



# WP4-A7. Technical test and implementation of IT improvements Interactive RockChain Tool.



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## 1. INTRODUCTION

This document presents the results of activity WP4-A7 “Technical test and implementation of IT improvements of Interactive RockChain Tool”, developed within Work Package 4 of the RockChain project.

In this activity, an early prototype build of the Interactive RockChain Tool was reviewed by external technical experts to:

- validate its robustness and clarity under realistic training conditions (group sessions, heterogeneous devices and networks), and
- identify feasible IT improvements to be implemented during the WP4 refinement and stabilisation phase.

The purpose of this report is to summarise the feedback collected through a structured online questionnaire, highlight the main technical strengths and weaknesses identified by the evaluators, and document the IT improvements that were prioritised and implemented in the updated build prepared for pilots.

The Interactive RockChain Tool and other public project outcomes are accessible through the RockChain project website: <https://rockchain.eu/>



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## 2. EVALUATION QUESTIONNAIRE

Each partner distributed the questionnaire to external technical experts, ensuring a balanced panel covering complementary perspectives: mobile development and UX engineering, blockchain/traceability architecture, QA and test engineering, cloud/DevOps, and cybersecurity/data protection.

A total of 6 experts completed the questionnaire (100% completion rate). The questionnaire contains 6 questions, combining Likert-scale items (overall satisfaction, content clarity, usability/visual support, and applicability to the sector) and an open question to collect concrete improvement proposals.

## 2.1. EVALUATION QUESTIONNAIRE

Below is the questionnaire carried out for the technical evaluation of this project and its products:

### Technical questionnaire of Interactive RockChain Tool.

TRANSVERSAL TECHNOLOGICAL SKILLS FOR THE ORNAMENTAL ROCK INDUSTRY  
FOCUSING ON THE  
APPLICABILITY OF BLOCKCHAIN IN A CIRCULAR ECONOMY  
REFERENCE: 2023-1-DE02-KA220-ADU-000166863



1. Overall, how satisfied were you with the RockChain Interactive Tool?

	1	2	3	4	5	
Not satisfied at all	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very satisfied

2. General questions. To what extent do you agree with the following statements?

	Fully disagree	Rather disagree	Neither agree nor disagree	Rather agree	Fully agree
The Tool are related to the theme of the project.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tool allow the user to learn about the blockchain applied to rock waste management.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The contents of the Tool are interesting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tool provide a better understanding of the benefits of the RockChain project.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tool is easy to understand and well structured.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3. In terms of technical contents to what extent do you agree with the following statements?

	Fully disagree	Rather disagree	Neither agree nor disagree	Rather agree	Fully agree
The Tool adequately cover all phases of the blockchain in the rock waste management..	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Specific examples of applications are included.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The technical contents are clear.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The content provides references to real studies.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. Thinking about its use in the work or educational setting, to what extent do you agree with the following sentences?

Fully disagree    Rather disagree    Neither agree nor disagree    Rather agree    Fully agree

Tool use clear and easy to understand examples to explain technical concepts.

Images or diagrams are used to aid in the visual understanding of Blockchain.

5. In terms of applicability:

	Fully disagree	Rather disagree	Neither agree nor disagree	Rather agree	Fully agree
The Tool include use cases or specific rock waste management.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is quantitative data on the improvement of the use of blockchain.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Case studies demonstrating tangible results of the technologies discussed are mentioned.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



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## 2.2. RESULTS OF THE QUESTIONNAIRE

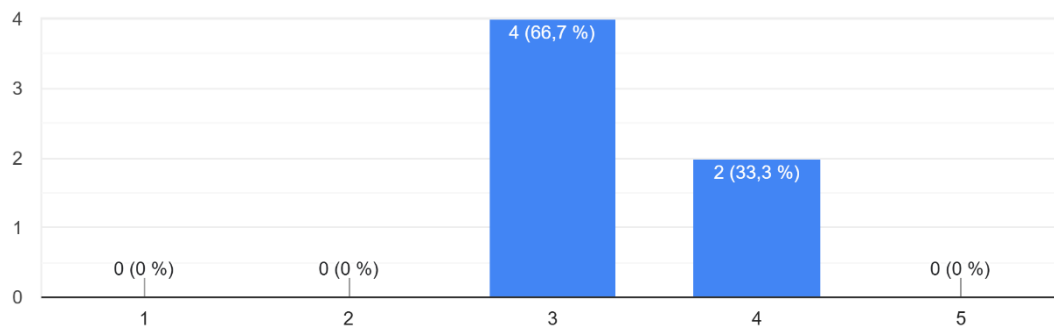
A total of six technical experts completed the questionnaire.

