Perverse incentives: how the reward structures of academia impede scholarly communication and good science

W. T. Gowers

University of Cambridge

November 22nd, 2017

The dream

The reality

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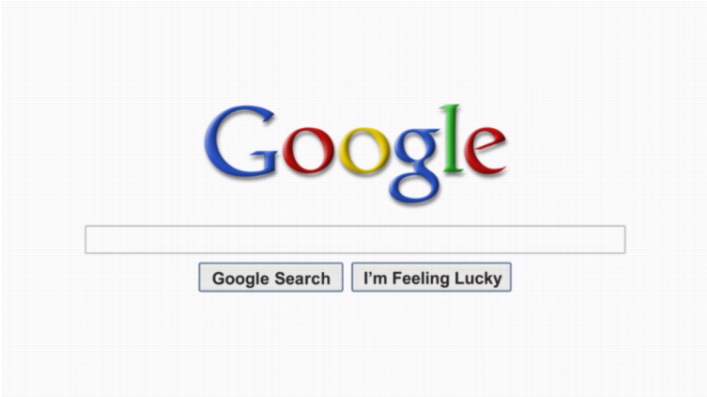

Quare fremuerunt. Iste psalmus primus titulum habuit. Unde & primus dicitur quia materiam precedentis psalmi que communis omnium psalmorum est primus incipit differenter tractare. Titulus autem ipsius est psalmus dicitur quod est iste tractatus agens de bona operatione. Unde & psalmus in titulari meruit. Attribuitur Christo qui uere manu fortis de bellans aerias potestates & desiderabilis est in quem desiderant angeli conspicere. Materia ipsius Christi rex

Quare fremuerunt: Ecce contradictores. Quia in celis. Pena ipsorum. Ego autem: Ecce regnum. Dominus dixit. Persone dignitas. Postula a me: regni quantitas & gentium & iudeorum in una fide coniunctio. Reges eos: equitas & iustitia regnantis. Et nunc reges: inuitatio ad subiectionem eius. Nequando irascitur. Comminatio pene eis qui subiecti non erunt. Operis finem optimo fine. Idest spe premii concludit. Beati omnes qui confidunt in eo.

git. insinuans quod eos qui uoluerint cum eo regnare necesse est aduersa cum eo tolerare.

Domine apud quem est salus plenitudo iustorum & perfectio beatitudinis in corrupte. Prima ut in legis tue

But also ...

$A - B$ is small, what can one say about A and B? A more specific question is as follows: if A is a finite non-empty subset of integers such that $|A + A| = K|A|$ for some small number K, what can one say about A? Here and in the rest of the text we use $|A|$ to denote the cardinality of a finite set A. The number $K := |A + A|/|A|$ is referred to as the *doubling constant* of A and will be denoted in this text by $\sigma[A]$. It is easy to see that this constant is at least 1, but it can be much larger; for instance, if A is a geometric progression such as $A = 2^{\wedge}[0, N) = \{1, 2, 2^2, \ldots, 2^{N-1}\}$

51

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"Stravinsky, The..." This video is no longer available due to a copyright claim by Boosey Hawkes.

Sorry about that.

Why do we need barriers to access?

Why do we need barriers to access?

- Creators need financial incentives.

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- Creators need financial incentives.
- Good content is expensive to produce.

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That's the theory anyway ...

Why do we need barriers to access to academic output?

