Socrates 2Plato™

JULY 2018

An incentivized, blockchain-based, scientific publication platform.

Introducing an incentivized approach for

Social Media
Optimization of
Curated
Reporting on
Academic
Testing,
Experimentation, &
Science
2 provide a
Public
Ledger of
Academic &
Technical
Opinion

Abstract

Socrates2Plato (www.socrates2plato.com) is a blockchain-based distributed database that supports peer-reviewed scientific publication with direct cryptocurrency rewards for all content contributors – that is, both the published paper's authors, and their paper's reviewers. **Socrates2Plato** combines concepts from peer-reviewed scientific publication with STEEM, a blockchain platform allowing incentivized social media and content publication, combined with a self-managed community providing the power of global *Wisdom-of-the-Crowd* analysis to rank both content providers and their reviewers. The key to successfully engage the global scientific community in a fair, honest, and self-sustaining online peer-review process is to incentivize both the scientist/authors to publish their work for the public scrutiny of the scientific community writ large, and the educated reviewer to provide thoughtful and informed commentary that will in turn itself be reviewed and ranked by the community.

Today, there are essentially two choices for the scientist wanting to share their discoveries and get the unbiased feedback of their peers, one is the *Traditional Peer-Review Journal Publications* that have recently been proven to be almost universally corrupt, fraudulent, and extremely biased toward self-serving cliques that both review and publish as they promote each other's work and block entry of new ideas and talent; and the new alternative, the so-called *Open Access Journals,* popping up daily all over the internet that reportedly rubber stamp papers for cash. On August 29. 2017 the headline on Bloomberg.com reported, "Medical Journals Have a Fake News Problem," saying one such company, Omics International, "roils the scientific community with sketchy publications." Starting in 2008 with the *Journal of Proteomics & Bioinformatics,* Omics now boasts over 1000 open-access journal titles posting "50,000 articles annually in fields including medicine, technology, and engineering."

The STEEM blockchain offers both the elegant alternative of a directly incentivized, online, autonomous, self-sustaining community of independent, self-policing scientific minds that will honestly and objectively review and rank additions to global scientific knowledge using a proven *Wisdom of Crowds* approach, as well as provide highly cost-effective transparency and accountability through an immutable, distributed blockchain database. That goal is achieved in a free market that is embodied in a fair accounting and direct distribution system that consistently reflects each person's contribution, as determined by the community. This blockchain database is based on Smart Media Token (SMT) technology, which is a STEEM blockchain protocol. This allows Socrates2Plato to reward its contributors with a stable cryptocurrency token that can be exchanged readily with STEEM tokens, and subsequently, the dollar.

This platform is designed to directly reward contributions to the contributors based on the community's evaluation of their value; establish an honest global forum where scientific inquiry can be evaluated honestly and those evaluations themselves given an honest weight; provide academic, as well as both public and private funding institutions, with an honest evaluation of new scientific opportunities when considering where to offer grants; and offer private enterprise an honest, unbiased ranking of potential new technologies' promise based on the global scientific community's honest and informed measure of them.

Introduction

Peer-reviewed publication has long played a key role in the scientific community. Almost since the very beginnings of science as a recognized field of study, the *Peer-Review System* of scientific journal publication has worked like a scorecard within the community itself, and it has evolved that the *score* is the accumulation of publications multiplied by the impact factory (IF) of the publishing journal, which is itself measured by the subsequent citation numbers of the journal as a whole. For scientific researchers, the scores decide if they, and their work, can be promoted. For institutions, publication is important for the ranking among the most prestigious academies, which in turn determines the home of many future donations and bequests.

Publication also plays a major role in promoting the career of scientific researchers because it is a key determinant of their ongoing research funding. In the United States, most scientific research is funded by public institutions, such as National Science Foundation (NSF) and National Institute of Health (NIH), or private foundations, like the Howard Hughes Medical Institute as an example. In 2017, NSF funded 6.4 billion dollars for scientific research [1] and NIH funded 33 billion dollars [2]. It is difficult to accurately calculate the total amount of funding for scientific research from the private sector, but the total amount has been estimated to pass public funding in 2016 [3].

