Control levels in epistemic vigilance against Fake News

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Abstract: Faced with the proliferation of fake news and the public's credulity, education in critical thinking and the development of informational skills are becoming increasingly urgent. The credibility given to information depends largely on schemes, i.e. the usual ways of processing this information. This notion of scheme is similar, in the documentary context, to the concept of informational habitus (Vivion, 2019). Inspired by the theoretical frameworks of cognitive ergonomics, in particular the instrumental approach (Rabardel, 1995), we propose to see the processes of epistemic vigilance as a diagnostic activity. We develop the idea that the level of schemes, insufficiently addressed in dual models (Kahneman & Clarinard, 2016) constitutes the privileged level of articulation between automatic processes and analytical thinking. In conclusion, we discuss the implications of these proposals for education.

Keywords: fake news, critical thinking, scheme, informational habitus, instrumental approach

Introduction

While familiarity and credibility assessment processes are in place from an early age (Pasquinelli et al., 2020), why is it so difficult to detect and challenge the information provided by fake news? One of the explanations often advanced is that the human mind is subject to biases that alter its judgement and critical capacities. For the supporters of this theory, the challenge is to inhibit automatic processes (Monteiro et al., 2020). However, the mechanisms that initiate this inhibition are not completely clear. In this paper, we propose to consider Internet as a dynamic system of instruments. Information processing can then be seen as a diagnostic activity. This approach provides us with an analytical framework for the reception of fake news and leads us to consider the evaluation of information as a consequence of the control of the activity and not as an objective of the activity.

Internet, a dynamic instrumental ecosystem

Laborderie & Szoniecky (2015) proposed to see documentary ecosystems by analogy with a garden in order to apprehend its complexity. Internet is then seen as a computer representation of a set of documents and information (the vegetation) on which human or software agents (the gardeners) act, whose activity gives the system its dynamic (living) character. The production or consumption of

documents is part of an instrumental dimension in which the documentary resource is both the object of the activity and the object through which this activity is deployed (Meunier, 2021a).

The instrumental approach

The notion of instrument was developed in ergonomic psychology, in particular by Rabardel (1995) who studied the relations between the subjects and the artefacts (tools) during an activity. He emphasised the dual nature of instruments with, on the one hand, a tool or artefact that constitutes the technical part of the instrument and, on the other, a subject who, through his schemes, uses the artefact to achieve his objectives. A document is not intrinsically an instrument, it is so because an individual uses it in a particular activity. This is particularly important in the case of fake news, since in this approach it is impossible to understand its use and effects without taking into account the activity of the subject who uses it. This dual nature also implies that any instrumented activity comprises two tasks, one main one which allows the goal of the activity to be achieved (understanding a document, finding information, sending a message, making oneself look good to one's "friends", making them laugh, etc.) and a secondary task which concerns the use of the tool. In the case of the Internet, two types of artefact are superposed, the documents and the consultation devices, which may themselves be superposed (browser, website, social network, PDF reader).

One instrument, several mediations

The instrument is fundamentally a mediator between the subject and the object of the activity. This mediation takes several forms (Cerratto Pargman et al., 2018). The first is of an epistemic nature. An instrument gives an understanding of the object of the activity (the information) by means of the instrument (the document). This is typically the case of an information search activity on the web. A document can also be placed in the position of object of the activity, notably in fact checking situations. The second type of mediation is pragmatic, it is oriented towards the transformation of the object and the achievement of a result. This type of mediation can be observed in annotation activities involving the transformation of the document with the result of identifying the main lines of a text. It is also the case of the recovery of information in a social network that leads to the creation of a new hybrid document that keeps the link with the original content and presents part of it in a new form. In the first case, pragmatic mediation is the goal of the activity, but more rarely in the second. These two forms of mediation, epistemic and pragmatic, are part of the relationship between the subject and the object of the activity. The use of an instrument can also mediate the relationship between individuals, in our case, the author (the source) and the recipient (the reader). This is called interpersonal mediation (Lonchamp, 2012). As for the subject-object axis, interpersonal mediation is declined between an epistemic mediation, aiming at knowing the other, and a pragmatic mediation, i.e. aiming at acting on it. The post on a social network can serve both types of mediation by inviting, for example, a contact to react or to make a comment and, in some cases, to make him/her adhere to the opinions communicated by the document. The fourth form is reflexive mediation (or heuristic mediation) which is part of the subject's relationship to himself through the instrument (Samurçay & Rabardel, 2004). This is typically what is done with selfies and, more generally, with posts on social networks aimed at supporting self-esteem. All these forms of mediation are part of a quadripolar model (Rabardel, 2001) that can be formalised in several equivalent ways. We propose to apply this model to any form of exchange instrumented by documents (Meunier, 2021b).

