



Relations Between the Concepts of Disinformation and the Fogg Behavior Model

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Abstract. This article aims to relate the concepts of false news and disinformation with the Fogg Behavior Model (FBM) in order to observe their existing connections. For this, two steps were carried out: a) Identify five concepts of fake news or disinformation of organs or institutions that work on information, education, science and/or society issues; and b) Relate the concepts of fake news or disinformation found with Fogg Behavior Model. The research has a qualitative approach, having characteristics of exploratory and documentary research. It is concluded that there were links between definitions of disinformation and fake news by UNESCO (United Nations Educational, Scientific and Cultural Organization), European Commission, Dictionary Oxford, World Economic Forum and Reuters with FBM with diverse levels of similarity. Through this analysis it is possible to learn more about how false information is formulated and how it can influence human behavior.

Keywords: Disinformation · Fake news · Fogg Behavior Model · FBM

1 Introduction

Many words are difficult to pinpoint their meaning, even when we use it daily and understand what they try to convey. Information is one such a word, in which multiple definitions apply to, in different situations and fields of study.

When it comes to conceptualizing, defining or giving meaning to the word information, the authors Capurro and Hjørland [20] affirm the existence of several concepts, from the most general to the most specific and when they are related to particular areas and disciplines. The importance of defining this word intends to solve existing problems in different fields, areas and disciplines; an example is the concept of information in the field of information sciences which, according to Losee, must have a general and precise definition [1].

Losee [1], in his study, defines information in a general way as: “information is produced by all processes and it is the values of the characteristics in the processes, output that are information”. In treating information as a factor of oral and written communication, it has always been present in the course of the development and evolution of human beings, from the act of informing particular news or subject to the conveyance

of knowledge and teachings. Developed, formulated and used by society according to their customs, needs and cultures [21].

Nowadays, with the arrival of political and intellectual combat, where population becomes its own threat, individuals think and manifest themselves in a more emotional than reasonable way. Nativism is gaining strength in numbers and society is on the right path for individualism. Politics and other correlated matters are becoming binary, instead of representing a dispute of ideas and relevant criticism. Science, studies and research are treated with doubt, unrest, suspicion and even contempt [2].

Those aspects end up favoring fake news that, as Alcott and Gentzkow [3] put it, are like articles on fake news published with the intent of informing untruth and misleading readers. Most of those articles are political biased, as shown in the United States presidential election of 2016. After this event, fake news began to invade our lives, along with post-truths (wherein emotions and personal beliefs value more than scientific facts), turning information into an object of manipulation, and transforming a lie into a truth in the eyes of those who have the propensity to trust [2].

Therefore, to comprehend the relationship between human's behavior with the internet and its offered tools, Fogg developed a psychological model called the Fogg Behavior Model (FBM), which "shows that three elements must converge at the same moment for a behavior to occur: Motivation, Ability, and a Prompt" [4].

Thus, this paper's objective is to identify if it exists a relation between fake news and disinformation's conceptions with the Fogg Behavior Model, in order to observe its existent connections. The research was done in two parts: a) identify five notions of fake news or disinformation in institutions or agencies that work on matters of information, education, science and/or society; and b) Relate the conceptions of fake news or disinformation found with the Fogg Behavior Model.

Studies made to understand what information and matters linked to it entails, such as disinformation and fake news, makes us improve our knowledge about the relevancy of researches done about the theme and recognize its importance for understanding and developing our society.

2 Information and Disinformation

Since the creation of the Gutenberg printing press in 1450, information is constantly undergoing development and improvement, from which knowledge becomes the social transformation of the population. Informational content is produced and disseminated on a large scale, which allows greater accessibility. Meanwhile, libraries have stopped being mere repositories and are used as study centers [5].

It was from this period, with the growing publication of news that began skepticism and questioning by intellectual authority, a process that led the scientific fields to produce their contents focused on scientificity [5]. Today we can see that the population constantly questions the authenticity and forgets to verify the information. In many cases people tend to believe news that brings up issues with which individuals choose to believe rather than scientificity.