In large part, the distribution of the vast majority of these funds will be determined by this process called ***Peer-Review***. In this process, the scientific researchers send in their applications for their work to be reviewed, and these institutes recruit their selected senior scientific researchers to review and score the application. The applications receiving the highest score are considered to offer the most promise, and therefore get funded. In the scoring process, the previous publications by the applicant is used to determine the credibility of that applicant and the potential success of their proposals. Essentially, it is the most important factor in scoring. By pre-judging this study based on the existence of previous studies by an author, it seriously skews the playing field away from new, innovative scientific voices achieving any success in entering a field already crowded by old voices.

However, that is not the only problem -- the whole scoring system is broken, notably in the field of biomedical research, which absorbs most of the funding for scientific research [4]. The biotechnology firm Amgen tried to confirm the results of fifty-three papers deemed landmark studies in the critical field of cancer research, *and only 6 were found to be reproducible* [5]. In similar study, *only 25% of published data can be replicated* in Bayer Healthcare Berlin [6]. That suggests *at least 30 billion dollars was wasted in 2016 alone!*

This is a very serious problem. Reproducibility is the holy grail of scientific findings. Any scientific research which is not reproducible cannot be considered truthful, and thereby is completely useless to the public. Worse, it's a fraud upon us all, because scientific research that was funded based on these fraudulent reports goes nowhere, and promising scientific research that could save or improve lives goes unfunded. This

problem not only caught the attention of the scientific community but is slowly catching the attention of informed society as whole. In the prominent journal *Economist* alone, there have been four papers on this issue published from 2012 to the present. They are:

- "*How Science Goes Wrong"* https://www.economist.com/leaders/2013/10/21/how-science-goes-wrong
- "Nobel Prize Winner Attacks Elite Journals" https://media.economist.com/news/science-and-technology/21591549-and-nature-and-cell-nobel-prize-winner-attacks-elite-journals-whats-wrong
- "Trouble at the Lab" https://www.economist.com/briefing/2013/10/18/trouble-at-the-lab
- "Incentive Malus: Why Bad Science Persists" https://www.economist.com/science-and-technology/2016/09/24/incentive-malus

Publications in other popular journals include:

- "How Journals Damage Science" (Guardian) https://www.theguardian.com/commentisfree/2013/dec/09/how-journals-nature-science-cell-damage-science;
- "Why We Can't Trust Academic Journals to Tell The Scientific Truth" (Guardian) https://www.theguardian.com/higher-education-network/2017/jun/06/why-we-cant-trust-academic-journals-to-tell-the-scientific-truth;

How did it go so wrong? Essentially, the peer-review evaluation system of today's scientific journal publications has become misaligned with the original goal of an accurate, honest review of work being conducted by the current scientific community based solely on its scientific merits, and a commitment to serving the public interest and has instead evolved into a model that corruptly benefits a few of the more traditional voices at the expense of more novel, innovative research.

Modern scientific publication began in the 17th century and followed the business model of journals, and later, prestigious publishing houses. In that model, when initially submitted, papers are first reviewed by the publication's editors. Editors, inundated by requests, scan papers only briefly, and accept those whose authors names they recognize, and a few others pursuing something they may have a personal interest in; the rest go in the trash. Those remaining papers are submitted to two or three reviewers, who are their personal 'go-tos' in that specific area of study. These 'chosen few' review the papers and submit their recommendations to the editors. Editors will then accept or reject based on those recommendations.

Many scientific fields of inquiry have become so specialized, and the communities of professionals working in them so familiar to each other, that senior authors can easily guess who will review their papers and will write for that audience. Because the number of funded research groups in a field will be so small they essentially begin to review each other's studies, creating an echo chamber with no room for new ideas and voices.

This has been proven by numerous studies to have led to the large-scale promotion of fraudulent science.

The lack of accountability that has evolved within this ecosystem has left us with no repercussions for those falsifying the data, because there is really no financial incentive for anyone to repeat the study and validate the data on even the smallest scale. For these reasons reviewers often simply give an easy pass to each other and assume the best when it comes to the validity of the reported data. That has destroyed the reliability of the peer-review system.

Worse, by promoting fraudulent science, the system also delays, or in some cases, denies, the recognition of important new scientific studies of great merit. In 1991, Dr. Prasher cloned the GFP gene, but received little recognition from major publications. His scientific career was finished due to the lack of publications, and for much of the time between that discovery and the recognition of his work by Nobel laureates in 2008, he spent driving a shuttle bus for a Toyota dealership, because he couldn't get the funding for his research to continue. This tremendous waste of human potential and capital continues today.

