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Development of the Blockchain Technology Literacy Test (BTLT): A Scoping Review of Current Literature: Open Review

Lukas Weidener,* Bence Lukács †

Reviewers: Reviewer A, Reviewer B

Abstract. The final version of the paper "Development of the Blockchain Technology Literacy Test (BTLT): A Scoping Review of Current Literature" can be found in Ledger Vol. 10 (2025) 18-46, DOI 10.5195/LEDGER.2025.401. There were two reviewers involved in the review process, neither of whom has requested to waive their anonymity at present, and are thus listed as Reviewers A and B. After initial review by Reviewers A and B, the submission was returned to the authors with feedback for revision (1A). The author resubmitted their work and responded to reviewer comments (1B). Reviewers A and B provided feedback (2A) but with a disagreement on whether to move forward, the editor facilitated discussion between the two reviewers, leading to additional feedback from Reviewer B. The authors resubmitted a version of the manuscript accounting for the reviewers' comments, which was then reviewed by Reviewers A and B a final time (3A). The authors responded (3B) and the paper was subsequently accepted for publication, thus ending the peer review process. Author responses have been bulleted for reader clarity.

1A. First Round of Review

Reviewer A

Does this paper represent a novel contribution to cryptocurrency or blockchain scholarship?

Yes, incremental contribution(s)

Please briefly explain why you think the paper makes or does not make a novel contribution.

Makes the case for a literacy framework and test in an area where one does not exist

Is the research framed within its scholarly context and does the paper cite appropriate prior works?

* L. Weidener (lukas@weidener.eu) is a researcher at Molecule, Berlin, Germany.
† B. Lukács (bence.lukacs@iabc.dbuas.de) is a researcher at the Institute for Applied Blockchain, Berlin, Germany.

Yes, but important references are missing.

Please assess the article's level of academic rigor.

Unsatisfactory (better than poor but a long way from excellent)

Please assess the article's quality of presentation.

Excellent (the motivation for the work is clear, the prose is fluid and correct grammar is used, the main ideas are communicated concisely, and highly-technical details are relegated to appendixes).

How does the quality of this paper compare to other papers in this field?

The paper has some value but it can easily be replaced by better scholarship in the field.

Please provide your free-form review for the author in this section.

The article advocates for the creation of a blockchain literacy test based on a blockchain literacy framework. For that purpose, it surveys existing literature and proceeds to identify relevant questions.

I must agree with the authors that the question of literacy around blockchain is under-explored compared to the vastly more developed literature around financial literacy. But whereas the authors see that as a gap, one can question whether there is actually need for a blockchain literacy test. Literacy tests are usually reserved for areas where non-experts are active and lack of knowledge may result in undesirable effects. Blockchain is a technology, not an activity that people engage in and so it is uncertain what purpose testing them on their knowledge on a certain technology serves. If we were talking about blockchain finance literacy, then the rationale is indeed that we want to know whether people understand how the sector of blockchain financial activities work because they invest their money in it, but simply testing people on a technology seems to me that serves little purpose. Relatedly, one would expect that the required knowledge and therefore the relevant testing around it, would change depending on the specific blockchain activity or application, and therefore a general literacy test around the technology of blockchain might not really tell us anything useful. It would be useful for the authors explain in what real life situations a blockchain literacy test could be useful. For example financial literacy tests have been mandated by law to make sure that people make informed financial decisions when borrowing large amounts of money (eg mortgages).

Moreover I think that the methodology needs more detail especially in terms of how the relevant literature was selected (what were the keywords – all of them not just examples – and why), and how the authors settled on the relevant questions. For the selection of questions seems arbitrary, even though it is easy to see how all of them are relevant to blockchain. But why exactly these formulations and these focus areas were selected remains unclear.

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Reviewer B

Does this paper represent a novel contribution to cryptocurrency or blockchain scholarship?

Yes, incremental contribution(s)

Please briefly explain why you think the paper makes or does not make a novel contribution.

I think that the paper's proposal of a blockchain technology literacy test is novel in establishing a building block for future development of building curriculum, training, and assessments for the areas of cryptocurrency and blockchain

Is the research framed within its scholarly context and does the paper cite appropriate prior works?

Yes

Please assess the article's level of academic rigor.