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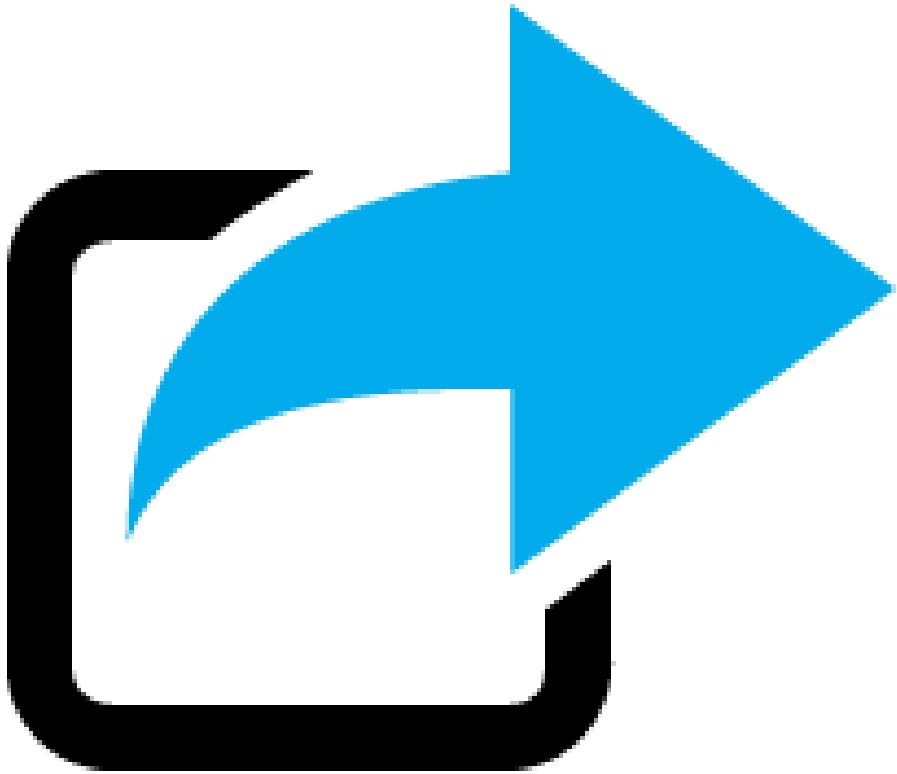
Why do we need barriers to access to academic output?