Scientific fraud, when it is leveled, is a serious accusation, with extensive repercussions for all involved, except the journal in question. For individuals, verdict will almost certainly lead to the end of their career. For institutions, it means an obligation to pay back the grants awarded for that project and often some fines as well. But who will judge if it is a fraud? Scientific journals publishing the papers do not have the resources to launch the investigation and so are held harmless. There is no accountability in the system today. The most they will do is to publish some negative comments regarding their determinations, admonishing others and absolving themselves, but all the retractions are voluntary. If the authors do not retract the paper, the paper will remain in the historical record, claiming credit despite mountains of negative evidence eventually brought to light within that community.

The Peer-Review Journal Industry's frequent failure to recognize the most significant breakthrough discoveries is probably its most egregious failure to us all. Most of these leaps in scientific knowledge are too new, or innovative, for these *established peer scientists to understand and accept*. If the more established, traditional scientists cannot understand the departure from existing dogma, it will be difficult for these explorations to ever pass through the traditional peer-review process and have any hope to get published. Imagine the peer-review of the white paper on bitcoin being reviewed by traditional financial technocrats. Likely, it may be rejected because reviewers with a more dated, traditional technical approach simply do not understand the concept.

More problematic is the explosion of scientific inquiry into ever and ever more compartmentalized areas of study, and how new concepts will increasingly involve intersections between, and integrations of, multiple areas of extremely specialized knowledge. So, it is becoming ever more problematic for researchers in these groundbreaking fields to find peers knowledgeable in all the specific highly-specialized

disciplines that may be required just to even understand and appreciate the concept, much less the conclusions drawn from the data analysis being reported. A much larger cohort of curating knowledge must be focused on this task and drawing on the Wisdom of Crowds to achieve this just makes sense.

Still another issue is the speed of communication to all global stakeholders, and any real realization of benefits from the reporting of this knowledge. Peer-review can take months, sometimes years to finish, which only delays the spread of these important ideas, and society's subsequent benefit from their implementation. The lure of an autonomous, immutable, auto-time-stamp that proves for all when publication of study results was recorded will offer incentive to publish as soon as results are in to be made available immediately for the community's review.

The current system is openly acknowledged to be broken, and a new system which will recognize and reward genuine scientific research based on its societal merits in a fair and informed manner is desperately needed. It's been a known problem for some time, and as expected, various methods have been proposed, and some projects have been attempted to raise funds to repeat key data in previously published papers [7], but it proved expensive and cumbersome, and did not properly align incentives with scientific merits. There has been a flurry of other online attempts to milk this market, across a reportedly broad range from altruistic to nefarious motives, but all fail on one level or another, with none offering a simple solution: *an online scientific community that is financially incentivized to give an accurate, informed, and unbiased review of new thought and study by authors that are being incented to honestly and accurately report scientific findings via an immutable, decentralized, auto-time-stamped database with built-in network security to the global scientific community writ large*.

Herein, a publication and review system based on the Smart Media Token (SMT), a blockchain protocol based on the STEEM blockchain, is proposed that offers just that. STEEM was launched in early 2016 and already had more than 60,000 active users daily as of Jan., 2018[8]. On the Steemit.com social news media application running on the STEEM platform, everyone can publish their content for review, and equally, everyone can curate that content with the understanding that in turn, their review will likewise be evaluated, rewarded by their peers in the community according to their perception of its value. Good content and comments are rewarded accordingly, and bad behavior is censured.

Socrates2Plato will follow a similar model to the Steemit.com application, with a few modifications in the scoring/rewarding mechanism. Every community member can publish their scientific thoughts and research results on the system, and these publications are subject to everyone's reviews. A balanced review and scoring system is introduced to reward publication authors, based on the scientific merits recognized by the scientific member community, and when appropriate, punish bad behavior. *We believe it has the potential to solve all the problems with today's flawed peer-review process:*

1. Because the review can be rewarded, and exceptional reviews can earn significant rewards, there will be incentives to do replication of data.
2. Because everyone can participate in the review it becomes a randomly objective, autonomous operation. Moreover, determinations made through a 'wisdom-of-crowds' process has proven to draw better conclusions, and because the community publicly scores the review's content, its fairness, and scholarly insight, the reputation of the reviewer is held directly and publicly accountable for dishonest or incompetent reviews.
3. The time gap between publication, recognition, and incorporation will be significantly shortened.
4. Low quality studies will not be rewarded, disappearing from the equation. Publications with the greatest chance of advancing science and creating positive impacts on society will be able to freely rise in reputation, and potential funding opportunities.
5. Fraud will be exposed to the scientific community with replications and reviews. The offending authors will lose funding and scientific reputation.
6. An immutable, distributed, auto-time-stamped database will prevent any attempts anyone might make to change records after the fact.