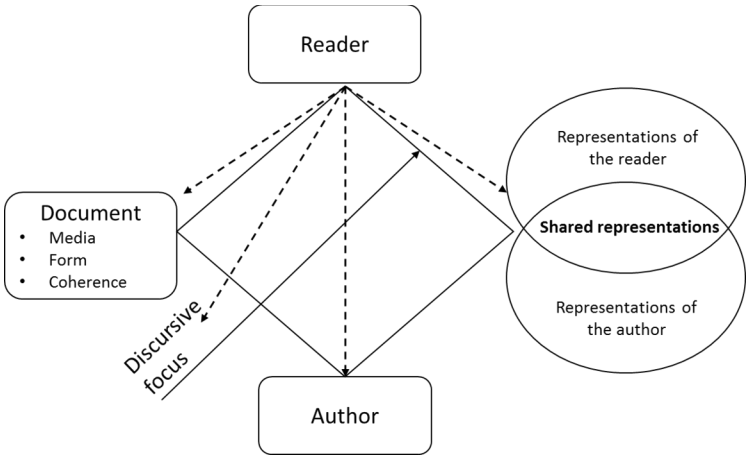

Figure 1 Quadrupole model of instrumental document use (inspired by Rézeau, 2002))

This model connects horizontally the representations (opinion, knowledge and beliefs) and the document. It expresses, on the author's side, the mediation and mediatisation of the information and on the reader's side the activities of understanding the document and the associated representations (dotted lines). The vertical axis is that of the interpersonal relationship between the source and the person consulting the document.

Application of the model to the analysis of fake news

This model applies to the analysis of fake news, which can be seen as a special case of document. Even if epistemic mediation is at the center of the verification activity, the requirement and the means to satisfy it can vary greatly from one individual to another. All these mechanisms (i) are not spontaneously activated (ii) may compete with the goals of the current activity (iii) involve a greater or lesser cognitive load. This is due to the fact that a reader is engaged in an activity of which consulting the document is only one aspect and of which verification may be secondary. Furthermore, the literature mentions the influence of many individual factors on the evaluation of fake news such as familiarity with the content, informational habitus (Vivion, 2019) or cognitive style (Sindermann et al., 2021) to name but a few.

Evaluations seem to depend on a multitude of factors from very different levels of processing: mood at the time of the task (Diaz, 2021); perceived emotion upon reading the fake news and compatibility with knowledge and beliefs (Berger, 2011; Wang et al., 2020) or even political or religious opinions (Bronstein et al., 2020). This model makes it possible to account for the instrumental dimension, but is therefore not sufficient to account for the complexity and levels of evaluation of information. Moreover, the reference to a verifiable truth is problematic. Indeed, it is only from the point of view of fake checkers that information is verifiable by reference to facts that are external to the source and the verifier. This is often what is expected of the general reader, although it is understood that this is beyond his or her reach because such verification implies (i) engaging him or her in an activity other than his or her spontaneous activity (ii) instrumenting him or her to acquire the information that enables the deviations from reality to be flushed out. Finally, the mechanisms of comprehension lead a reader to always try to re-establish coherence between his representation of the text and his knowledge. Thus, a reader will more easily adhere to information that presents a world that is easy to understand and will generally seek to reduce cognitive dissonance (Axt et al., 2020).

We must therefore abandon the myth of Internet users as verifiers of information and instead focus on understanding how individuals process information in order to identify ways of resisting misinformation, in particular by considering the epistemic dimension of mediation provided by the

document. One way of approaching this is to distinguish different levels of diagnosis according to the requirement for understanding and the time available.

Critical thinking as a diagnostic process

Considering the document as an instrument means embedding its evaluation in both an activity and its social context. This evaluation is therefore not a static judgement, but evolves according to the goals of the subject and the constraints of the situation and the consequences of the activity, which is why we propose that the evaluation of information, true or false, is a process of diagnosis of a dynamic situation. Our definition of the notion of diagnosis is "[...] an activity of understanding a situation, relevant to a decision to act" (Hoc & Amalberti, 1994, p 179). For these authors, decision-making and diagnosis are interactive processes resulting from a compromise between the necessary cognitive effort and efficiency.

Their model was initially developed to account for the management of industrial processes or the operation of machinery. These situations have the particularity of being dynamic, i.e. of evolving independently of the individual's action, which is the case of our documentary system, particularly in social networks where the effects of a post often exceed the author's original intention. It is because the subject exercises control over his or her activity, if only to ensure that it is carried out according to his or her expectations, that he or she is led to make a judgement on the information he or she encounters. This judgement is not an absolute judgement, it is determined by the purpose of the activity. Thus, when searching for information, an individual may focus more on the relevance of the information to the task in hand than on its truthfulness, especially if the subject is unfamiliar.

