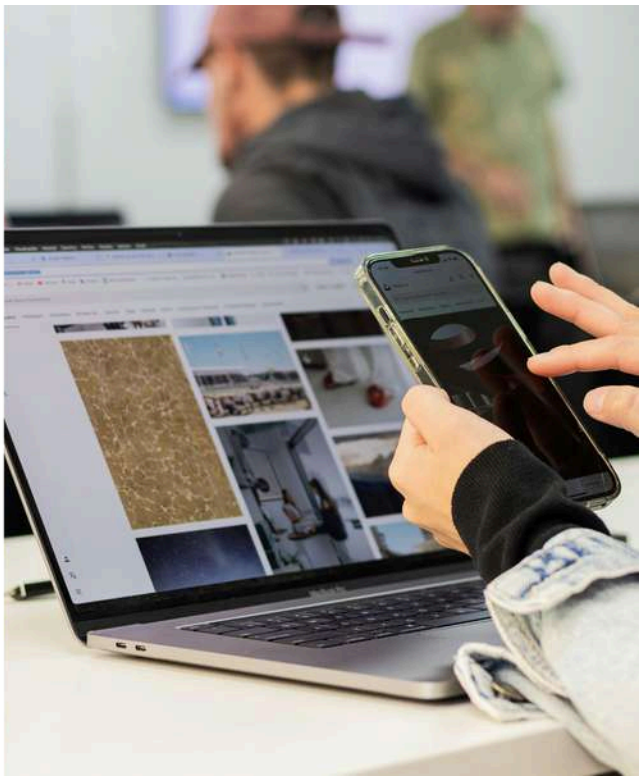
Sources of materials and tools:

Own materials: The safest option.

Materials on free licenses: **Images:** Search on Wikimedia Commons, Unsplash, Pexels, Rijksmuseum Studio (public domain artworks). **Sounds:** Freesound, Bensound. **Video:** Pexels Video, Mixkit. Always check the specific terms of the license (e.g., CC BY requires attribution).

Author's consent: If you want to use copyrighted material, you must obtain written permission.

Photography on Freepik



Photography on Unsplash

Attribution examples:

	File ID	File Name	Type	Location in Museum	Source (URL)	License Type
1	IMG-045	MonaLisa_HQ.jpg	Image	Renaissance Gallery	www.rijksmuseum.nl	Public Domain (PD)
2	AUD-012	Medieval_Lute.mp3	Audio	Medieval Section Intro	www.freesound.org	CC BY-SA 3.0
3	VID-007	Volcano_Eruption.mp4	Video	Geology Room	www.pexels.com/video	Pexels License
4	IMG-088	Rare_Coin.png	Image	Numismatic Cabinet	Unknown (Found on Google)	Unknown

Required Attribution

1 – None (Rijksmuseum Studio)
2 – Yes: “Lute Music” by Author X (CC BY-SA)
3 – None
4 – None

Status

1 – OK
2 – OK
3 – OK
4 – Problem (Remove!)

Detailed verification process:

1. **Create a media inventory:** In a spreadsheet, create a table with the columns: File ID, File Name, Type (Image/Audio/Video), Location in museum, Source URL, Author, License Type, Required Attribution Method, Verification Date, Status (OK/Problem).
2. **Determine source and license:** For each file, fill in the spreadsheet. Be a detective – if you are unsure about the license, do not use the material.
3. **Correct attribution:** Make sure you meet the conditions. Correct attribution or a CC BY license looks like this: “[Title of work]” by [Author] is licensed under [CC BY 4.0]. The title should link to the original, and the license name to the license text.
4. **Store evidence:** In a separate folder, keep screenshots from source pages with visible license information and email correspondence with authors who have given their consent.

Remember: “Found on Google” is not a license! Use Google Images with the “Usage rights” filter set to “Creative Commons licenses”.

EMERGENCY PLAN

Even the best-prepared project can encounter unexpected problems. Having an emergency plan will allow you to react quickly and effectively to crisis situations.

Detailed risk analysis:

- **Technical problems:** Server failure, platform errors (e.g., Spatial.io), bugs after a browser update.
- **Hacker attacks:** Unauthorized access, malicious code injection (XSS), content alteration (defacement), user data leakage.
- **Negative feedback:** Substantive criticism, hate speech on social media, an unfavorable review in the media.
- **Copyright issues:** A claim of copyright infringement after publication.

Expanded elements of the emergency plan:

1 Backups:

The 3-2-1 Backup Strategy:
3 Copies of your data (Original + 2 Backups) On **2** Different media (e.g., Server disk + External/Local drive) With **1** Copy Off-site (e.g., In the cloud - Off-site)

Automation
Configure daily, automatic backups of the entire site/application and database

Testing
At least once a quarter, perform a test restore from a backup to ensure the process works.

2 Monitoring:

Tools: Use a free tool like UptimeRobot, which checks if your site is online every 5 minutes and will email you in case of a failure.

Server Logs: Regularly review logs for suspicious activity.

3 Crisis Communication Plan:

Who is responsible? Designate one person (and their deputy) as the "crisis officer" responsible for communication.

Prepared Messages:

- **Technical failure:** "Dear visitors, we are currently experiencing technical problems with our virtual museum. Our team is already working on a solution. We apologize for the inconvenience and thank you for your patience. We will keep you updated on the progress." (to be placed on the homepage and social media).

- **Hacker attack (if no data was leaked):** "We have identified and blocked an unauthorized interference with our platform. We have restored full security and functionality. No user data has been compromised."

- **Contact list:** Create an emergency contact list: hosting provider, platform technical support, server administrator, lawyer (in case of legal issues).

4 Detailed response procedure:

- **Technical failure:**
  1. Publish the announcement.
  2. Contact technical support.
  3. If possible, restore the last stable version from backup.
  4. After resolving theproblem, publish a message about the restoration of service.

- **Security problem:**
  1. Immediately switch the site to maintenance mode.
  2. Change all passwords(administrator, database, FTP).
  3. Restore the site from a clean backup.
  4. Identify and patch thesecurity vulnerability (e.g., by updating software).

- **Copyright infringement:**
  1. Immediately remove the disputed material.
  2. Respond to the claim, informing about the steps taken.
  3. Consult a lawyer to determine further action.