Besides rewarding the scientific merits and controlling the quality of scientific publication, it accrues other benefits for society at large as well. Any new, even bizarre, ideas can be published there for fellow scientists to see, spurring intellectual thought and dialogue, and the community can sort it all out in their process. This way, really innovative ideas will not be ignored due to the noise of more traditional discovery, and the lack of understanding of establishment traditionalists sitting in their current positions as gatekeeper cannot stifle potential leaps in discovery from their very beginning.

Another benefit would be solving controversy between scientific claims. Because it is based on a distributed blockchain technology, all the publications are automatically time stamped and immutable, making it easy to solve disputes arising regarding timing. Still another is that it can accelerate the speed of publication. These days, scientists are keeping their data secret until publication to maintain an edge in their competition with other researchers in their field doing similar research. This review/publication process can take months to years to finish. With **Socrates2Plato**, you can publish as soon as research completes, and not worry about the competition, because the time stamp in the blockchain automatically provides immediate, incontrovertible evidence of publication.

The STEEM Platform & Smart Media Tokens (SMT)

STEEM is a platform for social media and content publication based on blockchain technology. According to the white paper first proposing the STEEM platform [9], there are three principles of this platform:

1. Everyone who contributes to a venture should receive either pro-rata ownership, payment, or debt from the venture. This principle is a common principle that is applied to startups as they allocate shares at founding and during subsequent funding rounds.

1. All forms of capital are equally valuable. This means that the contributions of those who contribute their scarce time and attention toward producing and curating content for others are just as valuable as those who contribute their scarce cash.

1. The community exists to produce products that serve its members. This principle is exemplified by credit unions, food co-ops, and health sharing plans, which serve the members of their community rather than sell products or services to people outside the community.

The first website application built on the STEEM blockchain platform was the incentivized social media news and commentary website, Steemit.com. The Steemit.com community provides the following services to its members:

1. A source of curated news and commentary.
2. A means to get informed answers to specific personalized questions.
3. A stable cryptocurrency pegged to the U.S. dollar to reward contributors of both content and curation.
4. Fee-less distribution of reward payments as determined by the community's perceived value when ranked against other contributors' content and curation.
5. Compensated opportunities to provide these services to other members.

With these principles, STEEM's purposeful realignment of economic incentives with the quality of content production has the potential to produce more objectively fairer, and more inclusive, results for all the stakeholders involved, and serve over time to improve the quality of both content and curation.

STEEM's digital currency system is composed of three currencies:

1. Steem: This is a simple, core cryptocurrency token that was generated by mining in an inflationary manner and is listed in major digital currency exchanges,

just like Ethereum, Bitcoin, Litecoin, and Ripple. Steem are simply the fundamental unit of account on the STEEM blockchain in the form of a digital token that all other tokens on the STEEM blockchain derive their value from, and as such do not generate interest or pay dividends and are valued based on the amount being held, and its perceived value by those who hold it and will not exchange it below that amount.

1. Steem Blockchain Dollars (SBD): SBD are *ostensibly* pegged 1:1 to the dollar through a systematic reset mechanism but work similar to the purchase of a convertible note that pays interest and is convertible to the backing token (STEEM) at any time at that current rate. It works like this, the SP holders vote on twenty (20) Witnesses, that serve as authority figures for the community, and the system automatically selects another one (1) randomly. These Witnesses report on the current average exchange rates of SBD to U.S. Dollars, and depending on whether it comes in under or over the ideal 1:1 exchange rate, the Witnesses will either respectively raise or lower the interest rate paid to SBD holders to reset the rate. So, you are essentially loaning the platform money at a stable rate-of-return in a digital currency pegged to U.S. Dollars. **Socrates2Plato** *will not have an equivalent token for the SBD.*