Good (not excellent but a long way from poor)

Please assess the article's quality of presentation.

Excellent (the motivation for the work is clear, the prose is fluid and correct grammar is used, the main ideas are communicated concisely, and highly-technical details are relegated to appendixes).

How does the quality of this paper compare to other papers in this field?

This is a good or average paper.

Please provide your free-form review for the author in this section.

This paper provides an overview of a Blockchain Technology Literacy Test as well as a Cryptocurrency Literacy Test and provides a literature review of existing work around this area. The proposed paper provides a good overview of current English-language literature in the field and the need for literacy tests in this area to support assessment efforts in these areas, as well as acknowledging its limitations and areas where future research can be done. Other areas of future research may also be assessing the circumstances and a proposed framework in which the content of something like the the BTLT and CLT may be updated and revised to reflect ongoing developments. There are also some areas of the paper that may benefit from further clarity, which I have outlined below. I believe this paper may serve as a basic foundation for future considerations of assessments from from

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education and employment providers who may be looking to build curriculum to cover the basics of cryptocurrency and blockchain.

Additional notes:
- This sentence on page 2 would benefit from being rephrased with greater clarity "It is, and subsequently will be important for organizations"
- Check citation on page 16 for cryptoliteracy.org/quiz indicates no author and no publisher - according to the quiz website, "CryptoLiteracy.org is an industry initiative promoting broad consumer education of digital currency. Led by Coinme, CoinDesk and MoneyGram, the website is the home of the official Crypto Literacy Quiz"

1B. Author Response to First Round of Review

Reviewer A

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- Thank you for your comment, which touches on broader debates on literacy and its relevance to the context of emerging technologies. Given the interdisciplinary nature of literacy, particularly technological literacy, there are multiple ways to address your question regarding the need for a Blockchain Technology Literacy Test (BTLT). The immediate and practical need for the BTLT is exemplified by initiatives such as the CHAISE initiative, which is highlighted in the manuscript. This initiative identified a clear demand for DLT-related education and workforce development, which necessitates robust testing mechanisms to evaluate and guide these efforts. Similarly, organizations such as UNICEF (Blockchain Learning Hub; https://www.unicef.org/innovation/blockchain-learning-hub) and UNESCO (Education and Blockchain; https://unesdoc.unesco.org/ark:/48223/pf0000384003) have identified blockchain education as a key area for capacity building. However, these initiatives often lack a tailored reference framework, such as the European Commission's DigiComp framework (https://joint-research-centre.ec.europa.eu/scientific-activities-z/education- and-training/digital-transformation-education/digital-competence-framework-citizens- digcomp_en), to structure and assess educational efforts effectively. The BTLT aims to fill this gap by providing a standardized tool for measuring blockchain-specific literacy.
- Beyond blockchain, the concept of literacy has evolved significantly over time. Historically limited to reading and writing, it has expanded to include competencies related to technological developments such as Internet use and digital devices. This evolution has given rise to frameworks for Digital Literacy (https://data.europa.eu/en/publications/datastories/digital- literacy-eu-overview) and more recently, Artificial Intelligence Literacy (https://artificialintelligenceact.eu/article/4/), as outlined in the European Union's Digital Competence Framework and the Artificial Intelligence Act.
- We argue that the need for frameworks and tests such as the BTLT arises naturally from the development and integration of new technologies. As blockchain increasingly permeates areas such as finance, governance, and supply chain management, its users, including non-experts, face the risk of undesirable outcomes stemming from misunderstanding or misuse. Therefore, despite blockchain being a technology rather

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than an activity, we believe that the BTLT addresses an existing and growing need by equipping individuals with the knowledge required to navigate this transformative field effectively.

If we were talking about blockchain finance literacy, then the rationale is indeed that we want to know whether people understand how the sector of blockchain financial activities work because they invest their money in it, but simply testing people on a technology seems to me that serves little purpose. Relatedly, one would expect that the required knowledge and therefore the relevant testing around it, would change depending on the specific blockchain activity or application, and therefore a general literacy test around the technology of blockchain might not really tell us anything useful.

