

# TRUTH, TRUST, VERIFICATION AND VALIDATION IN ACADEMIC COMMUNICATION: THE CHALLENGES OF ONLINE/SOCIAL MEDIA COMMUNICATION

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## Abstract

Academic communication, at least in its formal written form, has been built on a long and strong history of systems of validation and verification since about the seventeenth century and the development of the European (Western) Enlightenment. This paper investigates the contemporary challenges that online communication and culture has to this longer and relatively stable structure of how academic knowledge has been constructed. Online communication has produced a culture of information instability, transformed professional and personal identity and a new insecurity in trust and verification. At the same time, online culture and communication has also produced an incredible and unparalleled system of shared information. Through a close study of the gap between online communication and the exigencies of academic communication, the paper attempts to provide a pathway for the contemporary academy to make this new system of communication contribute effectively and with major scholar moderation to new generations of knowledge.

**Keywords:** Online communication, the Academy, academic communication, scholarship, persona, verification, knowledge, scholarship, rankings, citations, referencing, trust, truth, validation, big data, plagiarism, academic integrity, sharing, gestural communication

## Introduction

Communication in the contemporary moment is rife with paradoxes. From one vantage point, the technologies that support our forms of communication have led to an incredible production of information at levels inconceivable from the perspective of only 50 years ago. From another angle, contemporary culture is replete with a kind of information instability sometimes labelled as “fake news” in an era that even the Oxford English Dictionary identified in its heralding in early 2017 through its 2016 new word of the year as “post-truth” (OED 2017). At its core, contemporary communication privileges attention and the emotive techniques of drawing attention over and above the other values of communication.

This paradox of information surplus and instability not only haunts the online culture of news, it also is transforming our world of scholarly communication. What we define as scholarly communication includes the work of researchers and how and what circulates across the array of academic disciplines that shape our universities. Scholarly communication also includes what expectations of academic performance we expect from our

students in their assignments and course-related submissions as well as theses and dissertations.

Our current online forms of communication are dependent on quite different systems of verification and validation from those developed in the universities and scholarship. Central to the organisation of scholarly communication is the movement from information to knowledge, a movement currently far from privileged in online communication systems and structures that an online attention economy shapes and dominates. This paper explores the challenges that these new patterns, pathways and structures of online communication are presenting for scholarly communication and concludes with how the academy should move forward in both embracing these communicative transformations but reasserting the university's fundamental role in verification towards truth, facts and knowledge for our contemporary world.

### **The Emergence of the Academic System of Communication**

The systems of verification and validation of the modern academy have emerged from millennia of structured patterns of sharing knowledge. Relationships of both sharing and verifying information and knowledge are elemental parts of human civilization and at least recorded history. Strong knowledge sharing systems and antecedents in Western culture can be linked to Greek and Roman civilizations and their systems of schools, libraries and philosophy. Scientific traditions that helped inform medical sciences had strong links to the traditions of medieval Muslim systems of sharing knowledge (Al-Khalili 2011). In Chinese culture, the long history of the village philosopher that can be linked to Confucianism has been a form of information sharing and knowledge that has informed thousands of years of bureaucracies and cultural debate and discourse. It also must be acknowledged that the emergence of universities in Europe in particular were often intimately connected to religion and monastic orders: even with the most cursory view of contemporary Oxford University, one can see the historical antecedents of religion from 1000 years ago.