1. Steem Power (SP): Essentially, SP are Steem tokens that have been voluntarily 'locked' into a vesting schedule by the owner in their account which provides them with several benefits within the community, and that is referred to as 'Powering Up' their Steem tokens. It gives the owner more voting power in the distribution of rewards based on the volume of SP while it's held in their account, pays a dividend while its 'Powered Up,' and it also gives the holder greater authority within the community on other governance issues, including electing the Witnesses that establish price feeds for SBD and set that interest rate. When an owner wants to divest SP, they request to 'Power Down' and it is returned to them over the next thirteen weeks in equal weekly payments, starting one week after it's initiated. Fifteen percent of the annual inflation rate is paid to SP holders based on the relative amount of their holdings as interest.

Steemit.com's system has run for just over a year and a half to date, and already boasts more than 500,000 regular registered users. Every day, more than 80,000 comments and posts are published and over $40,000 dollars is being distributed to authors and curators for their contributions [10]. **Socrates2Plato** will follow the principles, process, and protocols of Steemit.com.com to establish a fair and prosperous scientific publication networked community.

Smart Media Token

In Sep. 2017, a Smart Media Token (SMT) protocol was proposed to let people build their custom-made blockchains, like **Socrates2Plato**, on top of the STEEM blockchain

platform [11]. It provides the framework and the open source codes for a STEEM-like network. Most site developers will only need to plug-in their custom parameters, and with only minor modifications, they can begin their own STEEM-like blockchain. For Socrates2Plato, the major modifications will be in the scoring, reputation, and reward mechanisms. All the other components will just use the framework of the SMT protocol, with only those noted modifications to the source code's off-the-shelf parameters.

Capital Structure & Coin Generation

We intend to follow the STEEM SMT protocol closely, but will not have a SBD-like instrument for investors. We will have a core equivalent token to Steem (S), called the Socrates token (SOX), and one with the same vesting parameters as STEEM's Steem Power (SP), called the Powered Plato token (POP). SOX can be converted into POP instantly, but the conversion from POP to SOX will be at a preset pace, same as S and SP. SOX will not have interest, but POP has. It's our plan to structure our SMT with four rewards pools these tokens will be distributed into: (1) a Founders Pool, 5%, (2) an Administration/Staff/Office Operations Pool, 5%, and (3), the Rewards Pool 80%, and (4), a 10% Interest Pool. *The founders are committed to establishing an efficient operation allowing a great majority of the distributions to go into the community's Rewards Pool.* Just as the reward generated from Steem, the reward coin will be generated from inflation.

Content Publication

Anyone can publish on **Socrates2Plato** for the community's review and scoring. After publication, the content is immutable in the original block. It can be amended after publication, but these changes can also be tracked. If the publication has multiple authors, at the time of publication a percentage of contribution must be indicated for each to determine future reward distribution, and as part of community membership requirements, signed consent forms will be required for all content published by anyone on the site to waiver the copyright to Public Domain. When appropriate, an authorization form from the institution that the publication authors represent will be required as well, along with the waiver.

Scoring, Rewarding, and Reputation System Modifications

The STEEM rewarding system: when a community member publishes content, all members of the community can comment and vote '*like/dislike*' on content as *curators*. The curation on the content generates the rewards in the form of *Steem Dollar* and *Steem Power*, which are to be distributed between the content generator and curators. Details on the underlying math for reward determination are available in the Steem

source code for anyone interested in how those calculations are performed, but in broad strokes, the basic principles are as follows:

1. Content generators receive 75% of the reward.
2. Each reward vote is positively related to the amount of Steem Power owned by the curator casting the vote. The logic behind this is that with more ownership (Steem Power) in the network, the lower the chance of abuse likely by voting members.
3. To prevent members maximizing their rewards by maximizing the number of papers they score without committing the time necessary for serious review, an individual's voting power will be decreased with each cumulative vote and can only be recovered after a designated waiting period.
4. Curation rewards naturally favor early voting, so to prevent early voting without serious review, a mechanism called *reverse auction* is initiated during the first 30 minutes after every content's posting.

SOCRATES2PLATO's reward system of Sox will largely follow the principles of the Steem platform reward protocols across most of our operation, with some admittedly major modifications to the Rewards/Scoring operations. Socrates2Plato has as a primary responsibility of honesty and informed evaluation in reviewing the merits of scientific thought and research findings, which cannot be simply voted up or voted down.