- ~~Creators need financial incentives~~
- Good content is expensive to produce

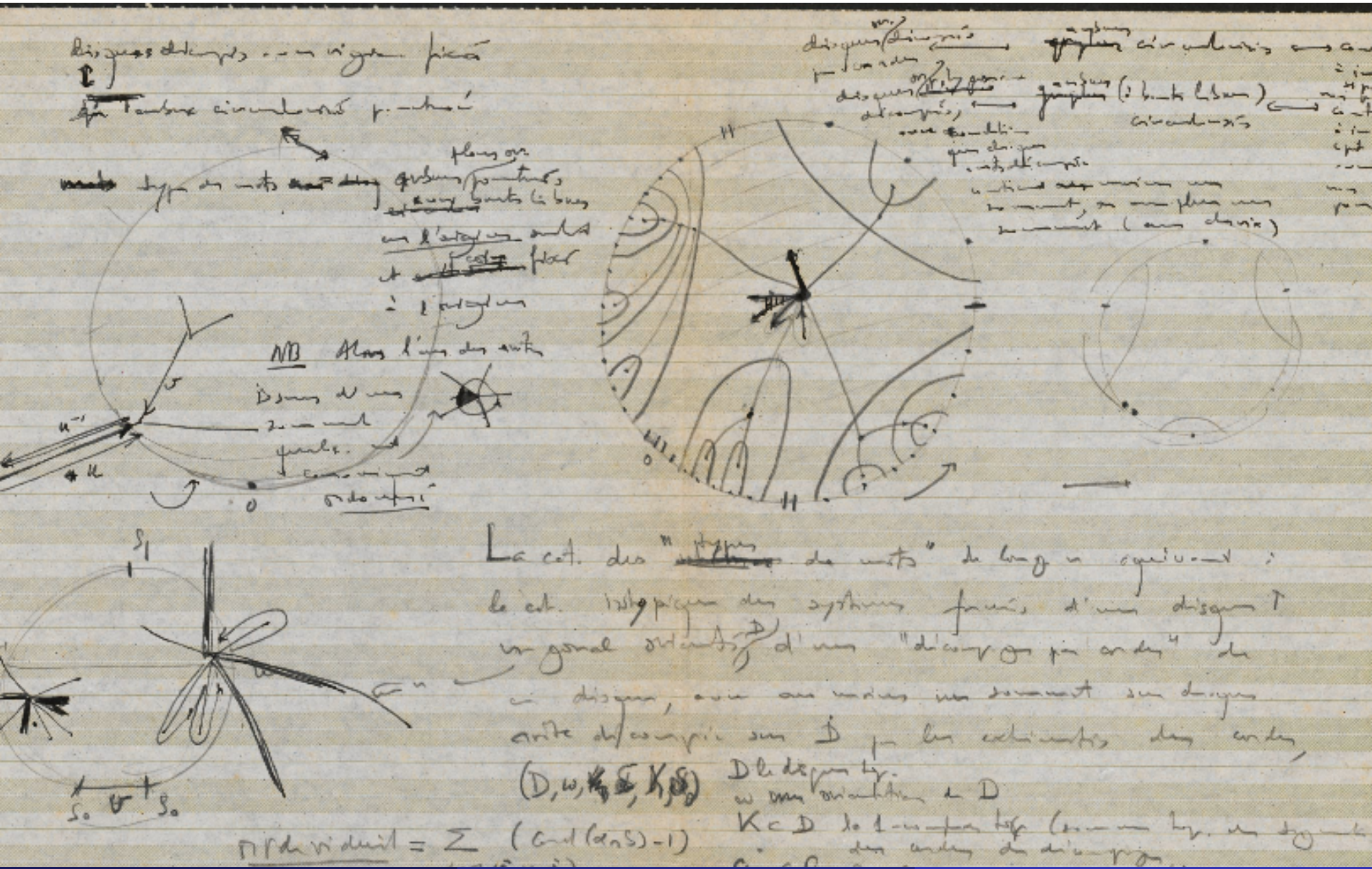
Why do we need barriers to access to academic output?

