Journal of Philosophical Investigations
Print ISSN: 2251-7960 Online ISSN: 2423-4419
Homepage: https://philosophy.tabrizu.ac.ir

Critical Rationalism and the Internet

Donald Gillies

Emeritus Professor at University College London – England. E-mail: donald.gillies@ucl.ac.uk

Article Info

Article type:
Research Article

Article history:
Received 25 January 2023
Received in revised from 27 April 2023
Accepted 11 May 2023
Published online 18 June 2023

Keywords:
Critical rationalism, The Internet, World 3, Misinformation, Popper's epistemology

ABSTRACT

The aim of this paper is to consider whether critical rationalism has any ideas which could usefully be applied to the internet. Today we tend to take the internet for granted and it is easy to forget that it was only about two decades ago that it began to be used to any significant extent. Accordingly in section 1 of the paper, there is a brief consideration of the history of the internet. At first sight this makes it looks implausible that any of Popper's ideas could be applicable to the internet, since Popper died before the internet came into general use. However, section 2 argues that Popper's theory of World 3 does apply very well to the internet. This application is significant because, as shown in section 3, it leads to the problem of misinformation, which is one of the most significant problems generated by the internet. In section 4 there is an attempt to solve this problem using ideas taken from Popper's epistemology. It is argued that there should be changes in education designed to prepare students for the internet age. Teaching in the internet age should focus on presenting to the students not just the accepted theories but also the evidence on which they are based. An illustration of how this might be done is given by considering an example from science teaching, namely the teaching of Newtonian mechanics in the last years of school or first years of university.

Cite this article Gillies, D. (2023). Critical Rationalism and the Internet. *Journal of Philosophical Investigations*, 17(42), 80-90. http//doi.org/10.22034/jpiut.2000.16573

Publisher: University of Tabriz
http//doi.org/10.22034/jpiut.2000.16573

1. Introduction. History of the Internet

It was during the late 1960s and early 1970s that the first tentative steps were taken to connect computers so that information could be passed between them. A number of systems were developed for this purpose in different parts of the world, but perhaps the most significant was the one produced by the USA's Defense Advanced Research Projects Agency (DARPA). DARPA's packet switching network was called ARPANET. A well-known anecdote, relating to this early period, concerns the first ARPANET link, which was established between the University of California, Los Angeles (UCLA) and the Stanford Research Institute on 29 October 1969. To check whether the link had been established, the participants were in touch by phone. First L was typed and it was checked by phone that it had appeared at the other end. Then O was typed and its appearance was again checked by phone. However, when G was typed, the system crashed.

Still great oaks do sometimes from tiny acorns grow. By 1981 ARPANET had 213 hosts. Another significant date was 1 January 1983 when ARPANET replaced some of its earlier protocols by the much superior TCP/IP protocols. TCP/IP allowed ARPANET to be connected up to other networks.

The story now shifts to CERN (*Conseil Européen pour la Recherche Nucléaire)*, which, in the second half of the 1980s, created for its own internal use an extensive internet using TCP/IP protocols. Berners-Lee, who was working at CERN, had the idea of improving this by using hypertext. He was allowed to proceed with his plan, and by Christmas 1990 had developed the basic tools for what he decided to call the World Wide Web. These included the HyperText Transfer Protocol (http) and the HyperText Markup Language (html). In January 1991 the first Web servers outside CERN were established, and, in the 1990s, the growth of the internet became explosive. In 1993, only 1% of telecommunicated information went through the internet, but, by 2000 this had risen to 51%, becoming 97% by 2007.

It is worth noting that virtually all the research and development which led to the modern internet was publicly funded. In fact, commercial use of ARPANET was strictly forbidden, and connections were restricted to military sites and universities. CERN was of course also government funded. Both CERN and Berners-Lee made the Web available freely with no patent and no royalty payments being required. Once the internet had been developed, however, it was rapidly commercialised, leading to the dot-com crash of 2001.