A more complicated review system scoring multiple relevant criteria will be used instead of the simple like/dislike curation used for Steemit, although that mechanism will be used to give a general 'good/bad' *Reputation Score*. When a science paper or report on study results is published, it can be either commented on along with a Reputation Score upvote or downvote, or it can be reviewed with *Criteria Scoring* as well. The comments will not generate reward scores for either author or commenter, but it does influence the post's trending position when ranking the publication's exposure to the community, and does seriously influence the authors *Reputation Score*, while the *Criteria Scored Complete Review* can generate reward scores for both reviewers and authors, and additionally carries a greater weight in exposure ranking.

Multiple rapidly completed, thoughtless reviews in a day will not foster good reviews, so only two reviews will be initially allowed per member to be submitted in a day. To allow dedicated members with a vested interest in the site's success to contribute at an accelerated level from the casual member community, holders of PP are allowed additional reviews beyond those two, based on the amount of PP held in their account. Since a bad review carries a similar risk of negative review and score from the community that a bad paper does, a mechanism to throttle voting power after each incremental vote is not considered necessary.

For authors, the *Reward Score* is calculated as an algorithm comprised of the *Dividing Score*, *Merit Score*, *Reputation Score* and *Weight. Dividing Score* is the distributed ratio between the author and reviewers. For the first review, the reviewer receives 70% and

authors gets 30%. For the second review, the reviewer receives 63% and authors get 37%. Each following review will get 90% of the effort score of the previous review, until the effort score for reviewers drops to 2.97% after 30 reviews. Beginning at 31 reviews, the effort score for reviewer will be stable at 2.97% and the effort score for authors will be stable at 97.03%. *Merit Score* is the sum of multiple scientific merit scores graded by the reviewers. The criteria being measured include:

- *Novelty (the degree of innovation or departure from accepted science)*,
- *Stringency of Writing* (*the degree to which the data or evidence supports the author's view of the published content*),
- *Effort* (*resources and time expended by the authors*), and
- *Potential for Societal Impact* (*the positive effect this inquiry has on the world community).*

Each *Merit Criteria* is scored between 0 and 9. *Reputation Score* is used to judge if the data can be repeated. The Reputation Score can be +1, or -1. +1 indicates the curator believes the data and trusts the methodology. -1 indicates the curator doubts the data and/or the methodology, therefore this score must be supported by extra evidence, perhaps even as alternative data offered up by the reviewer(s). Plagiarism likewise results in -1 Reputation Score (the source of plagiarism must be provided). Besides these infractions, unscientific writing will also result in a -1 Reputation Score. This Reputation Score is used to reward truthful, honest community effort, and deter the bad behaviors in scientific research: big claims with forged data will damage the authors' reputation and will be reflected in their account balance. *Weight* refers to the amount of reviewer's PP ownership, which is earned through publication and reviewing, or may be exchanged for by purchasing Steem, then exchanging the Steem for SOX and *powering them up*. PP essentially represents ownership in the network, under the assumption that significant vesting ownership in the community will deter abuse, which would ultimately decrease the overall value of the network. To prevent abuse of the system by large PP holders (whales), the weight will be calculated as ln (coin+2). This way, large PP holders can exercise relatively greater influence on the scoring system, but whales cannot dominate the scoring system because the incremental influence diminishes after 1000 tokens.

For reviewers, their *Reward Score* is the sum of the three scores: *Initial Review Score*, *Accumulative Review Score* and *Author Score*. These Reward Scores are all calculated as a multiplication of the Dividing Score, Merit Score, Reputation Score and Weight. For the *Initial Review Score*, the dividing score is as described in the last paragraph, *Weight Score* is related to the reviewer's ownership of PP tokens, all *Merits* are scored as 5 and Reputation score is set to +1. *Authors Score* is used for scoring the comment written by the reviewer, as described in the last paragraph. For *Reputation Score of Author Content*, besides the standards set up in the last paragraph, comments that are unrelated or inappropriate for a review of the original paper or are judged to be inconsistent with the community's values and mission, will result in a score of -1. *The Dividing Score* is the score of the comment's writer. The *Weight Score of Author Content* is the weighted score of the people who are in turn, reviewing those comments.

