Reimagining Academic Writing in Academia 4.0 to De-incentivise Plagiarism[1]

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Abstract: Academic research and scientific publication are being influenced irreversibly by what is referred to as the fourth industrial revolution. The exponential growth in the number of research publications continues, information and communication technology (including artificial intelligence) is making available research data and tools with unprecedented capabilities, and online open access to publications has enabled greater and more rapid access by other researchers. Changes of research practice and the behaviour of researchers and authors as a result of these developments are evident, and are challenging the criteria, norms and standards by which the quality and integrity of research has historically been judged. The manner in which prior research is being accessed, reproduced, applied and acknowledged is an example of such changes. In academia, the presentation of the ideas or writings of another without them being explicitly attributed to the original source has always been regarded as plagiarism and considered serious misconduct. Yet when such ideas and writings are freely available and in the public domain, they arguably fulfil the criteria for being considered common knowledge which don't necessarily need to be referenced. This article presents examples of acceptable replication and reuse of the work of others, and examples of how plagiarism is manifesting differently because of information and communication technologies, including plagiarism software. It is argued that while paraphrasing previous authors result from understanding and applying their prior research, paraphrasing may simply be a grammatical or mechanistic process that does not attest understanding and application. It is provocatively suggested that current norms and standards of academic writing, including referencing, may no longer be appropriate. Relatively modest amendments to academic conventions and assumptions are proposed that could lead to a new paradigm of more efficient research and scientific publications, acknowledging that this would place greater burden of responsibility on the users, reviewers, editors and examiners of research to be familiar with extant knowledge.

Keywords: Plagiarism, Ghost writing, Common knowledge, Attribution, Normal science, Paradigm shift, Literature review.

1. Introduction

The context within which academic research (research project reports, dissertations and theses for higher degrees) and scientific publication (in traditional subscription journals, open access journals and institutional repositories) are taking place is undeniably evolving. The growth of research literature continues despite Price's anticipated knowledge saturation (Wagner and Kim, 2014), research is becoming increasingly accessible electronically, and software and artificial intelligence systems continue to become more powerful.

These and other disruptive technologies are resulting in changes of behaviour and research practice. Specifically, the manner in which academics and researchers access, manage, analyse, develop, grow, describe, publish, exchange and reference knowledge is evolving. These changes of behaviour and practice are testing the validity and legitimacy of traditional norms, standards and assessment criteria, which may become less and less appropriate over time.

The aim of this article is to alert researchers to the changes that are currently being experienced in academia associated with contemporary information and communication technologies, and to provoke discussion and debate on how the academic and publishing community might respond constructively to the emerging challenges.

The emphasis is on the representation of the words, ideas and thoughts of others as one's own, because what has traditionally been considered plagiarism is one of the practices that highlights the emerging tension between the traditional and the future status quo. The reasons that students and researchers plagiarise include managing workload, ease of access to sources, inadequate knowledge of subject matter and simple laziness (Kayaoğlu et

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al., 2016). These will not be discussed in this paper because it is not anticipated that these antecedents will change fundamentally in the foreseeable future.

2. A Paradigm Shift towards Academia 4.0

Industry 4.0, also referred to as the *fourth industrial revolution*, is the term that has been coined to encapsulate current emerging and disruptive technologies in industry, such as cyber-physical systems, the internet of things, cloud computing and artificial intelligence. It is a progression from the first industrial revolution, characterised by mechanisation, water and steam power; the second industrial revolution, characterised by electricity and mass production; and the third industrial revolution characterised by computerisation and automation. In this paper, *Academia 4.0* is therefore used as a metaphor for the currently emerging and disruptive trends in tertiary education.

2.1 Exponential growth of research literature

The development of scientometrics as a field of study was pioneered by Derek John de Solla Price. He found evidence that the body of scientific literature has been growing exponentially for the past few centuries (Price, 1963). This has led to the aphorism that a substantial portion (up to 90%) of all the scientists that ever lived are alive today (Gastfriend, 2015). Price (1965) estimated the growth rate of scientific literature to be approximately 7% per annum and, despite his logic that exponential growth is not sustainable, this appears to be continuing even at an increased rate (Wagner and Kim, 2014, Bornmann and Mutz, 2015).