### Q1 – Overall satisfaction (scale 1–5):

The mean score was 3.3/5, with the following distribution: four ratings of 3 and two ratings of 4. This result reflects a prototype perceived as promising but still requiring refinement in flow, clarity and robustness.

1. Overall, how satisfied were you with the RockChain Interactive Tool?

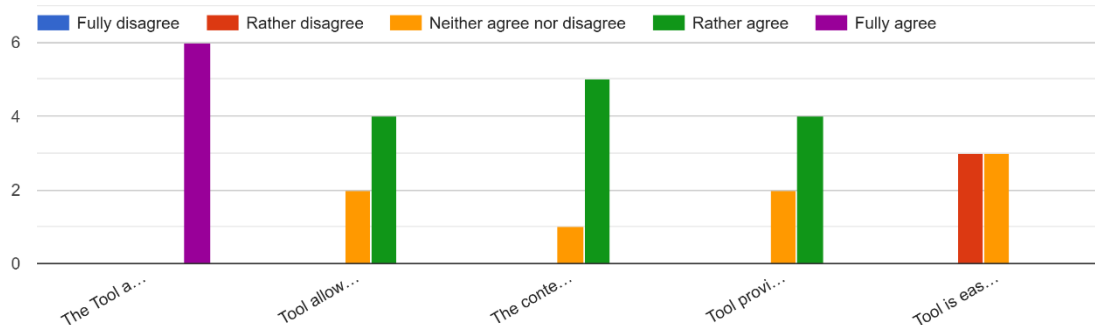
6 respuestas



### Q2 – General perception (content and relevance):

All respondents fully agreed that the tool is clearly aligned with the project theme. In terms of supporting learning about blockchain applied to rock waste management, responses were positive but cautious: most experts rather agreed (4/6), while a smaller group remained neutral (2/6). A similar pattern appeared for “better understanding of the benefits”: 4/6 rather agreed and 2/6 were neutral. Interest in the content was high (5/6 rather agreed, 1/6 neutral). However, ease of understanding and structure was identified as a clear early-prototype weakness, splitting between neutral (3/6) and rather disagree (3/6), indicating the need for clearer guidance and more explicit phase transitions.

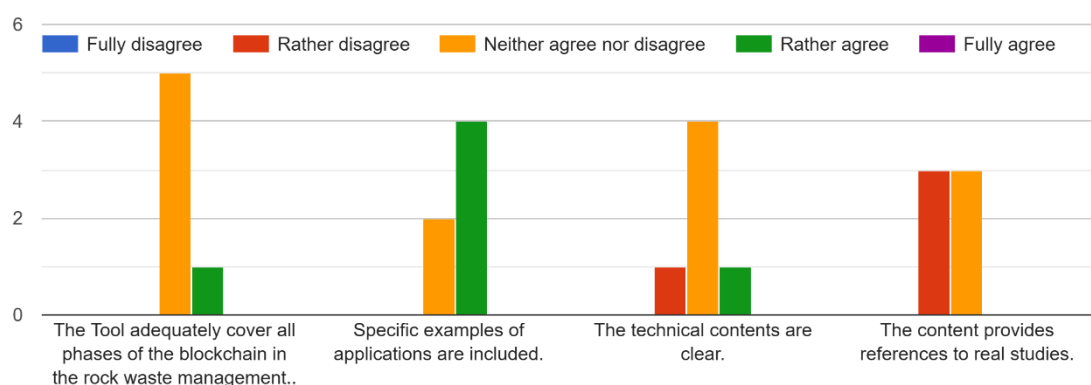
2. General questions. To what extent do you agree with the following statements?