Let us now return to critical rationalism. This is the philosophy first developed by Popper. Yet Popper died in 1994 when use of the internet was still in its very early stages. It might therefore seem unlikely that any of Popper's writings could have a direct application to the internet. Yet I will argue that one of Popper's main theories does apply in a very striking fashion to the internet. This is his theory of world 3.

Popper seems to have developed his theory of world 3 in the second half of the 1960s. What became the standard account of this theory appeared as chapters 3 and 4 of Popper's book *Objective Knowledge*, which was published in 1972. Chapter 3 *Epistemology without a Knowing Subject* had

already been published in 1968, while Chapter 4 *On the Theory of the Objective Mind* was based on articles which had appeared in 1968 and 1970. In his 1972 exposition, Popper uses the term 'third world', but later, following a suggestion by his friend Sir John Eccles, he preferred to use the term 'world 3'. In the present paper, I will use 'third world' and 'world 3' interchangeably.

Popper's theory of world 3 was developed from Frege's theory of the third realm (Frege 1918:19), which in turn had been developed from Plato's famous theory of a transcendental world of forms. However, there were two very important differences between Popper's theory and those of predecessors. Both Plato and Frege thought the world (or realm) which they postulated existed outside space and time independently of human beings. Popper on the other hand regarded his world 3 as existing in time and created by human beings.[1]

From the dates just given, we can say that the internet in its modern form appeared about twenty years after Popper had developed his theory of world 3, and that it took a further ten to fifteen years for the internet to assume its present dominant position in contemporary life. Despite these long-time gaps, I will try to show in the next section that Popper's account of world 3 applies very well indeed to the internet. This is what, in my view, gives Popper's theory of world 3 a prophetic quality.

2. Popper's Account of World 3 applies to the Internet

Popper begins by characterising the third world as (Popper, 1972, 106):

> the world of *objective contents of thoughts*, especially of scientific and poetic thoughts and of works of art.

Now the term 'internet' is perhaps ambiguous. We could mean by 'the internet' the infrastructure of cables, computer hardware etc, together with the software that enable these to work. This, however, is not the sense in which I want to use the term 'the internet'. I want rather to use the term to refer to the contents of all the web pages which are more or less publicly available. Now the internet in this sense does indeed contain almost all the content of scientific and literary works. Whether the internet contains the contents of works of art is perhaps more questionable. Consider paintings and sculptures. There are of course pictures of most such objects on the internet, but it could be argued that the full content of a painting or sculpture can only be obtained by seeing the original. The internet must contain hundreds of reproductions of the Mona Lisa, but the full content of that painting can perhaps only be obtained by viewing the original in the Louvre in Paris. The case of paintings and sculptures is therefore arguable, but for the most part the contents of the internet are the same as those specified by Popper's initial characterisation of world 3.

I now want to argue that the main points, which Popper makes about world 3, apply to the internet. To do so, I will use the device of the *transformed quotation*. That is to say I will give a quotation from Popper making an important point about world 3, substitute for the expression 'third

[1] For more details about the origin and development of Popper's theory of world 3, see Gillies (2010).

world' (or a similar variant) the expression 'the internet'. So that the reader is not deceived, I will put the original expression in square brackets […] after the phrase 'the internet'. The point of this of course is to show that what Popper originally said about world 3 is today true of the internet.

My first transformed quotation originally concerned the contents of world 3. It runs as follows (Popper, 1972)

> Among the inmates of the internet [my 'third world] are, more especially, *theoretical systems*; but inmates just as important are *problems* and *problem situations*. And I will argue that the most important inmates of the internet [this world] are *critical arguments*, and what may be called … *the state of a discussion* or the *state of a critical argument*; and, of course, the contents of journals, books, and libraries.

Nowadays the contents of journals, books, and libraries are for the most part available on the internet. There may still be a few journals and books, which only exist in paper form, but even this small remainder is likely to disappear before long. As for 'critical arguments' and 'the state of a discussion', they are arguably more easily obtained from the internet now than they were from libraries in the late 1960s and early 1970s. In any area of research, there are usually blogs in which the principal participants discuss the current situation in the field. Such blogs give a good picture of the state of the discussion in the area and provide the relevant critical arguments.