The proliferation of research in any particular field presents challenges to academic authors. First, it may not be easy to identify seminal and cutting-edge works in the field. Second, an author may independently arrive at thoughts, ideas or words that are comparable to those of other authors, thus giving the false impression of having plagiarised.

The relentless pursuit of knowledge in academia is competitive and obligatory, as captured in the maxim "publish or perish"; the metaphor of dwarfs standing on the shoulders of giants is often used to describe academic authors, who themselves aspire to become "giants" one day. Wagner and Kim (2014) identify various authors and philosophers of science who expressed concern about the quality as opposed to the quantity of scientific output. Without engaging with the awkward question of how to define and then measure the quality of research output, it is conceivable that the growth of research literature has been and continues to be at the expense of the quality of publications.

2.2 Electronic access to research

Information and communication technology has been a fundamental enabler of access to published research. Open access – providing free, online, permanent and largely unrestricted access to research – has experienced worldwide growth. Pinfield et al. (2014) in reviewing this growth from 2005 to 2012 note that while the initial development of repositories took place in North America, Western Europe, and Australasia, while more recently there has been repository growth in East Asia, South America, and Eastern Europe. A more recent review (Piwowar et al., 2018) identifies and describes four emerging themes regarding open access: an increasing partiality of funding institutions towards open access to the research; value adding services based on open access sources; contestation regarding the ethics and appropriateness of traditional subscription publishing; and the increasing unaffordability of access to traditional subscription sources.

It is acknowledged and should be noted that electronic access to research is not a panacea for researchers. In addition to the benefits, Tennant et al. (2016) and Björk (2017) identify detriments of open access to research. For example, the costs for researchers are typically higher for open access journals, and lower barriers to entry have resulted in a proliferation of so-called predatory publishers and conferences, with a corresponding impact on the quality and reliability of research publications.

Easy and reliable access to research publications are now a reality, irrespective of the advantages and disadvantages. An implication that has not been comprehensively addressed is that, being freely available in the public domain, open access research publications now fulfil one of the criteria for being considered *common knowledge*. This has profound implications for the attribution of knowledge and referencing.

2.3   Collaboration and communication among researchers

One of the phenomena of the internet era has been the emergence of literally hundreds of social networking websites, among the most popular today being LinkedIn (founded 2003), Facebook (founded 2004), Reddit (founded 2005), Twitter (founded 2006), Instagram (founded 2010), and Pinterest (founded 2010). These sites are defined as internet-based systems on which users can create individual profiles, connect with other users, and make additional connections through other users that would otherwise not be possible (Boyd and Ellison, 2007). Ovadia (2014) noted the increasing popularity of specialized academic social networking sites, focussing specifically on ResearchGate and Academia.edu.

The potential benefits of these academic social networking sites are similar to those of open access, and include knowledge dissemination and greater research impact, connecting with scholars with similar research agendas, sharing of data, and keeping acquainted with current research trends (Williams and Woodacre, 2016). Scholars have also expressed reservations about the use of academic social networking sites, for example: fears that their work will be plagiarised, the speed and convenience of communication can be at the expense of the quality of engagement; manuscripts can be posted that are not of publishable standard in recognised scientific publications, and traditional publication formats are favoured for purposes of academic appointments and promotions (Williams and Woodacre, 2016). No matter what the opportunities or risks posed by these academic social networking sites, there can be little doubt that they will remain a component of the academic research and publishing ecosystem.

2.4   Information technology and artificial intelligence

The influence of information technology (both hardware and software) and artificial intelligence on research cannot be underestimated. The sizes of datasets no longer constitute a constraint on storage, access or analysis; cloud storage provides practically limitless storage capability, communication bandwidths allow for rapid exchange of vast datasets, algorithms previously too complex to be practicable can now be executed, and the expertise and tools for unstructured "big data" analytics are commercially obtainable.