### Q3 – Technical contents (clarity and grounding):

Experts perceived that the prototype includes sector-relevant examples (4/6 rather agreed), but coverage of the full blockchain-enabled waste-management cycle was mostly rated neutral (5/6). Clarity of the technical contents was also largely neutral (4/6), with a minority either rather agreeing (1/6) or rather disagreeing (1/6). Importantly, references to real studies or external evidence were seen as insufficient (3/6 rather disagree, 3/6 neutral), suggesting that the prototype would benefit from lightweight credibility anchors (e.g., short case snapshots or references) without overloading learners.

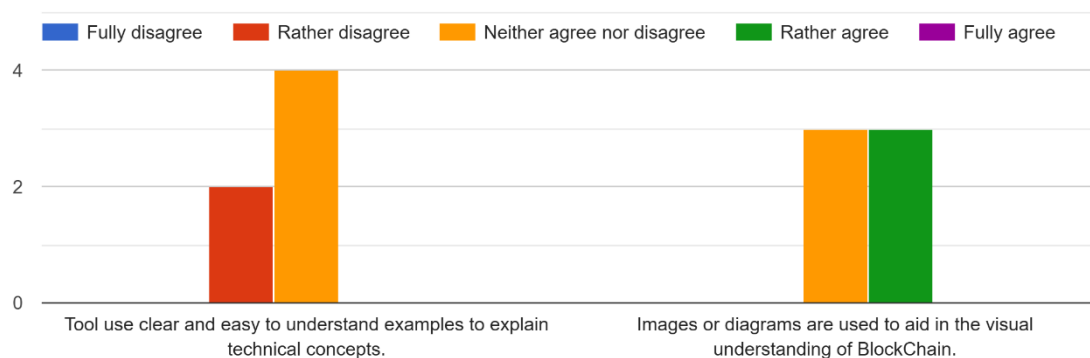
3. In terms of technical contents to what extent do you agree with the following statements?



#### Q4 – Visual support for technical concepts:

The use of examples to explain technical concepts was rated as neutral by most experts (4/6), with 2/6 rather disagreeing. The use of images or diagrams to support visual understanding of blockchain was more positive (3/6 rather agree, 3/6 neutral). Overall, the feedback indicates that visuals are helpful, but the “blockchain” mechanism should be made more explicit to reduce ambiguity for first-time learners.

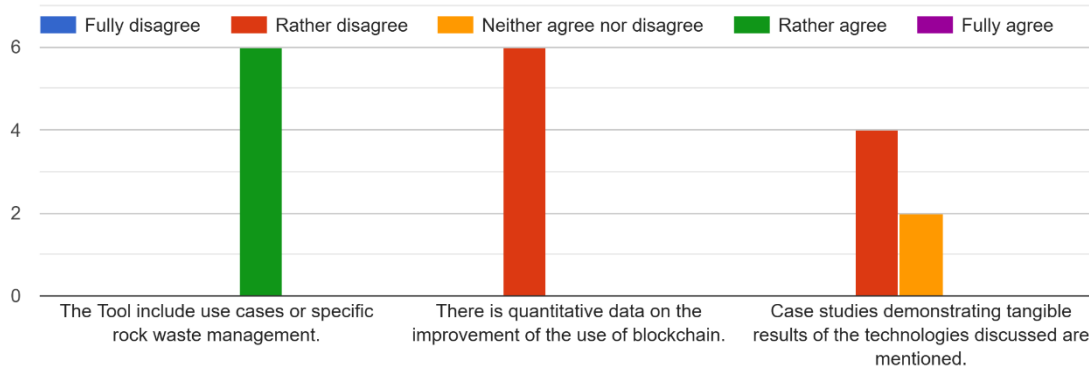
4. Thinking about its use in the wing or educational setting, to what extent do you agree with the following sentences?



#### Q5 – Applicability to the ornamental rock sector and evidence:

All experts rather agreed that the tool provides use cases that are specific to rock waste management (6/6). At the same time, the questionnaire revealed a clear lack of quantitative evidence within the prototype: all respondents rather disagreed that the tool presents quantitative data demonstrating improvements enabled by blockchain (6/6). Similarly, references to case studies with tangible results were considered limited or absent (4/6 rather disagree, 2/6 neutral).