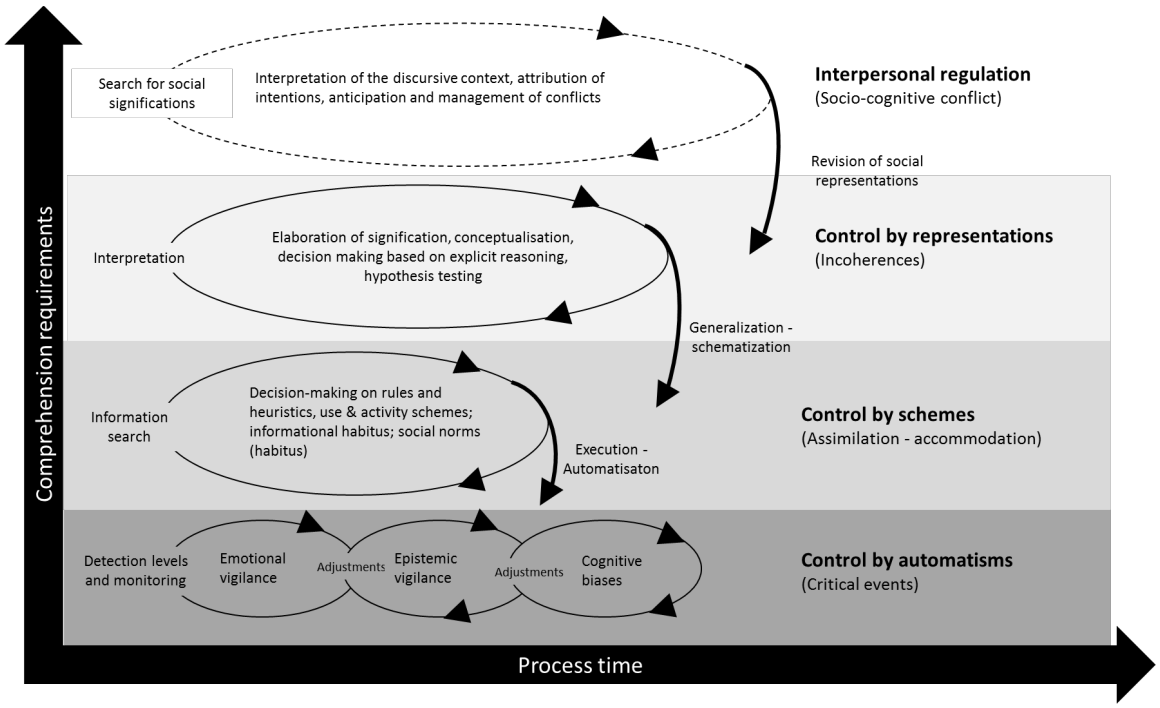

Figure 2 Levels of information evaluation. Inspired by Hoc & Amalberti (1994)

This primacy of action in diagnosis explains why an individual can be satisfied with a minimal understanding of the situation if it allows him to continue his activity. Two parameters determine the type and level of control: the requirement for understanding and the time constraint (see Figure 2).

For Hoc & Amalberti (1995), the levels of control of the activity and of diagnosis are closely linked. Three levels are distinguished: automatisms, rules and the control by representations.

Automatisms are usually data-driven and can be inhibited when a critical event occurs that challenges the process. These processes are very fast and often impermeable to information that does not concern them. At this level we find the mechanisms of epistemic vigilance (Sperber et al., 2010) or emotional vigilance (Grandjean & Scherer, 2014). This is also the level at which all cognitive biases are applied (Wang et al., 2020). Automatic processes require very little analysis of the situation and have a very low cognitive cost. Repetition, especially when the time constraint is important, induces the development of automatisms. In the case of fake news, repetition only can lead to increased credibility (Pennycook et al., 2018). These automatisms are difficult to change except in the case of a critical event that requires them to be interrupted. Control is therefore reactive and dependent on external data.

The second level is the level of rules. These are instantiated in an activity characterised by one or more goals; they are generative in nature, i.e. they generate the activity as it proceeds by determining the actions and information intake necessary for the activity. We propose to place at this level the schemes, which are structures that encompass the rules. This notion of scheme is to be compared with the notion of informational habitus (Vivion, 2019). This notion therefore brings together informational practices (search habits, preferred media, representations and trust in sources), information appropriation practices (reception, management and apomediation), but also informational reflexivity (evaluation of information, construction and modification of an opinion). Each scheme carries an expectation about the outcome (anticipation) which allows us to check its applicability to the situation (assimilation) and possibly to question it (accommodation) in order to make it evolve.