It is well known that researchers may have their own discernible style and register of academic writing. As and when the technology becomes available to characterise, identify and replicate researchers' style and register of writing, it may become impossible to attribute sources and contribution to knowledge reliably. This would undermine one of the fundamental tenets of academic integrity.

2.5   Literature Reviews

There is a degree of consensus about what constitutes a good literature review. Ryan (1979) notes that the literature review will both contextualise a study and justify the research question, and must be based on the best available resources. Similarly, Zaporozhetz (1987) referred to the "thoroughness" of the literature review, but added that there ought to be an overall flow of ideas and attention to detail. Indeed, in the latter part of the 20th century there are many mentions of a good literature review implying comprehensiveness and completeness as being the criterion of quality. Possibly this can be attributed to sources being relatively less readily accessible than they are today. Walker (1998) provides a useful editor's perspective in commenting that authors evidently try to impress by listing an excessive number of references, whereas the literature review should rather articulate the purpose of the study and then review the literature the context of that purpose. Electronic access to prior research has been an enabler of literature reviews that are comprehensive and have a broad scope, but has also resulted in the emergence of literature reviews that are little more than a compilation of summaries of prior publications. Such compilations add little value and do not fulfil the intended functions of literature reviews.

More recent publications have formalised the purpose of and what constitutes a good literature review. The "inverted pyramid" conceptual model (Maier, 2013) in Figure 1 identifies four distinct steps in the writing of a good literature review. Similarly, Rewhorn (2018) concludes that a literature review must provide context, identify and describe gaps in existing scientific knowledge, and providing the rationale for the research questions. Nakano and Muniz Jr (2018) argue that any contribution to knowledge requires a good literature review to provide the theoretical foundation. The authors cite key features of a good literature review, being: *coverage* of relevant sources, *synthesis* of a new perspective on the topic, well-articulated substantiated assertions (*rhetoric*) and evidence of practical and theoretical *significance*.
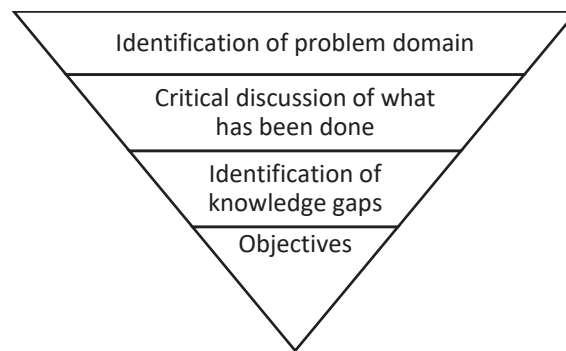
Figure 1: "Inverted pyramid" model of steps in writing a literature review (Maier, 2013)

Existing software and search algorithms have largely resolved the challenges of adequate coverage of relevant sources, thoroughness, providing context and identification of the domain of the research problem. New artificial intelligence applications are proliferating, and search tools are increasingly effective. Combined with natural language generation and text composition software, it is conceivable that the customary review of literature, the traditional foundation of research endeavour, will be automatically generated on the basis of appropriately specified key words and phrases. In this context, knowledge in the form of published research will in effect constitute research data for the potential generation of new knowledge, with debateable intervention and contribution from human researchers.

The review of literature as a research method in its own right, widely referred to as a Systematic or Structured Literature Review (SLR), was alluded to by Mittelstaedt and Zorn (1984) when indicating that it should examine the generalisability of particular relationships by means of a meta-analysis. Rowe (2014) provides another editorial perspective, with guidelines and recommendations for authors confirming that a literature review paper is not merely an overview of the literature. The greater accessibility to prior research publications enabling researchers to carry out comprehensive literature reviews is explicitly noted by Kraus, Breier and Dasí-Rodríguez (2020) who also provide a useful comparison between systematic and traditional literature reviews.

2.6 Plagiarism and ghost writing

There appears to be a degree of consensus in the literature that evidence and instances of plagiarism and ghost writing are increasing. Appropriately these phenomena are receiving increasing attention from the research community. It is self-evident that information and communication technologies have been enablers of both plagiarism and ghost writing, although the very same technologies may also have a greater role to play in the future in militating against them.