- ~~Creators need financial incentives~~
- Good content is expensive to produce if you insist on antiquated methods of production

Why do barriers matter?

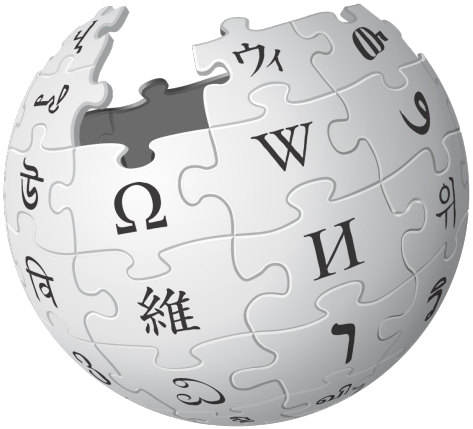


Here's what we could be sharing

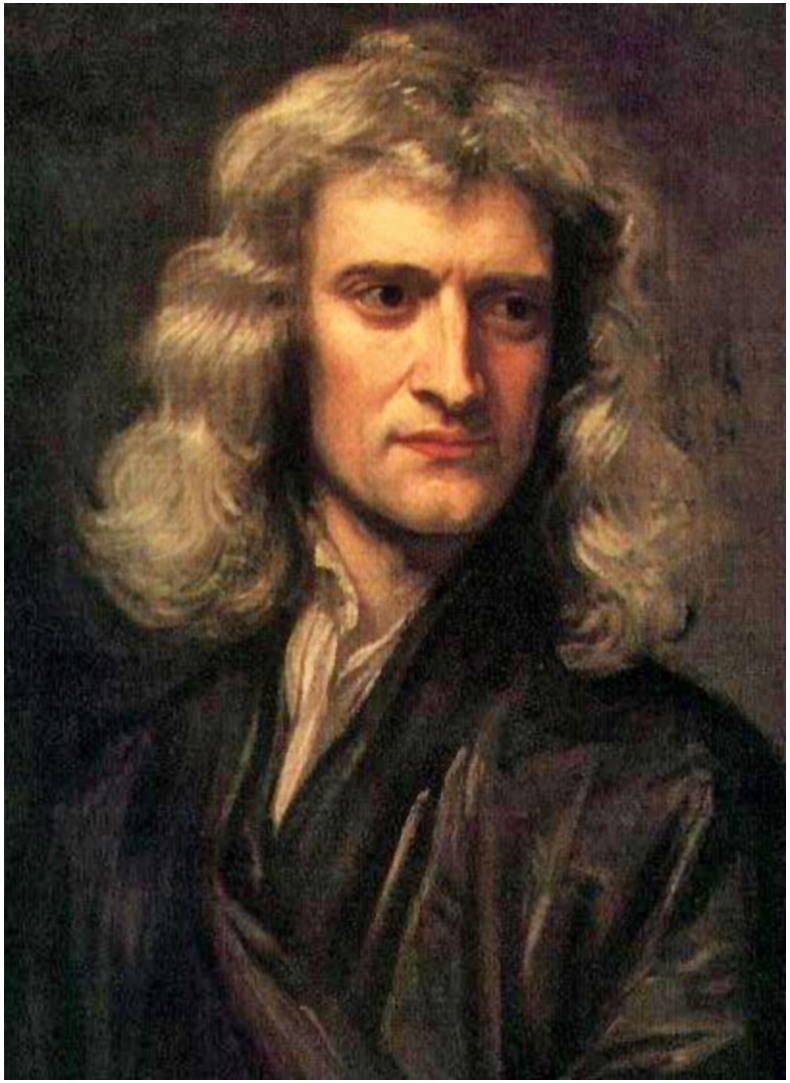


But we don't want this ...

In mathematics, the revolution has started



A competing vision



PHILOSOPHICAL
TRANSACTIONS.

February 19. $16\frac{71}{72}$.

The CONTENTS.

A Letter of Mr. Isaac Newton, *Mathematick Professor in the University of Cambridge; containing his New Theory about* Light *and* Colors: *Where* Light *is declared to be not Similar or Homogeneal, but consisting of differm rays, some of which are more refrangible than others: And* Colors *are affirm'd to be not Qualifications of Light, deriv'd from Refractions of natural Bodies, (as 'tis generally believed;) but Original and Connate properties, which in divers rays are divers: Where several Observations and Experiments are alledged to prove the said Theory. An Accompt of some Books:* I. *A Description of the EAST-INDIAN COASTS, MALABAR, COROMANDEL, CEYLON, &c. in* Dutch, *by* Phil. Baldæus. II. Antonii le Grand *INSTITUTIO PHILOSOPHIÆ, secundùm principia* Renati Des-Cartes; *novâ methodo adornata & explicata.* III. *An Essay to the Advancement of MUSICK; by* Thomas Salmon *M. A. Advertisement about* Thæon Smyrnæus. *An* Index *for the Tracts of the Year* 1671.

A Letter of Mr. Isaac Newton, *Professor of the Mathematicks in the University of Cambridge; containing his New Theory about* Light *and* Colors: *sent by the Author to the Publisher from Cambridge, Febr.* 6. $16\frac{71}{72}$; *in order to be communicated to the* R. Society.

SIR,

TO perform my late promise to you, I shall without further ceremony acquaint you, that in the beginning of the Year 1666 (at which time I applyed my self to the grinding of Optick glasses of other figures than *Spherical*,) I procured me a Triangular glass-Prisme, to try therewith the celebrated *Phænomena* of

"Perverse" incentives in mathematics

- Personal ambition.
- Reward for being first.
- The primacy of the journal article.
- Expository work and other "enabling" activities downplayed.
- Little recognition for incomplete ideas.

"Perverse" incentives in mathematics

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All these are obstacles to efficiency.

Why is so much mathematical output behind paywalls?

Why is so much mathematical output behind paywalls?