Despite this rich history of the conversion of spoken word to text to verification through many civilizations and their related traditions and institutions, the modern system of validation and verification that is the basis of academic/scholarly knowledge can be identified more accurately with a particular reorganization of sharing and validating in the last 400 years. In the 17<sup>th</sup> century, according to Grayling (2016), several techniques emerged that led to a new and more stable system of knowledge and science in particular. First, particular individuals operated as “gatekeepers” for connecting fellow philosophers to share ideas. These gatekeepers ensured the connection of knowledge across large geographical spaces and helped build new networks of knowledge that transcended any particular institution in any particular country. This sharing system of knowledge allowed others to text, validate and debate competing hypotheses and experiments. Along with this networking and sharing of information among leading thinkers and experimenters, Francis Bacon specifically advanced on a system of refereeing experimental methods by other scholars before it was distributed. This system of refereeing was also attached to Bacon and other's conception of the central tenet of science itself: the capacity to replicate the experimental research by another scholar identified the verification of information and the gradual confirmation of experiment information to relatively stable, shared knowledge. One of the key associated changes in the movement of information in text and published form was the gradual rejection of anonymised authorship to authentication by the revealing of the true name of the writer.

Our modern system has been an extension of these new interrelated pathways to truth and knowledge. The central element of academic communication at the start of the 21<sup>st</sup> century has become something we would call *referential thinking*, where in-text referencing of past work has become the standard method of acknowledgement of sources. This referential thinking is accentuated further through the connected integration of footnotes, endnotes and bibliographies to assist in consolidating the connections to pre-existing and therefore more stable forms of information and knowledge for any new work.

What has emerged in this system of academic communication are other techniques to hierarchize validation. Journals have become ranked in terms of their relative “credibility”. The specialization through disciplines has led to specialized rankings and values of journals and, in some disciplines, books. Collectively, this academic communication system provided a model for the movement of proclamations of truth-claims to what were hoped to be universal truths.

As described above, this system of the movement of information to knowledge that consolidated from the 17<sup>th</sup> century to the 20<sup>th</sup> century represents an idealized model. As academic institutions dealt with the further movement of knowledge into wider communities, they regularly converted their scientific and experimental knowledge into other forms of popular communication and dissemination. To have a wider currency in culture and business, science had to continue to integrate the communicative discourses of wonder that were part of religious thinking and conceptualization of truth and the related concept of magic in order to support the development of their practices, research and inventions. Throughout the 18<sup>th</sup> and 19<sup>th</sup> centuries, scientists regularly produced wondrous and beautiful instruments to demonstrate their findings and their applications first to elites and then the wider population. Indeed, the development of the magic lantern to film projection from the 18<sup>th</sup> century to the end of the 19<sup>th</sup> century as a technological invention from discovery/experimentation is exemplary of scientists’ need to disseminate their information more widely through a discourse of wonder and awe (Musser 1984).

By the twentieth century, scholarly communication had developed two interrelated patterns. Intrinsic to disciplines of knowledge and expertise were the refereed journals and formations of citations that further informed the practices of university students within these disciplines. In addition, as one of the key signs of human progress and advancement and expression of modernity itself, scholarly communication has been regularly converted into popular cultural formations of science and knowledge. A related tradition of public intellectuals who could explain science or articulate the parallel work in the social sciences and humanities through news and popular culture also developed and consolidated from the 19<sup>th</sup> century into the media forms of the 20<sup>th</sup> century (Marshall and Atherton 2015).

### **Change: The transformation of Information/Communication System into the 21<sup>st</sup> Century**

Although scholarly communication served as a model for validity and truth-claims in other more popular forms of communication in the 19<sup>th</sup> and 20<sup>th</sup> centuries, in many ways popular communication and academic communication were quite separate and distinctive universes. However, both these universes – the popular and the academic – functioned in a communication system that has been characterized as supporting a “representational media and cultural regime” (See Marshall 2014; Marshall, Moore and Barbour 2018): whether in

the academy or via television and other popular media, our communication and culture operated comfortably with an accepted, legitimate, normalized and naturalized system of representation. Our politics, entertainment and scholarship had clear and accepted hierarchies that simplified who “spoke” on behalf of our politics, culture, economy, and science. Although there are many examples of disruption through the 19<sup>th</sup> and 20<sup>th</sup> century, this system of representation and hierarchy prevailed via the communication systems of popular culture and the academy. Although not completely stable, a constructed pattern of information to knowledge was also privileged in this representational system.

