

Reviews for 2026-pottinger-plastics-round1

Review #1

Completed: 17-12-2025 12:23

Recommendation: Revisions Required

Conflict Declaration

I declare that I have no known conflicts of interest with the authors.

Review

This paper presents intriguing metaphors and creative adaptations of aspects, such as tutorials and gameplay loops, that are implemented in much more conventional ways in digital games. I find these ideas very valuable and potentially generative of further tools and principles for science engagement in principle. The study is complemented by implemented principles related to, e.g., privacy and facilitation in situated contexts. This clearly advances our knowledge of information visualization and the design claims are in general substantiated, even though the article does not provide strong empirical evidence that its design propositions are in fact resulting in the intended experience. I see this as a limitation of the paper and a future avenue (which is partially already there), but not as a requirement for publication.

My expertise is on game design and science engagement, so I will comment primarily on that side of the paper.

Openness

Everything seems to be publicly available and referenced.

Classification

Systems or design research

Recommendation

Minor Revisions

Revisions Requested

I see a clear connection between the first challenge, user agency, and the proposed solution: tutorialized open worlds support user agency quite clearly. I see also a connection between the system being approachable and your design for multi-variate evaluation. I would say the same of your levels of reading explanation. However, I find the final challenge-solution presented, speed, more difficult to connect: the challenge seems to refer to policy support tools being able to provide answers to questions immediately, but the solution speaks of technical aspects of the code. But how does this affect the final user's speed of use/acquisition of an answer to their question? In particular, the sentence "Shorter development cycles, making it easier to rapidly implement new policies to keep pace with policy negotiation" makes me think that your argument revolves around development being sped up and therefore answers staying current. Is this what is meant here? Do you think it is clear enough? If so, the metaphor does not work so well here because it is too far removed from the experience of playing games: it is not enough to say "A tool frequently used by games, this software turns to a domain specific language (DSL) to accelerate defining policy logic [66, 82]." In my understanding, DSL is not intrinsic to games nor does it have a direct impact on the player experience. I would like for you to (1) clarify the meaning of your argument, and (2) really consider whether this is related to game design at all, or if this is just a matter of general coding practices. Perhaps there is something related to how highly malleable and frequently updated games (e.g., multiplayer online games) deal with issues of speed and balancing that can be mentioned.

Later, in 3.2.2, the paper says "Similar to how the game design communities find benefits both from DSLs and a "hot reload" to change programming in-situ [25, 82, 85], this live development capability served not just during demonstrations but development of the tool as well." This is another clue for me: I would focus a bit more on how this is a benefit for the user/player experience, not only for designers. At the end of the day, we are talking about challenges encountered by audiences (are we?), not necessarily communicators. I see this as important but possibly easy to solve.

I found most of the discussion section to be essentially a retelling of some of the main characteristics of the system, but the comments did not seem to add much context or problematization in addition to what had already been presented. What is, then, the role of sections 4.1 and 4.2? If they are supposed to add new information, I would focus on providing alternative pathways and discuss limitations that still may exist. If there was no further intent, then I think the paper can do without them: the fundamental aspect I would require for this type of paper, which is future developments (and, implicitly, limitations), is already there.

One example of a missing limitation that may be considered: Bret Victor, one of the core references of this paper, says in their 2011 article on Explorable Explanations: "Most interactive widgets dump the user in a sandbox and say 'figure it out for yourself'. Those are not explanations. To me, an essential aspect of the "explorable explanation" concept is that the author holds up their end of the conversation. The author must guide the reader, and provide a structure for the learning experience. Only then can the reader respond, by ask-

ing and answering the questions that the author provokes. ... What I meant by “explorable explanation” was more like, “a written argument whose assertions are backed by explorable computational models, whose facts, assumptions, and calculations are all visible and editable”. The author’s role here is not just to teach, but to convince. The reader’s role is not to believe, but to critically evaluate, rebut, and come to a broad understanding. The reader rebuts by modifying the models.” It seems to me that this points out to a possible tension between your principle of being non-directing in policy (to avoid a ludonarrative dissonance of sorts) and “holding one’s end of the conversation” as an author. Maybe you consider that your invisible tutorial and other aspects of the system are an attempt to solve or mitigate this tension. Or maybe you consider that explorable explanations provide inspiration but that, in the end, the tool is not an explanation, so all of the above is essentially moot (I guess your interactive introduction <https://plasticstreaty.berkeley.edu/> is closer to a derived explorable explanation!). In any case, I’d love to see a mature discussion about it in this section.