THE PARADOX

1. Mathematicians produce it, find peer reviewers, do the peer review, and make the editorial judgments.
2. In the internet age, dissemination costs almost nothing.
3. Almost all the interesting recent content is available on arXiv.
4. And still libraries pay huge subscription fees!

I,
DON'T
CARE.

Vienna
Budapest
Chişinău
Târgu Mureş
Ljubljana
Trieste
Zagreb
Timişoara
Rijeka
Novi Sad
Banja Luka
Belgrade
Bucharest
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Plovdiv
Skopje
Tirana
Istanbul
Thessaloniki
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Albanians
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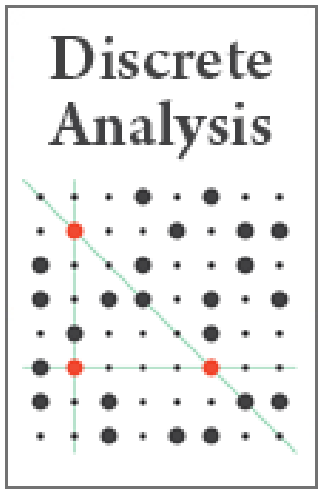
Croats
Gagauz
Greeks
Hungarians
Italians
Macedonians
Moldovans
Montenegrins
Muslims
Romanians
Russians
Serbs
Slovaks
Slovenes
Turks
Ukrainians
International boundaries

A few initiatives I have been involved in



Freedom of Information Act
2000

Pages 122–156

John W. Lawson, Matthew R. Mills

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Original research article

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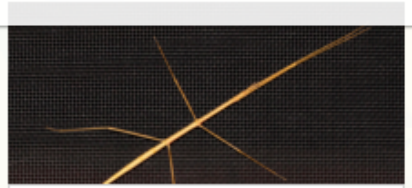
June 15, 2017

On automorphism groups of Toeplitz subshifts

Sebastian Donoso, Fabien Durand, Alejandro Maass, Samuel Petite

Automorphism groups are calculated for various classes of shift spaces.

Editorial introduction



June 02, 2017

From a packing problem to quantitative recurrence in [0,1] and the Lagrange spectrum of interval exchanges

Vincent Delecroix, Michael Boshernitzan

Two results are presented that generalize Hurwitz's theorem on rational approximation from rotations to much wider classes of measure-preserving transformations.

Editorial introduction

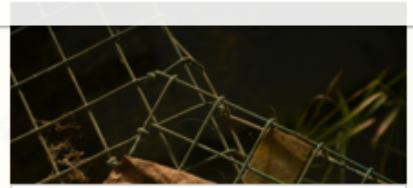
May 23, 2017

On distance sets, box-counting and Ahlfors-regular sets

Pablo Shmerkin

Theorems are proved that relate to the Falconer distance problem and that improve results of Orponen in several ways.

Editorial introduction



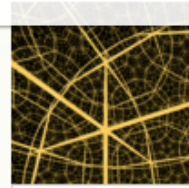
May 09, 2017

A counterexample to a strong variant of the Polynomial Freiman-Ruzsa conjecture in Euclidean space

Shachar Lovett, Oded Regev

The polynomial Freiman-Ruzsa conjecture is a central open problem in additive combinatorics. A natural strengthening of the conjecture turns out to be false.

Editorial introduction



May 09, 2017

Analyticity o and the esca random wall groups

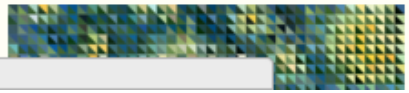
Sebastien Gou

The entropy a of a random w hyperbolic gr analytically o that defines it

Editorial introc

Extremal combinatorics

Arithmetic Combinatorics



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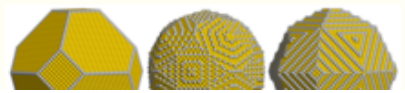