Beginning in the late 20<sup>th</sup> century, this relatively stable representative media and cultural regime and its production of both information and knowledge began to break down as a new system of communication across our cultures emerged. Building from elaborate computerized and shared internetworks of information called the Internet, the World Wide Web was launched in 1991. In its connection to millions of people who owned network-connected computers, its replication of past media through html coding, its capacity to distribute or share graphically enriched content and messages, and its capability in breaking down this information/media/communication into simple binary codes and reassembling them upon delivery to another computer, the Web heralded a massive transformation in our system of communication. As the Web expanded its presence, its user base, its techniques of sharing, it led to an accumulation of information of unprecedented proportions that dwarfed the traditional archives of the largest libraries in the world. By 1996, “digital storage [became] more cost-effective than paper” (Press 2013). Moreover, the Web also became a source for the accumulation of information from the activities of the millions – and eventually billions – of online users. Big data was not only accumulated through web sites and, by the latter years of the first decade of the 21<sup>st</sup> century, by mining the activities of social media users, it was read, repackaged, sold as a source for the further generation of data attempting to attract online users in some new and differentiated way.

It is important to realize that this expansion of data via online culture is an elaborate collection of information: it is not knowledge. Nonetheless, because of the sheer volume of information, this era of big data has often been understood as generating greater knowledge. The volume of data and information has actually led to new forms of instability in our determination of knowledge. As a result, the era of big data has been a particular challenge to scholarly communication and its relative stability of systems, hierarchy and representation.

What follows is an exploration of two major transformations of scholarly communication that have emerged from this proliferation of information via online culture in all its manifestations. The first identifies how big data formations have been integrated into the meaning of scholarship and its value. The second investigates the way in which the personalization and emotive quality of information has produced a naturalization of opinion over fact and belief over knowledge, both of which fundamentally challenge the academy and its organization as a pathway for education and knowledge.

### **A. Ranking and Rating ourselves to near oblivion**

Ratings and rankings have been part of academic credibility for a long time and have been connected to the validation of research by peer association and acknowledgement and the task of information and library scientists to map our expanding world of information for scholars. The first annual edition of the *Science Citation Index*, which pulled together past systems of citational work was in 1963 and was quickly followed by the *Social Science*

*Citation Index* (initiated in 1956), and the *Arts and Humanities Citation Index* in 1975 along with similar models designed for specific disciplines across academia (See Garfield 1979). Citation indices have helped organise the value of publications and scholars.

There is an odd paradox in this quite remarkable history of citations and its particular form of calibrating communication to help further connect academic scholarship. It is often overlooked that the contemporary world of big data and its model for individualizing and personalizing value in online culture was at least partially drawn from the longer tradition of attributing individual value in academic disciplines through the metrics of citational impact. In the development of our online culture of social media is the extensive and pervasive presentation of the self for others to follow, share, and validate along with a variety of forms and platforms of communication. As Cheney-Lippold deftly explains, we are transformed into a different datafied/digital version of ourselves as we are individually and collectively read and calibrated by the various major players of the “Intercommunication industries” (Marshall 2016, 64-77) such as Google and Facebook.

Whether as academics or the wider group of social media users, we are negotiating the production of a public version of ourselves that is quantified, calibrated and evaluated through the intersecting metrics of big data. Academics work very hard at producing their “persona” in their universities, professions and disciplines increasingly more aware of how data that their publications and citations generates, works to shape their public identity.