Accumulative Score is used to reward the review when any reviews or comments follow the scored review. For each review of (following) the Scoring Review, accumulative scores are calculated as one tenth of the following review score. For each *Comment Without Review* following the scoring review, the accumulative score is calculated as one percent of the comment author score. The reasoning for the design of reviewing reward scores is as follows: initial review will reward the reviewer's time and efforts, but it is an only small portion of the reward. That review is also subject to other reviews, and reviewers abusing the system risk getting a negative Reputation Score, which hurts both the reviewers' rewards and reputation. *Accumulative Score* is where the reviewers get the majority of the money. The Review Reward will be issued in PP only.

The Reward Distribution frequency with the STEEM blockchain is fixed at seven (7) days. The PP that was allocated to the Reward Pool the previous week are divided evenly between two pools: *Review Reward Pool* and *Author Reward Pool*. Next, the rewards are calculated according to their individual scores and Plato Powers are allocated to individual accounts. Informed, thoughtful reviews of any scientific paper are time-consuming and brain-draining tasks, and they are just as important to the process as the original paper posted.

STEEM Oracles Feature Incorporation

Another proposed feature of the STEEM blockchain is the ability to establish *Oracles*, adaptors to interface between the real world and the blockchain. Oracles are paid community members serving to safeguard the quality of data on the blockchain. The technical details for establishing oracle functionality are still being determined. We intend to deploy this technology to increase the data quality and safeguard the integrity of network operations. Any member holding PP above a required threshold can apply for an oracle position, and the Community will elect the oracles, ranking applicants according to votes received, with the top five (5) elected. The remaining applicants are the reserve oracle pool, and will replace any current oracle who withdraws, decreases their PP holdings below the threshold, or are recalled by a community vote. Oracles will be paid for their work from the Administration Reward Pool.

The primary function of an oracle is to verify the data accuracy of members who apply for the privilege of writing and reviewing. Each member applying for the privilege will be verified by at least two oracles for data accuracy and no multiple accounts. The other functions of oracles is to solve any conflicts between members, and detect any irregularities in the network. For example, a paper with extreme reviews will warn the oracles to step in and investigate. Following the investigation, oracles will vote with a super majority to issue their opinions. Any reports of system abuse will also trigger an investigation, with the oracles reporting their conclusion and issuing a finding based on their supermajority vote.

Additional Societal Benefits

Beyond the functionality of presenting to the public the merits of scientific papers, reports, and thoughts, this solution serves other functions for society. One function will be improving the scientific research grant allocation process. Grant funding institutions and agencies, both public and private, can both more efficiently and accurately identify the publications which best meet their funding aims and get an accurate judge of the relative value of these presentations using our 'wisdom of crowds' power through these reviews. If agencies decide to fund the research, they may also be able to use a proposed future smart contract functionality, if it can be incorporated later, to manage these funds.

The funding would continue only when the grantee publishes the results in the Socrates2Plato blockchain that meet the milestones set forth in the smart contract, which of course could also incorporate both timeline and platform scoring goals as incentives offered by the funding institutions. Future additions could offer other opportunities for the community to serve and be compensated by offering some degree of concierge services for content publishers through the community.

More and more scientific publications entering the world stage are from non-English-speaking countries, so English-language scientific translation and ghost co-authoring services are in high demands. However, there is no open market for such kind of service and the quality and price of this service are not uniform. If a future smart contract feature can be incorporated later, language translation services could be bid, and authors can select the bid according to the price and by their previous customers reviews. A portion of the author's reward can be assigned as a part of the fee structure, so the service provider has the incentive to do the best to improve the quality of the paper. The whole process can be managed by a smart contract. Moreover, the platform can be used as database storage for lab notes for their work in progress. It is digital, immutable and verifiable. These lab notes can be linked to papers to be published later and will be great for readers to verify the original data and learn the details of their work as it progressed.

Conclusion

The Socrates2Plato distributed blockchain database can provide an efficient incentivized, decentralized platform to review all scientific and academic thought, research, and study, measuring and ranking the merit of scientific and academic publications, highlighting true innovation, rewarding both those exemplary authors and their insightful, informed reviewers, and penalizing dishonest science, while providing the community a mechanism allowing it to self-police and control anyone attempting to game the system. The platform is effectively owned and managed by the community through a consensus algorithm. Moreover, this platform has the ability to provide

additional benefit to society, such as funding allocation, a lab notes database, referrals for service providers like language translation, co-authoring, etc.

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