Singh and Remenyi (2016) note that academic misconduct is not new, citing cheating in examinations, data falsification and fabrication, and illicit pre-viewing of examination papers as well-established examples. However, the authors note that the opportunities for cheating have multiplied in the past few decades. Similarly, Fisher et al. (2016) illustrate that the modus operandi of ghost writers depends heavily on the anonymity of the internet and the proliferation of online academic programmes.

The critical urgency of responding to plagiarism and ghost writing is highlighted by Fusch et al. (2017). Both involve profound deception which compromises integrity. The authors go on to describe the ethical implications of plagiarism for all participants and stakeholders in the research as a "moral harm inflicted on all parties" (Fusch et al., 2017). It is therefore appropriate to look deeper into the emerging tension between the historic manifestations and understanding of plagiarism, and the future status quo.

3. Emergence of Plagiarism

3.1 Evolution of plagiarism

It is not within the scope of this paper to review the origins and history of plagiarism, and there are various authors who have provided comprehensive and informative synopses (for example Sutherland-Smith, 2010). Common themes of these perspectives is that plagiarism has existed since time immemorial, that it is referred to using criminalising language, and that there is not necessarily universal consensus on the interpretation or appropriate consequences. It is noted that most research is carried out within existing frameworks or paradigms

and has been referred to as "normal science" (Kuhn, 1962), and therefore a certain amount repetition and replication of others' ideas is probably unavoidable.

3.2 Acceptable replication and reuse

It would be inaccurate to suggest that all replication and reuse of the words or ideas of others without acknowledgment is regarded as plagiarism.

3.2.1 Academic phrasebooks

There are many commonly used phrases in academic writing, to such an extent that some have become the butt of internet jokes and memes, examples of which are given in Table 1. While these particular interpretations are obviously not intended to be taken seriously, there are numerous internet resources that give examples of useful phrases and sentences for the benefit of academic authors, particularly those not writing in their mother tongue. The adoption of such phrases and sentences is so widespread that their use cannot reasonably be construed as plagiarism.

Table 1: Commonly used phrases in academic writing and their correct interpretations

Common phrases	Correct interpretations
Typical results are shown ...	This is the prettiest graph.
In a series of cases ...	Thrice.
According to statistical analysis...	Rumour has it.
It is believed that...	I think.
In my experience ...	Once.
It is generally believed that ...	A couple of other people think so, too.
In case after case ...	Twice.
It has long been known ...	I didn't look up the original reference.

Source: Various internet web sites. [†]
[†]The sequence of these phrases has been randomised so as not to reproduce the original sources exactly.

3.2.2 Imitation and Flattery

Oscar Wilde is credited with the adage "Imitation is the sincerest form of flattery that mediocrity can pay to greatness." Many witticisms are attributed to this Irish poet and playwright, but this saying has particular relevance in academia. In some cultures, it continues to be the case that the use of the words or ideas of others is deemed appropriate and respectful of seniority and authority (Park, 2003). While this is not prevalent in Western cultures, it does suggest that plagiarism needs to be viewed with cultural sensitivity.

3.2.3 Code reuse in software engineering

Plagiarism is particularly challenging in the software engineering discipline. Gibson (2009) notes that it is quite normal for existing code to be used in the development of new software, and discusses a code of practice specifically for use in academia to differentiate between legitimate re-use and plagiarism. Object oriented programming and example embedding (Barzilay, 2011) are examples of widely used software development techniques that involve legitimate and intentional reuse of other developers' code, which would not be regarded as plagiarism.

4. Contemporary plagiarism

Verbatim plagiarism in academic texts – comprising phrases, sentences, paragraphs or more that have been copied from original sources and replicated in an academic text without appropriate attribution – is surely the most straightforward and easily understood form of plagiarism. It is equally the most easily perpetrated form of plagiarism, particularly with the availability of electronic and online academic content.