The algorithmic expressions of value and calibration envelope academic communication. University rankings present an interesting formation of individual academic value in the last decade. The ARWU ranking, for instance, is skewed towards scientific disciplines and specifically whether academics have published in journals indexed by SCI and SCII that are linked to the Web of Science (ARWU 2018). The importance of university rankings has all sorts of financial impacts on each individual university: as a result, universities work to pressure academics with greater force to publish in journals that assist in improving their world ranking. What is often overlooked in the assessment of these world university rankings – from the ARWU, the Times Higher Education World Rankings, the QS World Rankings and the now International US News and World Report rankings – is that they are all commercial entities. Indeed, most are major publishers: for instance, The ARWU which is based in Shanghai is aligned with a commercial entity, Clarivate Analytics, that now controls all the most prominent citation indices in the sciences and social sciences. The Times Higher Education World Rankings is owned by one of the largest publishers in the world – Thomson Reuters – which also owns a large number of academic journals and scholarly trade presses. Although these rankings are built on what appear to be objective citation and journal data related to academics, it has to be acknowledged that the commercial nature of their operations also shapes their acceptance of what commercially controlled journals are included in their data calibrations. Thus, the system of citation, refereeing and peer-review does not have the independence of the academy in its structure and its operation.

Simultaneous to these university-pressured imperatives for academics, scholars themselves have over the last 10 years taken an active effort at shaping their current professional identities and constructing online academic personas. Academia.edu that tries to connect scholars online as well as being a major pathway for getting free access to academic publications has 58.98 million subscribers who are validated as associated with universities through their email (Academia 2018). ResearchGate, a service slightly skewed to sciences, has 14 million subscribers (Researchgate 2018). And like the ubiquitous professional

platform, LinkedIn, both these “services” are commercial entities. In a similar vein, millions of academics have taken to constructing their visible professional profiles through Twitter and Facebook over the last decade. The cumulative effect of all these services is that academics are now regularly monitoring their online persona as they work to shape their reputations and maintain their scholarly value. Many augment this monitoring through the informational platform related to academic publishing called Google Scholar. Because Google Scholar encourages academics to set up profiles and because the “search engine” successfully finds academic research more openly than the commercial citation services, it has become a major site for the exploration of academics and their work. Like all the other services that are constructing academic personas and research communication, it is derived from a commercial entity; nonetheless, Google Scholar at least appears more arms-length than publishing corporations such as Elsevier (Scopus) and Thomson Reuters (Clarivate: SCI and SSCI, and Web of Science) who dominate the citation industry and are an elaborate support structure for the academic journal publication industry.

### **B. The emotional and personal register of online communication: The challenge to the scholarly communication**

As academic communication becomes part of online communication patterns, forms and calibrations, it is equally important to be aware of the transformation in the form of address that predominates our online culture. As is evident from our study of the emergence of scholarly communication over the last 300 years, there is a particular register that operates across academic disciplines. Academic communication works much more strongly than journalism to aspire to objectivity in its presentation of findings. However, because academic communication, whether from the science tradition or humanities, is designed to persuade, its objectivity is designed to support an argument and a conclusion.

With the range of information available in online culture, it is difficult to generalize a prevailing register of communication. With the idea of information dissemination at the core of the Internet and Web’s identity, it is often presumed that objectivity should be the predominant communication form, although this presumption is mythic, and particularly a mirage in the highly used social media sites. It is important to discern the massive usage of social media platforms and understand that these are instrumental in shifting our various forms of contemporary communication across professional, intellectual and cultural domains. To get a mental picture of this social media map, here are some of the number of active users on the following applications: Facebook 2.234 billion; WeChat 980 million; Weibo 392 million; Instagram 813 million; Snapchat 255 million; Twitter 330 million (Statista 2018a).

From previous research into online persona and presentational media and culture as opposed to 20<sup>th</sup> century representational media and culture, it is clear that a personalized and individualized presentation of much information is privileged by most online (and mobile) activities. In the contemporary era and particularly via social media in the last 10 years, the individual has been privileged as the pathway for the sharing of all forms of communication. To capture this blend of a different public space that is shaped by individuals across platforms that are commercially driven, we employ the concept of a new “*privlic*” space (Marshall 2016). *Privlic* acknowledges a shifted private and personal sensibility and public sharing in online culture. In addition, *privlic* also identifies the commercial (private enterprise) mining of individual data for reconstruction and sharing by corporations who own the social media applications that construct this shifted (and somewhat contested

acceptability) notion of public for further forms of promotion and capture by other corporations.