- Thank you for your comment, which raises an important consideration regarding the scope and utility of blockchain literacy tests. As outlined in the longer response above, the BTLT is designed as a foundational assessment that addresses the general knowledge of blockchain technology. We fully agree that specific applications, such as DAOs, decentralized finance (DeFi), or NFTs, require more targeted literacy frameworks to address the unique competencies and knowledge relevant to those domains.
- However, blockchain literacy remains a highly relevant baseline for interacting with such advanced settings. In this regard, the BTLT could serve as the first component of a broader assessment framework, such as a DAO Literacy Test or a DeFi Literacy Test, which builds on the foundational knowledge assessed by the BTLT. By establishing this foundational understanding, the BTLT contributes to a layered approach to literacy assessment, enabling the development of more specialized tools.

It would be useful for the authors explain in what real life situations a blockchain literacy test could be useful. For example financial literacy tests have been mandated by law to make sure that people make informed financial decisions when borrowing large amounts of money (eg mortgages).

- Thank you for your comment. As addressed previously, real-life applications of the BTLT include its integration into educational and training efforts, such as those exemplified by initiatives like CHAISE. These initiatives highlight the growing demand for standardized blockchain literacy to equip individuals with the foundational knowledge required to participate effectively in professional and technological ecosystems involving blockchain.
- In particular, the BTLT can be used to support workforce development programs, assess readiness for specialized roles in the blockchain industry, and serve as a benchmark for tailoring educational curricula. Additionally, as blockchain technologies become more integrated into everyday activities, such as managing digital identities, participating in DAOs, or interacting with decentralized finance platforms, the BTLT can help individuals understand the basic principles required to make informed decisions and navigate these technologies responsibly.
- To clarify the need for the BTLT and emphasize the importance of blockchain technology literacy, the following text has been added to the manuscript:

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- *The foundational understanding of literacy in this study underscores the urgent need for adequate blockchain technology literacy testing frameworks, as exemplified by the CHAISE initiative by the European Union. Although the educational significance of blockchain technology has been widely recognized, there remains a lack of robust assessment tools to support workforce development programs, evaluate readiness for specialized roles in the blockchain industry, and serve as benchmarks for designing targeted educational curricula. Furthermore, as blockchain technologies become increasingly integrated into everyday activities such as managing digital identities, participating in DAOs, or interacting with decentralized finance platforms, reliable assessment methods for blockchain technology literacy are essential to equip individuals with the foundational knowledge required to make informed decisions and effectively navigate these technological advancements.*

Moreover I think that the methodology needs more detail especially in terms of how the relevant literature was selected (what were the keywords – all of them not just examples – and why), and how the authors settled on the relevant questions. For the selection of questions seems arbitrary, even though it is easy to see how all of them are relevant to blockchain. But why exactly these formulations and these focus areas were selected remains unclear.

- Thank you for your comment. We recognize that additional detail in the methodology section enhances transparency and replicability. Following your suggestion, we have reworked the methodology to address these aspects:
- *The following keywords were used in combination with Boolean operators (AND, OR) to narrow down the search results: Blockchain technology, Distributed Ledger Technology (DLT), Blockchain literacy, Cryptocurrency literacy, Blockchain education, Decentralization, Smart contracts, Consensus mechanisms, Public ledger, Cryptocurrency, Bitcoin, Ethereum, Tokens, NFTs, Decentralized Finance (DeFi), Web3, Literacy assessment, Education frameworks, Skills development, DLT, Distributed ledger technology, Blockchain technology, Cryptocurrency, Token, DeFi, Web3, NFT, DAO, Literacy, Skills, Terminology, and Understanding. The keywords were derived from the research objectives and further refined through a preliminary literature search to ensure a comprehensive coverage of the relevant literature. Synonyms, abbreviations, and variations were incorporated to account for the different terminologies used across disciplines and regions, thereby enhancing the inclusivity and accuracy of the search. The keywords were also iteratively refined based on the results of the preliminary searches to ensure their relevance and inclusivity.*
- Furthermore, a new section detailing how the questions were defined has been added to the manuscript:
- ***Test Development Process*** *- The questions were selected based on the objectives of this study to develop a comprehensive literacy assessment that addresses the foundational, technical, and application-based aspects of blockchain technology. Questions that were newly developed or adapted (i.e., not directly adopted without changes from identified and relevant publications) were drafted by the research team. The authors have advanced academic qualifications, including graduate education in blockchain technology and education, as well as significant practical experience in*

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research and professional roles focused on blockchain education and technology. Their expertise includes active contributions to research on educational methodologies in technology-related fields, full-time positions in the blockchain industry, and education. The developed set of questions was reviewed by two blockchain experts (a senior blockchain engineer and a head of the product), each with over five years of experience in blockchain system design and implementation. Their feedback refined the questions to ensure practical relevance, alignment with technological advancements, and an effective assessment of both foundational knowledge and advanced competencies. The question development process also involved iterative refinement to enhance clarity, relevance, and alignment with the study objectives, resulting in a comprehensive and accessible final set.