4.1 Plagiarism software

There is a plethora of software available to address plagiarism. It is intriguing to consider how these various software products are described: they are labelled variously as "plagiarism detection", "plagiarism analysis", "plagiarism checking", "anti-plagiarism", or "plagiarism prevention" software. There are two problems with these labels. Firstly, an implied claim that the software itself might prevent plagiarism is farfetched; only the

researchers or authors themselves can avoid plagiarising with the software providing them some technological support. Secondly, current software packages use algorithms that identify similarities and matching text, making it particularly reliable at identifying verbatim plagiarism. However, not all forms of plagiarism are manifest as similar or matching text. The theft of the thoughts of others may have no similar or matching text whatsoever and may therefore remain undetected, yet remains plagiarism.

Turnitin appears to have attracted the most attention of academics and researchers. The website (www.turnitin.com) asserts that "academic integrity begins with Turnitin" and claims to be "the world's most effective plagiarism detection solution". Another popular plagiarism software is Grammarly (www.grammarly.com) which also checks grammar, spelling, tone and style. This software can be used as an add-in to Microsoft Office to check documents and emails. iThenticate claims on its website (www.ithenticate.com) to be "the most trusted plagiarism checker by the world's top researchers, publishers, and scholars." While that claim may be difficult to substantiate, the website does have links to a few useful readings.

The problems of both false-positives and false-negatives do not negate the benefit and utility of these software. However, they do require more than a superficial and simplistic interpretation of a similarity metric. The software has potentially given academia a false sense of security, because it has changed how researchers and authors compose their works. Writing and editing to evade plagiarism software has become a specialised and valued skill.

4.2 Paraphrasing

When reviewing literature and prior research, it is common practice to paraphrase the text of the original authors. The principle behind this is that it demonstrates one's understanding and interpretation of the original text in the context of one's own research. The logic is that through understanding and interpretation of the original text in the unique context of one's research, one will end up paraphrasing the original text. However, the reciprocal logic does not necessarily apply: paraphrasing the original text does NOT guarantee or imply that one has necessarily understood the original text and applied it to one's own research.

Paraphrasing can be a mere grammatical exercise. There are websites and applications that will perform the function, albeit with varying degrees of competence, without any intellectual input from the researcher. By way of example, the following sentence was obtained from the Oxford University website providing academic guidance to students (https://www.ox.ac.uk/students/academic/guidance/skills/plagiarism?wssl=1) and some clauses also are to be found in various online resources:

> *Paraphrasing the work of others by altering a few words and changing their order, or by closely following the structure of their argument, is plagiarism if you do not give due acknowledgement to the author whose work you are using.*

This sentence was submitted to a number of paraphrasing applications, the results of which are shown in **Table 2**.

Table 2: Examples of paraphrasing applications

Tool and Website URL	Paraphrased text
QuillBot https://quillbot.com/	*Paraphrasing other people's job by changing a few words and changing their order, or closely following the structure of their argument, is plagiarism if you don't offer the author whose work you're using due recognition.*
Spinbot https://spinbot.com/	*Summarizing crafted by others by adjusting a couple of words and changing their request, or by firmly following the structure of their contention, is written falsification in the event that you don't give due affirmation to the writer whose work you are utilizing.*
Small SEO Tools https://smallseotools.com/article-rewriter/	*Paraphrasing the work of others by sterilisation some words and dynamic their order, or by closely following the structure of their argument, is plagiarism if you are doing not provide due acknowledgement to the author whose work you're victimization.*
Best Free Spinner http://bestfreespinner.com/	*Paraphrasing the work of some others by altering a very few words and changing their particular order, or by carefully following the structure of these argument, is plagiarism should you not give due acknowledgement towards the author whose work you might be using.*

It is clear that the ideas expressed in the original text have remained unchanged, although in most instances the style has become somewhat idiosyncratic. Nevertheless, paraphrasing using mechanistic tools such as these can be an effective means of evading plagiarism software, particularly as natural language processing and paraphrasing algorithms mature and increase in effectiveness. Therefore, it cannot be assumed that paraphrased text is free of plagiarism, even if it has evaded detection by so-called plagiarism software.

4.3 Anecdotal experience

Ison (2015) did not find that that internet had had a significant impact on the prevalence of plagiarism at doctoral level, and this author's experience of postgraduate student research suggests that the reliability of software that can identify verbatim or cut-and-paste plagiarism has proved to be a deterrent. However, there have been perhaps unintended consequences: while there has been a decline in verbatim plagiarism, the relative number of instances of more subtle forms of plagiarism has undoubtedly increased.