Formerly quite distinct domains of communication are blended in this online environment with porous boundaries between the personal, the private, intimate with work and professional identities as individuals work to negotiate followers, networks, micro-publics and how meaning and sharing indexically points to blended notions of connection, sharing, friending, and liking (Marshall, Moore and Barbour 2018).

Emerging particularly from the last 10 years of social media use, online communication has developed a new semantics. To distil what we are referring to as online communication's "register", it is useful to see how emotion has become central for how individuals present themselves in this *privlic* space. The new semantics of online communication is often gestural in its indication of a mood or support for another's shared opinion and media form. Indeed, the expansion and proliferation of emojis, related stickers and rolling gifs for individuals to express themselves beyond text is exemplary of this gestural turn on social media and online culture more generally. Perhaps this new social emotional etiquette is best seen in the routine way individuals respond to Instagram posts. Liking – which is now pictographically represented through the emoji heart symbol – is almost a universal and perfunctory response to posting on Instagram: it makes one's relationship visible as these new forms of friendship networks or "micro-publics" are sustained through regular emotive connections. Paralleling this form of shared connection are the proliferation of hashtags on all social media. The tags themselves serve as beacons of interest that identify the concern, the humour, and the disposition of the posting person, but also a continuous reaching out to others that allow the potential intersection of overlapping micro-publics and friendship and follower networks.

Other very visible and shared styles of online communication play in this emotive and gestural register. For example, memes, where a piece of information is both transformed and shared as it moves through and between various online social media spaces (See Shifman 2013), has become a way to establish online cognoscenti subcultures who can both appreciate and understand the transformed structure of the information presented. Memes are often humorous and actively play with subtle changes in a streamed/shared image/text composition. A sense of the weight and emotive value of currency and sharing also envelopes what is called "virality" online (See Sampson 2012). A particular piece of information that goes viral identifies the relative speed with which connected individuals highlight and pass on the particular information to others and thereby linking their identity visibly to this current of information and communication. What has developed through these techniques of virality, memes, and the privileging of emotion and gesture in online communication is something that can be described as a new word of mouth culture. Gianni Guastella in his analysis of fame and the movement of unstable information in Antiquity and the Middle Ages identifies the instability of word of mouth communication and its relationship to gossip, rumour and contagion in its manifestations in eras that were predominantly pre-literate oral cultures (Guastella 2017). Despite the incredible presence of text, data, and the information it generates, our style of communication in this surplus information economy online has devolved into a destabilized *movement* of information that replicates oral cultures and the persistent turbulence of opinion and rumour in contemporary culture (See Marshall 2017).

### **The Effects on the Academy**

With this new word of mouth culture comprised of its surplus information economy and gestural patterns of personalized expression pervasively and pandemically part of our transnational culture of communication, it is perhaps inevitable that our traditional scholarly forms of communication have been affected.

The first key effect is derived from the now stronger relationship of the academy to big data and its capacity to be used for assessment. We can call this move to big data as the expanding deployment of algorithms for educational value. For academics, like many professions and services, they are now evaluated through the collection of information from their “clients”, which in education - a less corporatized world - are called students. Internally, these are called teaching evaluations; but their numeric structure produces an augmented value and belief in their accuracy. Recent research, however, has begun to show how these surveys have many inaccuracies. Gender bias (Mitchell and Martin 2018), inordinately low numbers of participants as they have moved to online platforms and clear reactions of students to levels of difficulty that led to poor teacher evaluation ratings (Vasey and Carroll 2016) are some of the more prominent issues that have been identified. There is also an American-based publicly commercial site that evaluates university teaching call RateMyProfessors.com. Operating since 1999, the service is designed for students, has 19 million ratings of 1.7 million professors from 7500 universities. According to their information, RateMyProfessors.com has “more than 4 million college students” active on its site each month. Along with other forms of analysis, it also had a controversial emoji ranking of professors in terms of their “hotness” through the use of 0 to 4 chili peppers (RateMyProfessors.com 2018). This form of ranking of professors was withdrawn after decades of use by the site after complaints about its appropriateness (Shannon 2018).