If the comprehension requirement increases, especially when the schemes are inoperative, the individual must reason on an explicit representation. This does not exclude the fact that the schemes continue to influence the interpretation of the situation by guiding the search for information. These processes are slow and require an in-depth analysis of the situation, as well as a significant cognitive effort. At this level, we find all the mechanisms of decision-making based on explicit reasoning or hypothesis testing. The reconsideration of representations depends above all on the detection of inconsistencies. This is the privileged level of rethinking representations. Results such as those of Pennycook & Rand (2019) support the idea that analytical reasoning is correlated with perceived accuracy. This level of distancing from opinions when evaluating information through analytical thinking is supported by other findings (Greene & Murphy, 2021; Pehlivanoglu et al., 2021; Ross et al., 2021), but some studies report conflicting results (Bago et al., 2020). Furthermore, this level is not exempt from the influence of emotions and the role of perceived personal involvement (Pehlivanoglu et al., 2020; Vafeiadis & Xiao, 2021).

To these three levels, we propose to add a fourth with interpersonal regulations. From our point of view, even individual activities are socially situated and therefore imply different forms of interpersonal regulations. Hoc & Amalberti (1995) built their model to account for the evaluative dimension that is indispensable in all activities. The situations they studied are mostly individual, even if they are part of a collective framework and may in some cases be collaborative activities. However, these authors did not isolate the level of interpersonal regulations as we propose to do. It seems important to us, however, to do so in order to account for the interpretation of the intentionality of the source and the discursive framework in which fake news is situated. These processes could, however, be considered in the context of knowledge control. In interpersonal regulations, the reconsideration of representations is mainly based on (i) socio-cognitive conflict

(Buchs et al., 2008) and (ii) the acceptance of opinions without verification, in particular the results of Colliander (2019) which show the influence of comments on the evaluation of the veracity of a information (iii) or on mechanisms of escape from this conflict due to the perception of the opinion of others, even if this implies that the subject replaces his or her own beliefs with those of others (Jang & Kim, 2018).

Implications for education

The approach we propose distinguishes several levels of processing that can be mobilised, specifically to educate critical thinking. While studies on the development of critical thinking classically emphasise the need to inhibit the automatic system in order to allow the analytical system to operate freely (Beaulac & Robert, 2011; Houdé & Moutier, 1999), our approach emphasises the importance of an intermediate level between these two systems, that of schemes and habitus. These can be constructed through informal learning, in particular through confrontation with varied situations that allow invariants to be identified, but their consolidation most often requires formal teaching. A first approach consists in confronting the participants with fake news by teaching them to identify the relevant criteria for detection through the evaluation of the source, the media and the coherence of the content. Compared to a control group, the trained students were better at discriminating information on the three critical dimensions. However, the results varied according to the type of question on source evaluation (Pérez et al., 2018). Since text comprehension varies considerably depending on the reading context (Rouet et al., 2017), the main limitation however is the transfer of these skills outside the school context.

A second educational approach is inspired by the biological analogy of "inoculation". It is based on the principle that an individual who knows how fake news is constructed will be better able to detect it when he or she encounters it. Roozenbeek & van der Linden (2019) developed the game FakeYou to train players to generate their own fake headlines and thus familiarise them with the processes of formulating convincing fake news. The use of such a game does indeed lead to a decrease in sensitivity to fake news, but also shows that users favour specific processes for generating fake news, which strongly attenuates the scope of the schemes developed and also questions the transfer outside the learning context.

The approach we are looking to develop as part of the Polemika project (Desfriches Doria & Meunier, 2021) is midway between the two previous approaches. Our intention is to build on an automatic argument generator that will allow us to have an "argumentative dialogue" with an artificial intelligence that will be able to play on the emotional levels. The device that we want to gamify will repeatedly confront subjects with plausible but false statements or absurd or caricatural statements. The objective is not simply to learn to detect them (level 1 in our model), but to learn to counter-argue, which first requires the implementation of the third level. We hypothesise that the subject will then construct schemes for verifying information, but also schemes for identifying fallacious arguments and opposable counter-arguments. The hypothesis that we will try to evaluate is that by situating education in critical thinking in an activity of evaluation of arguments and especially of production of counter-arguments, individuals will manage to i) learn to detect more effectively fallacious arguments, ii) increase the quality of the criticisms carried out on the statements, iii) build verification schemes allowing not only to verify the quality of the source and the media, but also to elaborate a counter-argumentation The use of artificial intelligence should make it possible to better control the diversity of learning contexts and thus the generalisation of the schemes developed by the subjects.

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