Burke [5] considers that this informational explosion, aggravated by the emergence of the internet and social media (environments of easy publication and dissemination of

news), brought us to the “knowledge crisis”. That is, a world with a lot of information and disinformation, where the population no longer knows what to trust and end up choosing to believe in what is convenient for them. After this period, at the end of the twentieth century, we experienced with greater precision the transformation in our culture resulting from the technological paradigms involved in Information Technology (IT) and later in Information and Communication Technology (ICT).

In the Industrial Revolution, energy had a huge impact on society; people could have light in their homes, cook and do other jobs more easily. With the arrival of IT, it was as if there was a new revolution: the internet and its popularization changed and are still changing the lives of many people and the way they relate to others around them. Hence, Castells names this period the Technological Revolution, where Internet has a similar importance to what energy had in its emergence [6].

Castells relates the Industrial Revolution to the Technological Revolution based on changes and patterns of development in populations’ economy, society and culture. In the first Industrial Revolution, science had no support, but information was widely used. In the second Industrial Revolution, science aided in the innovations of this period. Nowadays, in the Technological Revolution, the information and knowledge produced apply in society, creating new information and knowledge, forming a cycle of innovation and continuous use. However, this last revolution usually happens in a centralized way and in limited locations [6].

Another revolution presented by Castells is the Information Technology Revolution. It emerged amidst a new social structure, with cultural diversity and remodeling of the social behavior of communication forms, where it brings the informationalism that speaks about information networks, information flows and our dependence on them [6].

The growth of information has led several authors to start their research in order to understand this term. In the field of Information Science, Buckland [7] identifies information in three main uses of the word. Information-as-process deals with the act of informing, information-as-knowledge, seen in information-as-process, which is knowledge gained from communication. Lastly, information-as-thing, that designates objects, such as data and documents, from which it can provide knowledge.

Capurro, however, differentiates Information into three predominant epistemological paradigms in Information Science, which are the physical (physical object of a signal and the transmission of a message, must have informative value), cognitive (related to the search for knowledge due to a gap or need) and social (treats information as something linked to the user) [8].

D’Ancona addresses the revolutions that involve IT and/or ICT as Digital Revolution, which has brought many benefits to humanity, such as improved information democratization and access to tools that help us in everyday life, making it increasingly impossible to imagine a world without the use of technology, its software, applications and programs. Digital technology is one of the most innovative inventions in the world and the way it fits into people’s lives quickly, practically and naturally is imperceptible. This has made the digital environment, especially the World Wide Web, a mirror of humanity [2].

Media modifications eventually aided the growth of a treacherous industry, beginning with the rising reach of high-speed broadband internet. This in turn, transformed it into

a cheap communication and publication tool, fast and accessible as never before seen, bringing a behavioral and cultural impact on society as a whole [2].

These new forms of connections made people use social media to disseminate much more information than normally, consequently increasing the sharing of news without checking its veracity. Considering this in a larger scale, it is possible to say the sharing of fake or modified news has become a State issue, bringing with it risks for the population in a social, cultural and cognitive aspect [2].

Fake news and disinformation have been around for centuries, but were not as globalized as nowadays, with the use of the internet and sharing on social media. Today, fake news comes from various types of websites. Some of those are specifically designed to bring false information, some with the intent to make fun of it, while others aim to make people believe the news is true [3].

To understand how disinformation has become a threat in digital environments through social media, we will start with research and studies related to human behavior and see what leads individuals to believe, share and disseminate false or adulterated news.

Thus, the behavior must be clearly understood and its purpose known, “[...] whether is it being investigated a behavior (observable acts) or a behavioral consequence”. Therefore, we are researching behavioral consequences, as well as human development, their personal, social and cultural relationships and how these factors may affect their future contribution to the growth of disinformation [9].

3 Fogg Behavior Model (FBM)

To make effective codifications that lead to changes in human behavior, especially in persuasive technology, it is necessary to have knowledge about human psychology and what guides this behavior. Therefore, FBM, as previously mentioned, is a psychological model that emerged from the need to understand the changes that occur in human behavior, especially when it comes to its communication channels and current technologies. With this model, it is possible to think in a systematic way about the behavioral changes in human beings [10].

This model is in constant development and improvement, as behavioral changes shifts from new social, cultural and technological interactions. FBM is based on persuasive technology that deals with “[...] learning to automate behavior change.” FBM is divided into three main factors: motivation, ability and triggers, each of which has its own subcomponents. The use of this model characterizes the reasons that lead a person to perform such action, and for a specific human behavior to occur it is necessary to have the three factors present, initially having sufficient motivation and ability, as well as having an effective trigger that influence in this process [10].