4.3.1 Randomisation

It was indicated in a note to Table 1 that the entries in the table had been resequenced. Such reordering of itemised lists, or transposing of words or phrases is a common method used by academic authors to evade detection of plagiarism by the applicable software.

4.3.2 Word switching

The use of thesauruses together with the "find and replace" word processing function makes it straightforward to edit source text so that the words no longer match the original. In the comparison between the student's submission and the original source given in Table **3** it is clear that the words "dominant players" or "the dominant" have been substituted for "monopolies" and "monopoly" respectively.

Table 3: Comparison of student's submission and original source illustrating word switching

Student's submission	Original source [†]
Dominant players have existed throughout much of human history. This is because powerful forces exist both for the creation and maintenance of dominant players.	Monopolies have existed throughout much of human history. This is because powerful forces exist both for the creation and maintenance of monopolies[6].
The Dominant is a term used by economists to refer to the situation in which there is a single seller of a *product* (i.e., a good or service) for which there are no close substitutes. The word is derived from the Greek words *monos* (meaning *one*) and *polein* (meaning *to sell*). (Swannell, 2006)	*Monopoly* is a term used by economists to refer to the situation in which there is a single seller of a *product* (i.e., a good or service) for which there are no close substitutes. The word is derived from the Greek words *monos* (meaning *one*) and *polein* (meaning *to sell*).

Student's submission	Original source [†]

[†]   The Linux Information Project (2005). Monopoly: A Brief Introduction. Retrieved from http://www.linfo.org/monopoly.html

Plagiarism software would generally draw attention to instances of plagiarism of this nature. The absurdity of this example is patently obvious in the second paragraph in which the etymology of the word "monopoly" is incongruously used to explain the derivation of the word "dominant".

4.3.3   *Paraphrasing as a means to avoid plagiarism software*

In the following example the student's submission returned a relatively low similarity index of 5%. However, closer inspection revealed that extensive sections of the Literature Review consisted of systematic paraphrasing of consecutive sentences from other authors' publications. Evidence led at this student's disciplinary hearing indicated that approximately 63% of Literature Review had been edited in this fashion.

By way of an example, **Table 4** gives three sentences from just one paragraph of the student's submission and the original source text. Sentences have been shown separately for greater clarity.

Table 4: Comparison of student's submission and original source illustrating ideological plagiarism

Student's submission	Original source [†]
Higher financial literacy levels have been associated with superior financial decision making.	Higher financial literacy scores have been linked to higher quality financial decisions.
The chief costly financial blunder that older family units make is not refinancing their mortgages in an environment where interest rates are falling.	A particularly costly financial mistake for older households in a falling interest rate environment is the failure to refinance a mortgage
Mimbs-Johnson and Lewis (2009), established that characteristics related to financial sophistication are good predictors of refinancing behaviour that maximises wealth.	Campbell (2006) finds that characteristics associated with financial sophistication predict wealth-maximizing refinancing behavior.

[†]   Finke, M. S., Howe, J. S., and Huston, S. J. (2016). Old age and the decline in financial literacy. *Management Science*, 63(1), 213-230.

While the original words have not always been used, it is clear that the student has faithfully reproduced the thoughts and ideas of the original authors without any acknowledgment. This is termed ideological- or style plagiarism, and may be considered to be an indication of a deliberate attempt to "outsmart" plagiarism software. It is interesting to note that the student replaced the original citation in the last sentence, which may be a further indication of intent.