Popper stresses in a number of places that world 3 is made by humans, and, of course, the same applies to the internet. In one striking passage Popper compares the human creation of world 3 to spiders making webs and bee's honey. The transformed quotation runs as follows (Popper, 1972, 159-60):

> the internet [the third world] … is the product of men, just as honey is the product of bees, or spiders' webs of spiders. … larger parts of the internet [the third world] are *the unplanned product of human actions* …

Popper introduces another analogy, that of building a cathedral. He says (Popper, 1972: 185):

> … working on science is a human activity like building a cathedral.

This obviously applies to the internet, which is indeed like a cathedral rising up through the labours of vast numbers of workers.

Popper stresses in another passage that individual contributions to the third world are vanishingly small. The transformed quotation runs (Popper, 1972, 161):

> All of us contribute to the internet's [its] growth, but almost all our individual contributions are vanishingly small.

This passage has been criticized By Parusniková in her 2016, where she writes (p. 313):

> Another way of diminishing the status of the human mind can be found in Popper's argument that 'almost all our individual contributions are vanishingly small' … True, if the third world contains all knowledge accumulated in history, it continually balloons and reaches ever grander proportions; one person must surely gape at this achievement with the feeling of being tiny and overwhelmed. But Popper did not appropriately consider the other side of the same coin in this context, namely, the fact that the whole third world has been produced by human minds. The same researcher can well feel proud of this achievement of all mankind – and of himself as a part of it.

Indeed, Popper's use of the expression 'vanishingly small' is too strong. As already remarked, the internet enables an instant exchange of critical arguments in blogs, chats, etc. It creates the possibility of constant discussion, provoking participants to respond and communicate. In this way the internet accentuates the role of the individual subject in helping to create world 3. We can illustrate this point by continuing the cathedral analogy. Suppose there is a magnificent cathedral which is famous for a number of statues. Visitors come from all over the world to admire these statues, which we can suppose were made by several medieval craftsmen whose names are unknown. Would it be correct to say that the contribution of these individuals to the cathedral was 'vanishingly small'?

Popper's next major point about world 3 is that, although it is created by us, it becomes largely autonomous, and in fact reacts back on us. This is equally true of the internet as the following transformed quotation shows (Popper,1972, 147):

> the internet [the third world] … is man-made. But … the internet [this world] exists to a large extent autonomously; … it generates its own problems, especially those connected with methods of growth; and … its impact on any one of us, even on the most original of creative thinkers, vastly exceeds the impact which any of us can make upon it.

Moreover, Popper stresses that no individual can master even a small part of world 3, and the same of course applies to the internet. Here is the transformed quotation (Popper,1972, 161):

> We can act upon the internet [it], and add to it or help its growth, even though there is no man who can master even a small corner of the internet [this world].

These quotations show that Popper actually provided a theory of the internet more than twenty years before the internet came into existence. I have one more transformed quotation to give, but, as it introduces a new point, I will give it in the next section.

3. The Problem of Misinformation

Popper compares his world 3 to Plato's world 3 – the world of forms. Popper points out that in contrast to the Platonic world of forms, his world 3 is man-made, changing, and contains false

theories as well as true ones. The following transformed quotation shows that all this applies equally well to the internet (Popper,1972, 122):

> Plato's third world was divine; it was unchanging and, of course, true. Thus, there is a big gap between Plato's third world and the internet [his and my third world]: the internet [my third world] is man-made and changing. It contains not only true theories but also false ones, and especially open problems, conjectures, and refutations.