To better understand how FBM occurs, Fig. 1 exhibits the two-axis model, presenting the relation between Motivation (vertical axis) and Ability (horizontal axis) in order to perform a target behavior, i.e. a desired behavior or behavior to be analyzed. The vertical axis corresponds to the motivation, being the upper part of the axis considered high motivation and the lower part low motivation of an individual to perform the pre-established behavior. In the horizontal axis it deals with the element Ability, where the

left side corresponds to low Ability and the right side to high Ability of an individual to execute the target behavior [10].

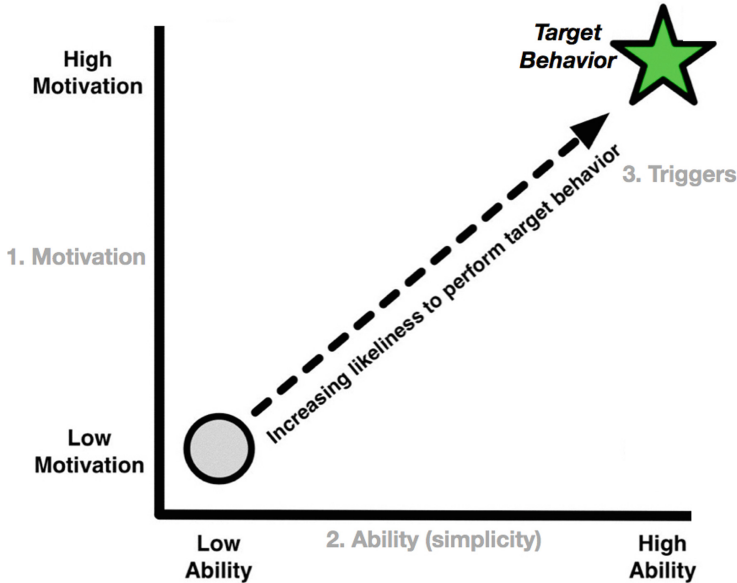


Fig. 1. The Fogg Behavior Model has three factors: motivation, ability and triggers [10].

In addition to the axis presented by this model, there is the factor that Fogg names triggers, an item that is close to the star (represents the behavior of the target). The presence of this factor is essential for the behavior to occur. The trigger and star can be directed anywhere, differently from the fixed axes of motivation and ability. In the case of motivation and ability they are usually necessary for behavior to occur, but as depicted in Fig. 1 with the diagonal arrow, it emphasizes the relationship between motivation, ability and target behavior (star). Individuals with high skills and motivation are more likely to perform the desired behavior [10].

Motivation and ability are factors that do not necessarily have to be high or low at the same frequency, but do need to be related. People with high motivation and low ability can perform desired behavior, just as individuals with low motivation but high enough ability to accomplish their goal. What cannot happen is an individual with no motivation or ability. Often, the increase in ability is more important than motivation, since the former refers to the facilitation of target behavior, and these levels are likely to be of manipulation [10].

The third factor raised by Fogg is the trigger which can be considered the most important one. It is through an appropriate trigger that the effectiveness of the desired behavior is defined. When a trigger is “[...] successful, it has three characteristics: First, we notice the trigger. Second, we associate the trigger with target behavior. Third, the trigger happens when we are motivated and able to perform the behavior” [10].

In order for the design of a target behavior to be able to develop such activity efficiently and effectively, that is, a well-formulated and designed behavior that leads to its result with the user fulfilling the behavior it is necessary to analyze the target user and the target behavior. This analysis is conducted to determine the best subsets of the motivation, ability and trigger factors to be used [10].

Motivation is mainly responsible for its elements that lead a user to have enough of it to perform certain behavior. Motivation has three pairs of elements that are presented in Table 1, the use of these items aims to raise the user’s position to high motivation [10].