4.3.4   *Similarities with multiple sources.*

The proliferation of easy access to electronic sources can result in uncertainty over the true origins of some material, as highlighted by the ambiguity regarding the origin of the opening internet meme above. When analysing a document using plagiarism software, it is not uncommon that specific phrases or word sequences are found to be similar or identical to multiple uncited sources. This would be neither unusual nor unexpected when multiple researchers are working within the same paradigm (Kuhn, 1962). Excluding cases of discipline specific jargon and technical terms, a number of uncertainties arise. For example, if the author did indeed use the words or ideas of another without attribution, it is uncertain from which source the words or ideas were plagiarised. In an environment in which academic misconduct is increasingly common (Singh and Remenyi, 2016) it is plausible that words or ideas have been plagiarised from previously plagiarised sources. While there is more than one way to skin a cat, it is surely impracticable for every author to describe a frequently discussed or universally accepted concept in their very own words. It is conceivable that the specific phrases or word sequences merely constitute common knowledge which, by convention, do not need to be cited.

Ferro and Martins (2016) refer to *common knowledge* as a "grey area" in academia, citing Neville (2010) in describing it as knowledge that is either commonplace in a specific discipline or field of studies, or that is in the public domain. It is this latter description that has become particularly problematic with the proliferation of online and open access to academic sources. Authors can and do argue quite cogently that online and open

access journals are *de facto* in the public domain, and as such can and perhaps should be considered to be common knowledge.

4.4 Referencing conventions

There are many referencing software tools available to assist researchers and authors that cater for different budgets and needs. Some of the most well-known are BibTeX, Mendeley, EndNote, Zotero, RefWorks, and Reference Manager. Appropriately attributing material to the original authors and adherence to referencing conventions are considerably easier for authors using these software tools. A major advantage is the ability to reference on the fly, both while compiling notes and in drafting of manuscripts, thereby militating against inadvertently failing to attribute correctly and facing allegations of plagiarism.

An unintended consequence of the use of such software is that authors may pay less attention to the completeness of the details in the list of references, incorrectly assuming that this will be taken care of by the software. These software are only tools and the underlying database is only as reliable as the data stored therein; authors remain responsible for ensuring that all the necessary details of sources are captured correctly.

5.   Changing the paradigm of academic writing in Academia 4.0

A combination of passive voice and the third person is frequently used in academic writing. This can result in some ambiguity as to who has carried out the action or activity described. Where an in-text citation follows phrases such as "The data were gathered …", "Participants were asked …", "It was found that …", or "No significant difference was found …", it is clear that the sentence does not refer to the author's own work. Conversely, when such phrases are not followed by a citation, by convention it is generally assumed that the action or activity was carried out by the author her- or himself. Therefore, by omitting a citation of the work of others, it may be alleged that the author has plagiarised. This can be unfortunate if the omission of the citation was a mere oversight or pertained to the grey area of common knowledge.

5.1 Justification for a paradigm change

It is clear that there are powerful incentives to plagiarise. Hoover (2006) shows that the incentives make plagiarising a rational choice for individuals, while Necker (2014) concluded that the "publish or perish" culture in academia is a significant incentive for individuals to plagiarise. In response to authors expending undue time and energy merely avoiding plagiarism and adding no value, plus ease of access to prior research, paraphrasing and plagiarism software, and the proliferation of online resources, this author proposes that plagiarism be reframed as a worthless and pointless activity – a complete waste of time and energy. The objective of changing the paradigm of academic writing would be to remove all incentives for authors to plagiarise, but to make it essential to acknowledge prior research in order to be recognised for making a contribution to knowledge.

Fundamental to the paradigm change of academic writing are the criteria against which academic writing is evaluated by supervisors, mentors, examiners, reviewers, editors and the like. The author of this paper proposes a paradigm for academic writing in Academic 4.0 in which:
1.   seminal and significant prior research and other sources in the public domain are regarded as common knowledge and need to be acknowledged by citation, but not reviewed;
2.   unreferenced statements, claims, findings, etc. are assumed to be drawn from prior research, for which the author takes and is given no credit; and
3.   the merit of academic work is judged solely on the basis of that which authors explicitly claim as their own and which patently enhances the extant theory or body of knowledge.

There ar; various justifications for de-incentivising plagiarism, particularly in literature reviews. Plagiarism consumes and wastes research resources; the time expended by researchers, supervisors, examiners, moderators, editors, and others produces no contribution to scientific knowledge whatsoever. The proliferation of research literature within any given paradigm (Kuhn, 1962) results in unnecessary and similarly unproductive duplication of references. In the foreseeable future, technology in the form of smart search algorithms and natural language generators will be at least as effective as human researchers at summarising and applying prior research. Finally, literature reviews have been found to be relatively poorly valued by the research community (e.g. Maddan, 2018; Walker, 1998; Mustaine and Tewksbury, 2016).