At the moment there are important developments in the analysis of the internet and its effect on human knowledge and so on society. This area of study is usually described as the philosophy of information. The idea is that information is obtained from the internet and that this gives rise to the information society. Can Popper's ideas about the third world make a contribution to this important area of contemporary research? I think they can.[1]

In the last transformed quotation given, it was stressed that the internet contains both true theories and false theories, that is to say both correct (or sound) information, and misinformation. This is obviously the case. One need only think of holocaust denying websites which give an account, which is totally at variance with reality, of the concentration camps of the Second World War. It is of course still true to say that, in our information society, people do generally obtain information from the internet, but it should be remembered that information on the internet is mixed up with misinformation. So, the transformed quotation we have just given from Popper leads to what could be called the problem of misinformation. This can be stated as follows. Whenever we want to obtain information from the internet, how can we be sure that what we download is correct information and not misinformation? This is a serious practical problem, and, in the next and final section, I will propose a solution based on a development of Popper's epistemology.

4. A Solution to the Problem using a Development of Popper's Epistemology

When investigating a rather abstract problem, it is often useful to consider a concrete example. Here is one, which I think is fairly realistic. Suppose someone (Mr X say) would like to minimise his chance of getting heart disease by adjusting his diet. What should he eat? The standard answer for several decades has been that he should approximate his diet to either the traditional Mediterranean diet or the traditional Japanese diet, or perhaps some combination of the two. To simplify the discussion, let us concentrate on the traditional Mediterranean diet as it existed in the South of Italy before fast food outlets were established there. One feature of this diet is that, compared to the diet of Northern Europe, it contained much less of the saturated animal fats to be found in meat, cheese, milk and butter. In fact, in the South of Italy, butter was hardly known at all. Olive oil was used instead. The diet contained a little meat and cheese, but not very much since

[1] I have already made an attempt to apply Popper's theory of world 3 to the philosophy of information in my (2010) which discusses the ideas of Luciano Floridi – a leading researcher in this area. The present paper is a continuation of this line of thought. Floridi has provided an excellent introduction to the philosophy of information in his (2010).

there were few cattle in that part of the world. Instead, there was quite a bit of fish from the Mediterranean Sea, a whole range of beans, vegetables and fruit, and a great deal of pasta and bread. In addition, of course, wine, especially red wine, was a common beverage. Epidemiological surveys combined with experiments into how plaques formed in the arteries, suggested that this diet, and particularly its low levels of saturated fat, protected against heart disease. This view was quite revolutionary when it was introduced in the 1950s for, previously it had been thought that the Northern European diet, based on much more meat, creamy milk, and cheese, made those who consumed it stronger and healthier. However, the view that the traditional Mediterranean diet was in fact better at preventing heart disease came to prevail and is now the standard view in medical circles.

Recently, however, this standard view has been challenged by a new approach. According to this new line of thought, saturated fat is not as bad as it has been made out to be. What is really unhealthy in a diet is eating too many carbohydrates. Those who adhere to this new approach advocate eating more meat and dairy products but less bread and pasta than is to be found in the traditional Mediterranean diet.

Naturally the internet contains websites advocating both approaches. For those who are interested, a website which promotes the new pro-saturated fat, anti-carbohydrate approach is fatburningman.com. Let us therefore return to our puzzled Mr X. After surfing the internet, he feels hungry. Should he prepare a large plate of spaghetti with tomato and fresh basil sauce, or would it be better to have a steak with cheese sauce? Let us next see what parts of Popperian epistemology might be relevant to his dilemma.

In fact, Popper considers the question of whether there can be a rational choice between alternative actions in chapter 1 of his book: *Objective Knowledge*. He writes (Popper, 1972, 21):

> a man of practical action has always to *choose* between some more or less definite alternatives, since even *inaction is a kind of action*.
>
> But every action presupposes a set of expectations; that is, of theories about the world. Which theory shall the man of action choose? Is there such a thing as a *rational choice*?

This leads to what Popper calls the '*pragmatic problems of induction*'. In fact, Popper gives two such problems, but it is the second (Pr_2), which is relevant to us. Popper states this problem and then answers it as follows (Popper, 1972, 21-22):

> Pr_2 Which theory should we prefer for practical action, from a rational point of view? … My answer to Pr_2 is: … we should *prefer* as a basis for action the best-tested theory.