Regarding section 4.3.2: Facilitation can provide much more to the user experience than mediation. In my view, a possible future avenue includes embedding this digital system into wider playful experiences such as the Climate Action Simulation, which incorporates En-ROADS into a role-play: <https://www.nature.com/articles/s43247-025-02744-w>. If you find this to be true, please include it as well.

4.3.4: The paper mentions the desire to avoid collecting individual information as a reason not to pursue human subjects research involving policymakers, but I do not see this as an imperative: is it not possible to collect anonymized data that still answers questions about how the principles adopted, and the tool itself, supports user needs, or originates more complex engagement? I may be missing something here, but for me one does not preclude the other: the kinds of questions that could be answered may not even involve details about what policies the participants explore, but focus on general use and process aspects. If you find this to be true, please amend this section.

The link of reference 56 seems to be broken, though the article can be found via Medium <https://medium.com/data-science/when-accuracy-isnt-enough-visualization-and-game-design-48b95425130a>

Reviewer Name

anonymous

ORCID

N/A

Review #2

Completed: 06-04-2026 08:26

Recommendation: Accept Submission

Conflict Declaration

I declare that I have no known conflicts of interest with the authors.

Review

This paper provides new insights into game design for science communication and the use of science in the context of public policy. It clearly explores the question of how to design an engaging and ludic narrative based on scientific data. The various approaches tested and the design patterns presented offer valuable insights for the scientific community seeking to develop this type of interactive platform for their audiences. Taking into account the educational and progressive nature of both data discovery and exploration when developing this type of platform is highly beneficial, whether for research in design, human-computer interaction, or science communication. This article could benefit from more screenshots of the final tool or the various stages of development to illustrate how these design patterns are implemented, as well as some user feedback, if any is already available. However, these would be bonus features, and their absence does not prevent readers from understanding the article and the contributions of this research project.

Openness

This article provides a detailed overview of the design choices and thus serves as a practical guide that can be easily adapted for use in other research projects. For researchers in other disciplines who face the same challenge of making their data accessible to inform policy decisions, this set of design models related to the concept of “ludonarratives” can serve as a working framework and a ready-to-use checklist. For as I know, the software, hardware and licences used are described and explained /justified. The source code and libraries are available on GitHub.

Classification

Systems or design research

Recommendation

Accept

Revisions Requested

No revisions

Reviewer Name

anonymous

ORCID

N/A

Review #3

Completed: 29-06-2026 16:47

Recommendation: Accept Submission

Conflict Declaration

I declare that I have no known conflicts of interest with the authors.

Review

The paper “Using Game Design to Inform a Plastics Treaty: Fostering Collaboration between Science, Machine Learning, and Policymaking” presents an interactive tool that simulates and visualizes the effects of different global policy implementations regarding plastic pollution and management. The tool is targeted at different expert stakeholders and negotiators that are engaged in the development of global plastics treaties. The paper draws on some ideas from game design literature, describing how these ideas informed the design process of their tool, to allow users to actively engage with and explore the role of different plastics treaty policies.

I think the paper touches upon a timely and important topic, it is generally well-written, and it presents a compelling case for how the interactive tool could help users engage more deeply with the complex problem of plastics treaties and the outcomes of different policy scenarios, potentially informing future policymaking.

Overall, I find the paper to be a solid piece of work, but below I outline a few minor comments or suggestions, which the the authors could potentially reflect on to further improve the work.