Reviewer B

Does this paper represent a novel contribution to cryptocurrency or blockchain scholarship?

Yes, incremental contribution(s)

Please briefly explain why you think the paper makes or does not make a novel contribution.

I think that the paper's proposal of a blockchain technology literacy test is novel in establishing a building block for future development of building curriculum, training, and assessments for the areas of cryptocurrency and blockchain

Is the research framed within its scholarly context and does the paper cite appropriate prior works?

Yes

Please assess the article's level of academic rigor.

Good (not excellent but a long way from poor)

Please assess the article's quality of presentation.

Excellent (the motivation for the work is clear, the prose is fluid and correct grammar is used, the main ideas are communicated concisely, and highly-technical details are relegated to appendixes).

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- Thank you for this valuable feedback, which is well-received. The suggested areas for future research have been incorporated into the manuscript as follows (p.13):
- *In addition to exploring specific areas such as DeFi, Web3, or DAO Literacy, future research should also consider establishing a framework for the periodic review and revision of literacy tests such as the BTLT and CLT. This ensures that the content remains aligned with the ongoing technological advancements and emerging applications. Such a framework could outline the criteria and processes for identifying new concepts, refining outdated questions, and incorporating stakeholder feedback to maintain the relevance and efficacy of these assessments.*

There are also some areas of the paper that may benefit from further clarity, which I have outlined below. I believe this paper may serve as a basic foundation for future considerations of assessments from from education and employment providers who may be looking to build curriculum to cover the basics of cryptocurrency and blockchain.

Additional notes:
- This sentence on page 2 would benefit from being rephrased with greater clarity "It is, and subsequently will be important for organizations"
- Check citation on page 16 for cryptoliteracy.org/quiz indicates no author and no publisher - according to the quiz website, "CryptoLiteracy.org is an industry initiative promoting broad consumer education of digital currency. Led by Coinme, CoinDesk and MoneyGram, the website is the home of the official Crypto Literacy Quiz"

- Thank you for your valuable suggestion. We have revised the manuscript accordingly, and the updated sentence is provided below for reference:
- *Blockchain education is essential for providing individuals and organizations with the skills to understand, design, and implement decentralized technologies. As blockchain expands beyond finance into areas such as supply chain tracking in manufacturing and retail, secure handling of health records in healthcare, and transparent decision making in public governance, a knowledgeable workforce is indispensable. Blockchain literacy is expected to drive innovation and enable solutions to challenges, such as improving supply chain traceability, enhancing healthcare data security, and increasing trust and efficiency in governance.*
- Furthermore, the suggested reference has been updated accordingly.

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2A. Second Round of Review

Reviewer A

Did you review an earlier version of this submission? (If "no," please contact the editor.)

Yes

Has the submission been sufficiently revised to address your previous concerns?

No

If you answered "no" to the previous question, please provide more detailed feedback here.

I want to thank the authors for revising the paper. However, few details have been added to improve the case for a blockchain literacy test. The authors state that blockchain education is important, and I do not doubt that, but this is different from advocating for a blockchain literacy test. There are numerous areas of human activity where education is important, but we do not have relevant literacy tests. What makes blockchain different? Also, a point that was left unanswered is that other literacy tests are around an area of activity, not a specific technology, like the blockchain literacy test. I am still not sure what the purpose of testing people on a technology will achieve when these people will go on to use blockchain in vastly different ways. Lastly, questions around the envisaged audience of the test, purpose/application of the test (other than just generally test for knowledge), evolution of the test to keep up with developments etc. still remain unanswered. I think if this paper is to make a strong case for a blockchain literacy test it needs to demonstrate a specific use, what results it would achieve, and what risk is threatened if the test is not in place. Prior research on financial literacy tests may help here.