While at first sight, such a paradigm might seem to be taking an unduly lenient view of plagiarism, it is suggested that this will be an altogether more rigorous and potentially demanding approach to academic writing. In this paradigm, unattributed findings would be disregarded as academic puffery and poor academic writing, while plagiarism would comprise authors explicitly taking credit and responsibility for statements, activities, findings, etc. that were not their own.

5.2   Direct impact of a change of paradigm of academic writing

The most obviously impact of the proposed change of paradigm of academic writing would be substantial de-emphasis of the traditional literature review. The justification for this is that the seminal and significant published works would have been acknowledged and would be being readily accessible, and therefore restatement would be redundant. In proposing to do away with the literature review in the criminological and criminal justice disciplines Maddan (2018) suggests that researchers would get to the substance of their article much quicker, more rapid article production would facilitate quicker dissemination of research findings, shorter articles would enable the publication of more articles per journal, and the entire publication process would be expedited.

However, authors would need to familiarise themselves and be thoroughly acquainted with the existing theory or body of knowledge in order to lay claim to their unique contribution. Similarly, those evaluating academic work (for example: research supervisors, mentors, examiners, reviewers, and editors) would also need to be sufficiently conversant with the discipline in order to make a meaningful evaluation of the work. Conversations and engagement among stakeholders using academic social networks are set to become essential components of the knowledge creation process. These will be expected to be visible in the public domain as they will replace some of the discourse that currently takes place through journal publications, at conferences or in personal correspondence. All participants will need to be active in these domains to maintain their credibility and influence.

The de-emphasis of the traditional literature review and the corresponding intensified focus on the authors' explicit contribution would potentially reduce the recycling of knowledge that tends to occur in "normal science" (Kuhn, 1962). This would increase the likelihood of researchers challenging or at least questioning the essential assumptions of current frameworks, leading to paradigm shifts. Similarly, traditional publication metrics may need to be reconsidered as they are framed and understood within the current paradigm.

Finally, authors may need to adapt their writing style, as writing in the first person and active voice – as recommended in APA 6th Edition, Section 3.18 (American Psychological Association, 2010) – would necessarily become the new norm. This would also be consistent with an increasing level of informality that has been observed across various disciplines (Hyland and Jiang, 2017).

While academic misconduct in the form of plagiarism and the related and more insidious practice of ghost-writing would not be eliminated, they would require a greater investment of time and intellect; the cost versus the benefit would largely mitigate against them.

6.   Conclusion and Recommendations

There is an evolution in the manner in which academic misconduct is manifesting, driven at least in part by emerging technologies. Acknowledging the transition to *Academia 4.0*, mirroring the so-called fourth industrial revolution, it is suggested in this paper that there may be an alternative to the traditional definition and response to plagiarism.

It is posited that the relative ease of access to prior research and information has lessened the importance of the traditional literature, and that much more can now be thought of as common knowledge than has been the case historically. The suggestion is that although attribution of sources remains fundamental, in future authors must explicitly claim their own interpretation of and contribution to knowledge, and unattributed or unsubstantiated statements should be disdained and discounted as academic puffery rather than being considered indicators of potential plagiarism.

The proposed reframing of plagiarism and placement of greater emphasis on unique, new knowledge generation may be more intellectually onerous on researchers and evaluators, and the quantity of research may decline. However, it is suggested that the quality and impact of the research will be substantially enhanced.

The practicalities of changing writing standards and effect such implementation would have on academic examination, review and publication processes has not been explored. Given that these standards and processes are well-established, it is clear that implementation will be extremely disruptive (Pinheiro, Cope and Kalantzis, 2019). It is therefore suggested that it is imperative that further research begin on the barriers and enablers of a transition to a new paradigm of academic writing and publication, from the perspective of each and every group of stakeholders.

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