While the paper states that the tool aims to “present neutrality” (p. 5), and to engage users in exploring different policy scenarios, I was left wondering what was the rationale for pre-selecting the ‘most positive’ option for (almost) all of the policy check boxes (rather than, say, leaving them blank, or somehow reflecting the current “business as usual” scenario). At least personally, I would notice myself just automatically ticking off each of the boxes, leading to what I considered then to be the ‘optimal’ solution (although I have no idea how pragmatic/realistic). I would suggest that the authors might consider whether there may be some ways in which they could somehow revise this aspect of the tool, to achieve a more neutral starting point for the experience, and to potentially invite users to engage more deeply with alternative options (if this is deemed desirable).

A minor point that is more of a question of curiosity for me: In the tool, I noticed that in many cases, ticking the >90 % reduced additives box actually increases the rate of mismanaged waste (for example, when all of the other default policy boxes are selected). Being a non-expert, I do not understand the reason for this, but I expect that there is probably a logical explanation for this. If this is expected behavior, I think that it could be a useful addition to the tool to add an explanation for why this happens (e.g., in the information bubble of said policy). On a more general level, if there are similar ‘moderation’ / ‘interaction’ effects between the different policies, I think it would be nice for the tool to somehow communicate

these to the user, which could potentially also foster deeper engagement with the tool and the topic, helping them understand the interconnected nature of different policies.

My own expertise is mainly in games research, and as a layperson in terms of plastic treaties, I was left wishing for some more concrete information as to what these changes actually would mean, or how they would impact the world, beyond the abstract numbers and slightly less abstract downward curve of global managed waste. I believe this could help engage users more deeply with the topic, fleshing out why waste should be reduced and why such policies are important, and how they would affect the real world. Still, I acknowledge that this might not be a particularly relevant point for this context, since, as the paper points out, the tool is not intended to the general public but rather to active and typically knowledgeable treaty participants. Also, the paper's arguments as to why no written introductory tutorial was included for the tool was reasonable (p. 5).

I think that the paper generally does a solid job at connecting ideas from game design literature into the design process of the presented tool, and at articulating how this ludic vocabulary was seen to inform the process. Still, in some parts, I feel like the introduction of these game design ideas risks coming off as a bit shoehorned, and I think the paper could generally benefit from including a bit more contextual discussion and elaboration of the included game design ideas. For example, on page 11, regarding AI optimization, I was not quite sure what was meant by “ludonarrative dissonance” in this context.

Openness

I think the design process of the system was described well, and I appreciate how the interactive tool itself was publicly available and linked to the paper.

Classification

Systems or design research

Recommendation

Accept

Revisions Requested

None

Reviewer Name

anonymous

ORCID

N/A

Metareview

Completed: 2026-09-15

Recommendation: Minor Revision

Conflict Declaration

I declare that I have no known conflicts of interest with the authors.

Review

All three reviewers were highly positive about the submission.

They agree that the work is timely (R3), offers insight into both game design and Sci-Com (R2), and is valuable for future design work and science engagement (R1). Overall, the reviewers agree that this work is valuable for scientists, designers, and communicators and should be accepted.

R2 and R3 argue for accepting the paper directly, with R3 suggesting some minor clarifications. R1 recommends some minor revisions.

Revisions Requested

- R3 raises several interesting questions the authors may want to acknowledge in the paper. They wonder what the rationale was behind the pre-selection of options and wonders if the tool could be designed to foster more exploration of the options.
- R1 notes that the challenge-solution speed appears to be somewhat mismatched. The authors should clarify what exactly the challenge is and how the solution solves it.
- R1 points to further research the authors might want to consider mentioning in section 4.3.2
- R1 suggestion a small ammendment to section 4.3.4 regarding the collection of personal data.

I kindly ask the authors to engage with the issues and suggestions raised by R1 and R3. I want to further emphasize that I do not ask the reviewers to implement the changes requested unquestioningly. If the authors feel the reviewers are wrong or that the addition does not fit the scope of the paper, they are free to argue such and forgo implementation.

Given the positive feedback of the reviewers, I recommend Minor Revisions with no further input from the external reviewers. The paper is basically ready to go.

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