5. In terms of applicability:



#### Q6 – Qualitative comments (main improvement proposals):

Open comments converged on a consistent set of improvement priorities for an early prototype:

- clearer feedback during waiting states and phase transitions to avoid the perception of “being stuck”
- more robust reconnection and re-synchronisation behaviour under unstable networks
- a short optional onboarding and/or glossary to reduce jargon barriers
- lightweight traceability-style messages (event log) to make the blockchain metaphor tangible
- basic technical logging/observability to support pilots and troubleshooting. Several experts also suggested adding minimal transparency notes (what is simulated vs. real, what data is stored) to strengthen trust in a training context.



6. Do you have any further comments and recommendations on the Tool? What could have been done better?

Please, tell us what kind of improvement you can suggest:

6 respuestas

In tests with poor network connectivity/alternating foreground-background, inconsistent states appear (timer/round and misaligned screens between players). There is a lack of explicit handling of timeouts/retries and understandable error messages. I would suggest minimal instrumentation (phase transition logs, write failures) for debugging and stabilisation.

For a first version, the foundation is good, but there is cognitive load: too many new terms without support. I would make onboarding optional and/or add a quick glossary, more micro-feedback when performing actions, and pace options ("slow timer") for groups with mixed digital skills. I would also review contrast/touch sizes.

The concept of "blockchain" is perceived more as a metaphor than as a visible mechanism. I recommend a simple "traceability log" per round (events: purchase/transformation/recycling + result) so that students can see the chain of events and the logic of traceability. Adding 2-3 mini-cards with real examples/quotes would lend credibility.

It's fine for a prototype, but I would like to see some basic transparency: what data is stored, for what purpose, and for how long (even if it is in pilot mode). Technically, I would reinforce the principle of least privilege in sensitive operations (status/round changes) and avoid critical logic only on the client side.

The prototype is already engaging, but the flow is broken during transitions: I was once left waiting, unsure whether it was loading or frozen. A short onboarding session is needed to explain phases/indicators and micro feedback ("what does this action mean in terms of circularity/traceability"). The robustness of reconnection and a synchronisation status indicator would also be improved.

It is clear that this is a prototype: operational metrics and observability are lacking to understand failures (connections, reconnections, round transitions). I would add basic telemetry and a simple dashboard (or logs) to view errors per session. I would also optimise reads/writes per round to avoid latency in large groups.

### 3. CONCLUSIONS

The technical assessment confirmed that the *Interactive RockChain Tool* is built on a solid conceptual and functional foundation. However, it also showed that the early prototype needed further refinement before being fully ready for classroom use. Results reflected strong alignment with key topics and high perceived relevance to the sector, while also revealing some common early-stage issues around clarity, system robustness, and evidence integration.

Experts especially appreciated:

- the relevance of the use cases to rock waste management
- the serious-game format's potential to support structured group sessions
- the opportunity to introduce traceability concepts through an interactive, hands-on experience.

The main weaknesses identified were related to user guidance—particularly during phase transitions and in dealing with technical jargon—the limited visibility of the blockchain mechanism, and the lack of embedded quantitative data or real-world case examples in the prototype.

Based on the qualitative feedback (Q6), the consortium prioritized the following IT improvements in the updated version developed for pilot testing:

- Clearer transitions between phases and better feedback during waiting states, including visible status messages, loading indicators, and improved error handling, to reduce confusion during gameplay.
- Enhanced round synchronization and reconnection handling (e.g., timeouts, retries, re-syncing on rejoin) to improve stability, especially in classroom environments with fluctuating network quality.
- Optional guided onboarding for new users, supported by simplified terminology and quick-access definitions for key concepts via a glossary-style help feature.
- Lightweight “traceability log” notifications that help illustrate the blockchain metaphor in a user-friendly way without overloading cognitive resources.
- Adjustable pacing options (e.g., standard vs. slow timers) to better support diverse digital skill levels and sessions led by facilitators.
- Basic technical logging to assist with pilot support (e.g., tracking key events and errors), along with a brief transparency note explaining what data is stored and what parts of the simulation are fictional.



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The team also identified several valuable additions for future updates, including real-world references and case examples embedded within the tool, more detailed session exports for trainers, and expanded accessibility features. These ideas will be revisited after the pilot phase, depending on user feedback and technical feasibility.