The second key effect on scholarly communication relates to the complicated challenge that new algorithmically designed reconstruction of academic writing can have for the integrity of academic work whether by scholars or students. For more than 15 years, Turnitin has been the leading commercial online plagiarism detection service. Since 2014, Turnitin has had more than 500 million submissions from more than 26 million students across 15,000 institutions internationally having their academic papers surveyed through their service. When reviewing a paper, Turnitin identifies the level of similarity in the semantic relationship of text to pre-existing texts: hence it has become the source for determining plagiarism across the academic sector.

Contrapuntal to plagiarism detection services are the emerging technologies that can assist in or completely generate an essay for the scholar or student: writing becomes secondary to the apparent research work that a student/scholar can input into these applied programs to help write both papers for university coursework and, quite remarkably, for submission to reputable academic journals (Pels 2017). In a similar vein, a recent case of alleged contract cheating by an international student at our home institution at Deakin University turned out to be the student writing their own assignment in their native language and then using an online translating services (such as Google Translate) to convert their writing to English and then utilising an online grammar correction program to polish their work into a solid and grammatically correct English essay ready for submission. These programs challenge what universities imagine as a legitimate scholarship process and the production of self-written work. The accoutrements available to enhance our academic and scholarly communication will no doubt proliferate in a variety of platforms, services and forms that will make the search for academic integrity all the more difficult, costly and resource-consuming in the next 10 years.

An even further effect is the transformation of the default form of communication that students are asked to generate for assessment. With the capacity for students to generate videos or perhaps text-based interactions as opposed to spoken-word or combinations of text, image and commentary, contemporary scholarly communication is challenged in terms of what it should privilege and/or integrate into the concept of scholarly communication. Once this is explored at the level of student assessment, it seems that perhaps different forms of communication may be valuable for the movement of scholarly information and knowledge in disciplines as well.

### **The Value of our Current Emerging System**

Scholarly communication is certainly challenged by these new and predominant forms and registers of communication that are derived from online culture; but it is important to not to dismiss these challenges and thereby seal scholarly communication in a quasi-monastic safe house. There is significant value in this emerging system of communication for scholarly and academic communication. Before we can conclude with what universities should focus on and advance for the future of scholarship, this section revisits the value of our destabilized communication environment. Here is a basic list of positives from our work in this paper:

1. There is a massive amount of information in contemporary culture – truly unprecedented and beyond the collective capacity of all libraries in the world combined. It is both fascinating and, potentially, overwhelming.
2. By implication of this massive amount of information, we have to acknowledge that there is emerging a massive amount of (potential) knowledge.
3. The capacity to share:
  - a. information – and potentially knowledge – has also expanded; and
  - b. for the dissemination and testing of information to form knowledge is clearly more possible across millions of “scholars” and researchers.
4. There is genuine capacity to democratize knowledge partly through this information surplus and partly through the pathways to find information.
5. There is also an increased capacity to generate genuinely new information through more extensive playing with the data of the information.

Despite these positive values of our new system of communication, we have to acknowledge the problems of our compromised system of communication for scholarship. What follows are the issues that make our system of communication of knowledge compromised:

1. As we have identified in this paper, there is an unstable patterning of the movement of information. This instability comes in two forms:
  - a. The sharing structure of online communication has no clear means of verification to truth-claims or to truth and valued knowledge
  - b. The data system is producing new information that is also producing new patterns of “identity” knowledge that are being mined and used for specific purposes:
    - i. Monitoring the activity of individuals
    - ii. Classifying individuals into categories
    - iii. Selling these identity clusters and categories of individual profiles to others for profit
2. Finally, as we all negotiate our way through online communication and this compromised system, our own identities are shifting – not datafied (that is how others use us online), but shaped and congealed through this massive data sharing structure.