Do you have any new concerns specific to this revision?

No

Reviewer B

Did you review an earlier version of this submission? (If "no," please contact the editor.)

Yes

Has the submission been sufficiently revised to address your previous concerns?

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Yes

Do you have any new concerns specific to this revision?

No

If you answered "yes" to the previous question, please provide more detailed feedback here.

2B. Further Feedback

Additional from Reviewer B after discussion with Reviewer A: "Though there is mention of supporting workforce development programs and a reference to CHAISE initiative, **the paper would benefit from drawing some additional illustrative examples around where it may be useful**. Specifically, in addition to supplementing workforce development programs, the existence of a BTLT may serve as a foundation for future labour force skills evaluation, labour force planning, as well as standards development. As well, **explicit mention of the existence of the BTLT as a starting point for future work in the sector** with regards to building out training and development for the workforce would be helpful. There is much research that is already out there around digital literacies and workforce development and tying into this may be good. For example, if a policymaker is looking to bolster knowledge broadly, something like a BTLT used among educational institutions or workforce evaluation could serve as a way to measure the growth of basic knowledge in that area. There may also be applicability to future development of standards around blockchain training and knowledge, as well as maturity models for organizations. The above are a handful of examples, but generally, **tying the BTLT into the bigger picture will be helpful to make the connection as to its broader relevance.**"

3A. Final Round of Review

Reviewer A

I still think Reviewer B's opinion should weigh more than mine here, but in any case, my last two cents:

I am still a little unconvinced about the value of a literacy test; most of the new content they added talks about blockchain education, which I don’t disagree with, but I see literacy tests as something different and they didn’t add much on that. I don’t think I should be doing their research for them but I suppose the closest example of a real application of a blockchain literacy test can be found here: https://www.esma.europa.eu/sites/default/files/2025-02/ESMA35-1872330276-

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2004_MiCA_-_Consultation_Paper_-_Guidelines_on_knowledge_and_competence.pdf. If you decide to publish it, perhaps you can ask them to draw on this consultation paper to bolster their argument.

Other than that, they take comments well and they seem keen to stand behind their paper. I appreciate that.

Reviewer B

To me, it seems that the authors have addressed the comments that were raised in the earlier rounds. I think that a blockchain literacy test, though not a perfect mechanism, is one that can be used in a future that will hopefully have additional (and better) tools, and I see this as a potential starting point for a growth of a future ecosystem of assessments and evaluations. I agree with Reviewer A in that the consultation paper may be additionally helpful to reference if/when it goes to publication. I would be in favour of moving ahead with it.

3B. Author Response to Final Round of Review

- In response to the reviewer's comments, we have revised the discussion section and added a new paragraph (highlighted in red in the PDF) to address the inclusion of the mentioned article. For your convenience, I have also included the revised paragraph below.
- ***Rationale and Implications of the BTLT*** *— Recent developments have underscored the potential rationale and implications of blockchain literacy frameworks. Although formal literacy tests often focus on activities where the general public faces immediate risk (e.g., financial borrowing or consumer investments), a rapid expansion of blockchain technology and subsequent educational needs is expected (6–8). Nonetheless, literacy tests are often criticized, especially if applied to fast-evolving technologies such as blockchain technology, because emerging blockchain technology applications can differ significantly in scope and complexity (7, 8). Different blockchain use cases, whether DeFi or supply chain verification, may demand unique forms of competence that a single test format cannot fully capture.*
- *However, emerging regulatory guidelines have begun signaling the need for demonstrable competence in blockchain and crypto-asset knowledge, particularly in professional settings. For instance, the European Securities and Markets Authority (ESMA) has issued a public consultation on knowledge and competence guidelines under the Markets in Crypto-Assets (MiCA) Regulation (36). These guidelines seek to ensure that personnel providing advice or information about crypto-asset services meet minimum standards related to DLT fundamentals and risk factors (36). Although these proposals target professional advisors, they emphasize the requirement for formal blockchain technology-related competencies, which necessitate literacy assessments. Such regulatory contexts*

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broaden the scope of the BTLT, reinforcing the need for a comprehensive blockchain technology literacy assessment instrument that spans curriculum design, industry training, and regulatory compliance.

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