Early in the same chapter, Popper defines *degree of corroboration* as follows (Popper, 1972, 18):

> By the degree of corroboration of a theory I mean a concise report evaluating the state (at a certain time t) of the critical discussion of a theory, with respect to the way it solves its problems; its degree of testability; the severity of tests it has undergone; and the way it has stood up to these tests.

In the light of this, I think we could develop Popper's ideas, by adopting the principle that, in the case of a choice, it is rational to prefer as a basis for action the theory which is the best corroborated by evidence.[1]

If we apply this to Mr X, then it is clear he should prefer the diet theory which is better corroborated by evidence, whether this turns out to be the Mediterranean diet theory, or the theory which advocates more meat and dairy products, but less carbohydrate. This answer is, in my view, correct in theory, but raises some practical problems. It would, in principle, be possible for Mr X to find out on the internet about the evidence in favour of and against the two competing theories of diet, and to form a judgment of which of the two theories is better corroborated by evidence. However, this is quite a skilled task, which Mr X may not be able to perform.

One way out of this problem for Mr X would be to try to assess the reliability of different websites. Mr X could, for example, consult nhs.uk. This is the website of the UK's National Health Service (or NHS), and the views expressed on it are approved by the British Medical Association and so represent mainstream views in scientific medicine. Mr X could well decide that it is better to trust the views of this website rather than others which do not have the same degree of backing from leading scientists. Now this is a perfectly sensible strategy, but yet not entirely satisfactory. It is based on an appeal to authority, while critical rationalism suggests that people should not rely on authority but rather form their own opinions in a rational and critical fashion. But how can an average man, such as Mr X, who is not a scientific expert perform such a task?

The answer to this new problem must lie in making changes in education, which prepare students better for the age of the internet. At the moment many subjects such as history, science, and medicine are taught in a rather dogmatic fashion. The accepted 'facts' are presented, and the student just has to learn them. Many of these 'facts' are really theories, or at least involve theories, and yet these theories are assumed without giving any of the evidence for them. Accepted 'facts' are now so easily obtained from the internet that there is no longer a strong reason for learning them by heart. However, what we cannot immediately tell is whether the alleged information we download from the internet is genuine information or rather misinformation. Thus, teaching in the internet age should focus on presenting to the students not just the accepted theories but the evidence on which they are based. I will now try to illustrate how this might be done by considering an example from science teaching, namely the teaching of Newtonian mechanics in the last years of school or first years of university.

[1] This may diverge from Popper's own views by giving 'degree of corroboration' an inductive interpretation. For a discussion of this point, see my (2009).

When I first learnt Newtonian mechanics more that sixty years ago, it was taught in a very dogmatic fashion. We began by learning Newton's laws such as force = mass x acceleration (**F** = m**a**), but no attempt was made to justify these laws in any way. They were just assumed. We were then taught how to apply these laws by being given a whole series of quite complicated problems to solve. Curiously though, these problems did not include the problem which had originally prompted Newton to invent his laws, namely the problem of explaining the motion of the planets round the Sun.

Suppose now that we want to teach Newton's laws in a non-dogmatic fashion by presenting the empirical evidence for these laws. This could be done by introducing some history of science into the teaching. A natural starting point would be a discussion of Galileo's law of falling bodies. The experiments whose results corroborated Galileo's law empirically were quite simple ones carried out on pendulums and balls rolling down inclined planes. These experiments are cheap and easy to perform, and it would be a simple matter to get students to carry them out at the beginning of their study of mechanics. In this way, they would see for themselves the empirical evidence for the first basic law in the field.

After this, there could be an account of Kepler's laws and how they were corroborated by Tycho Brahe's data. This sets the scene for introducing Newtonian mechanics as an attempt to explain both Galileo's law of falling bodies and Kepler's laws of planetary motion. It might be too difficult mathematically at this stage to derive the law that planets move in ellipses from Newton's theory, but it would be possible to give a mathematical derivation of the simpler case of a circle, which approximates to an ellipse, and it could be explained that the full derivation will be presented at a later stage when the student has learnt more mathematics.