This has implications for how we conceptualize ourselves as academics and scholars (and, of course our wider identities) and how students are conceptualizing themselves. It is important to identify this instability in identity formation and that it has implications for the future of universities as much as many of the other contemporary institutions that are part of our current everyday life. As we have identified in this paper, the emerging work in persona studies is a starting point for understanding these new identity formations of the self.

### **Conclusion: What should we do? The #5Ways**

There are no easy solutions for the future of scholarly and academic communication. What we have identified through this paper are the challenges that have shifted what was a relatively stable information-to-knowledge system for the last 300 years. We have identified that online communication and the associated relationship to data and sharing has produced a fundamentally different communication environment, one that we have identified as a new word of mouth culture, a big data culture and one dominated by gestural and emotive styles of communication. This new system of communication cannot be ignored by the academy. To conclude our study of the challenges to truth, verification and knowledge in contemporary culture, we would like to propose the 5 ways (for sharing purposes, known as the #5Ways) that the university and the academic community can advance in the coming years to build a new system of academic communication that moves information to knowledge.

1. First and most importantly, the Academy broadly conceived should retake leadership in the movement of information to knowledge.
  - a. As a first step, with our academic identities we should actively develop the standards for what constitutes “publication” in online culture.
  - b. In a related way, we should spot the dangers in the current algorithmic constructions of value and innovation and, through no doubt difficult work, identify the values of online algorithmic constitutions of truth and verification.
  - c. Begin developing/identifying a new spectrum of publications that are scholarly – blogs/posts/interventions/videos – that allow for collective evaluation via “crowd-review” as opposed to “blind-peer-review” by scholarly associations for their scholarly value. The academy through this work gains a new relationship that is concurrent with online communication in generating research in a more timely manner. This represents a challenge to the slow and compromised system of academic journal publications, not necessarily a full replacement, but a way in which different forms of academic communication are valued in the academy.
  - d. Use the video/computer game idea of “beta” testing to establish the forward process of review and verification of any opinionized article/media online. In other words, academics work to verify some of the unstable, new word of mouth styles of communication and recognize these prevalent opinionated and emotional forms of communication need to be verified at some level by the academy on a regular basis.
  - e. In conjunction with beta testing above, develop Wikipedia systems of continuous “checking” of content and providing updates of the relative validity and value of any publication.
  - f. Develop crowd-writing as an acceptable academic form of communication that is validated by the academy and the various disciplinary associations in terms of its value for the advancement of knowledge.

- g. Encourage sharing but develop a universal and accurate-as-possible referencing hierarchy for online information that acknowledges the movement of knowledge and information via sharing stages. These could be organised to identify alpha, beta, gamma, delta stages in the movement of information. This task is difficult; but it is needed to help move information from online culture into the referencing and validation systems of academic communication and knowledge.
2. Secondly, wrest the system of rankings and reputations for both universities and individual academics back into the Academy and away from the corporations now holding these systems of information/algorithms of value.
3. Integrate these new systems of judging truth and verification we have identified in 1. above into the classroom for all the various ways students write/produce scholarly work -this will take time and, without doubt, trial and error to be accomplished.
4. Work on identifying the new systems of sharing information and knowledge and developing related systems of referencing these systems that have emerged and will emerge online.
5. Recognise that the gestural communication and sharing processes of online culture need adjudication and evaluation and are generally identified as opinion not facts when they are part of university teaching and communication. ***They are valued differently.***

Scholarly communication continues to have a central value in the world of higher education and the wider movement of information and to knowledge. Our study of how to deal with the new instability of truth, trust and verification is the essential task of universities. If the academy takes up this challenge and reasserts its centrality in the formation of knowledge, it will ensure the relevance of universities and their systems of education for generations.

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