Computational Complexity

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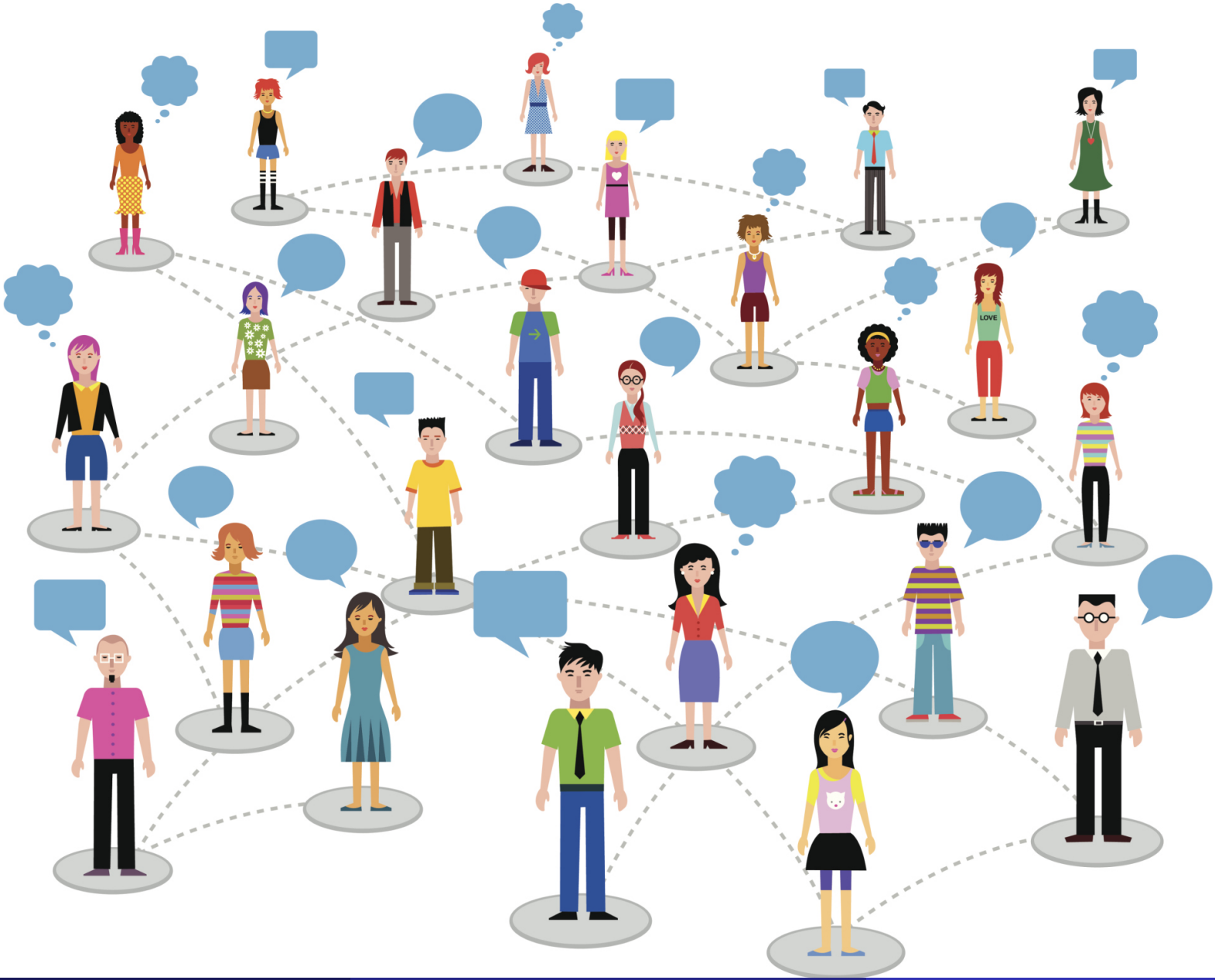
The incentive structure that supports the status quo



The players

- Publishers
- Editors
- Writers
- Readers
- "Readers"
- Librarians
- Learned societies
- Consortium negotiators
- Funders

Hilf
atlos