I think it would also be desirable to contrast Newton's theory of action at a distance with Descartes' view that all action must take place by contact. Descartes' view seemed much more plausible at the time, and this led many contemporary researchers to be sceptical about Newton's law of gravity. Their doubts were overcome by the empirical successes of Newton's theory in explaining not just that Kepler's laws held to a high degree of approximation, but also that deviations from these laws occurred due to gravitational attractions between planets, in explaining not just Galileo's law but the variations in the acceleration due to gravity at different depths and altitudes. A brief account could also be given of the success of Newton's theory in explaining the tides and comets. The point of all this would be not only to show the student that Newton's theory was accepted because of its high degree of empirical corroboration, but also that a theory which at first seems surprising and counter-intuitive can gain acceptance through empirical success.

Teaching science by this historical approach which emphasises the evidence which led to the acceptance of theories would give a better understanding of the subject. In mechanics, for example, students often become confused about the question of centrifugal force versus centripetal acceleration. Newton's derivation of the shape of planetary orbits proceeds by considering the natural tendency of a planet to move off in a tangent according to Newton's first law which is overcome by the gravitational attraction of the Sun which pulls the planet round into an ellipse.

This example helps very much to clarify the issue of centrifugal force versus centripetal acceleration. Of course, students would still have to try to solve those difficult problems applying Newtonian mechanics to various complicated situations, but, with a better understanding of the principles of the theory, they would find these problems easier.

There are a number of other benefits of this kind of teaching of both science and other subjects. Students learning how older and less satisfactory theories have come to be replaced by new ones which are better corroborated empirically would naturally acquire the habit of evaluating their beliefs in the light of evidence, and so become less likely to be deceived by misinformation. One argument which is often used by the anti-scientific is: 'why believe in what scientists say as their views are always changing?' Those who are taught science in a dogmatic fashion might fall for this argument, but those who are taught by the historical approach which emphasizes evidence will be aware that these changes of scientific opinion are changes from an older theory to one which is better corroborated empirically, and so constitute a strength rather than weakness of science.

When discussing what theory people should base their actions on, I assumed implicitly that there was a theory which was both very well corroborated, and much better corroborated than its rivals. This is often the case in science, but not always. There can be situations where none of the existing theories in an area has been very successful and become well corroborated. This could be the case, for example, in some branches of psychiatry. An education which lays emphasis on evidence would be very useful in dealing with such situations because it would lead to a recognition of one's own ignorance, and the consequent need to act with caution. Those brought up to accept theories dogmatically would be more inclined to accept a theory for which there was little or no evidence, and acting on such weakly corroborated theories is a recipe for disaster.

I am not of course saying that the kind of education I have been advocating is the answer to all problems. It would improve things but would not enable the average person to evaluate the evidence for a scientific or medical claim as skilfully as an expert. It should, however, enable such a person to follow the main arguments in favour or against a hypothesis and so understand why the majority of scientific experts accept the hypothesis in question, if this is indeed the case. Someone who had a grasp of the main arguments would be making an informed choice rather than a choice based entirely on blind faith in the views of experts.

References

fatburningman.com (consulted 25 November 2022)

Floridi, L. (2010). *Information: A very short introduction*. Oxford University Press.

Frege, G. (1918/19). Logical Investigations. Part I Thoughts. In Brian McGuinness (Ed.), *Gottlob Frege, Collected Papers on Mathematics, Logic, and Philosophy*, Basil Blackwell, [1984], pp. 351-372.

Gillies, D. (2009). Problem-Solving and the Problem of Induction. In Zuzana Parusniková and Robert S. Cohen (Eds.) *Rethinking Popper*, Boston Studies in the Philosophy of Science, Springer, pp. 103-115. (Available on ResearchGate)

Gillies, D. (2010). Informational Realism and World 3, *Knowledge, Technology & Policy*, 23(1), 7-24.

nhs.uk (consulted 25 November 2022)

Parusniková, Z. (2016). The Devaluation of the Subject in Popper's Theory of World 3, *Philosophy of the Social Sciences*, 46(3), 304-318.

Popper, K. (1972). *Objective Knowledge*. Oxford University Press.