Table 1. Elements of motivation

<i>Motivation (elements of motivation)</i>	
<i>Pleasure/Pain</i>	Usually immediate factor, little thought or anticipation, are powerful motivators and a primitive response, being able to adapt to various situations. To increase motivation, pleasure and pain may be incorporated. It is not considered an ideal approach, but it must be recognized as a motivation option
<i>Hope/Fear</i>	Anticipation of a result. Hope is the anticipation of something good happening and fear is the anticipation of something bad. People are motivated by hope (joining a dating site) and fear (updating antivirus software). Hope is probably FBM’s most ethical and empowering motivator
<i>Social Acceptance/Rejection</i>	Controlling part of our social behavior, people are motivated to do things that give them social acceptance and even more motivated to avoid being socially rejected. Our track record shows that being banned from a community is a form of punishment. With social media, methods to motivate people through social acceptance or rejection has flourished. People are significantly motivated by the desire to be socially accepted

Source: Based in Fogg [10].

The ability to deal with the ease of performing the desired behavior is divided into six parts Fogg calls the “elements of simplicity” presented in Table 2 which, when used together, yield the best results. This item is not about teaching the user how to perform a task, but about simplifying that activity so that they are more likely to do it [10].

The last factor in FBM is the trigger that may have different nomenclatures, but is intended to make an individual perform a desired behavior immediately. The triggers have three forms of which are presented in Table 3, but not all people are stimulated to perform a behavior by the same triggers and often make us act on impulse momentarily [10].

The purpose of this model developed by Fogg is to understand the human behavior when performing some activities, especially those that are pre-established. Their results can explain the factors that lead individuals to perform certain functions and how digital

Table 2. Elements of simplicity.

<i>Ability (elements of simplicity)</i>	
<i>Time</i>	If target behavior takes time and we have no time available, the behavior may not occur
<i>Money</i>	For people with limited financial resources, targeted behavior that costs money may not happen
<i>Physical Effort</i>	Behaviors that require physical effort may not be simple
<i>Brain Cycles</i>	For the most part, we overestimate how much ordinary people want to think. If performing a target behavior leads us to think too much, it may cause the individual not to achieve the desired
<i>Social Deviance</i>	If a behavior requires going against the norm, violating the rules of society, that behavior is no longer simple
<i>Non-Routine</i>	Activities and behaviors that need to get out of routine, people may not find it simple and end up not performing the desired behavior

Source: Based in Fogg [10].

Table 3. Three types of triggers.

<i>Triggers (three types of triggers)</i>	
<i>Spark as trigger</i>	Used when a person has no motivation to perform a behavior and so, a trigger that has to do with a motivational element is designed. Sparks can leverage any of the motivational elements and can be accomplished in many ways, as long as the trigger is recognized and presented to users at the moment they can act
<i>Facilitator as trigger</i>	Suitable for users who are highly motivated but not skilled, the facilitator triggers the behavior and at the same time makes it easier. An effective facilitator tells users that target behavior is easy to perform, that it does not require a feature that he or she does not have at the moment
<i>Signal as trigger</i>	This type of trigger works best when people have the motivation and ability to perform the behavior. The signal does not seek to motivate people or simplify the task, it just serves as a reminder

Source: Based in Fogg [10].

developers can use tools to systematically stimulate, persuade or manipulate stipulated behaviors, which involve human feelings [10].

Then, by presenting the concepts of disinformation in organs and institutions that deal with information, we will approach these definitions relating to the factors and their subcomponents presented by Fogg, in order to understand if the concepts of disinformation have characteristics that can lead humans to spread fake news through motivation, ability and/or triggers.

4 Methodological Procedures

The data collection procedures make it a documentary research, aiming to identify five conceptions of fake news or disinformation by agencies or institutions working on information, education, science and/or society issues. This research has a qualitative approach, being an exploratory research aiming to relate the concepts of false news or misinformation developed and provided by UNESCO (United Nations Educational, Scientific and Cultural Organization), European Commission, Oxford Dictionary, The World Economy Forum and Reuters with the Fogg Behavior Model.

The study plans to contribute to the Information Science field's theoretical development in which it discusses the behavioral relationships of humans with information and disinformation, seeking to understand this phenomenon and therefore, identify manners to prevent the growth in disinformation at environments that deal with information and communication media.

5 Analyze

The vast amount of information that is produced today is disorganized and this has caused some professions working with communication and information to lose its quality, truth and credibility, for example journalism [11].

For UNESCO much of this information is being published and disseminated in order to spread falsehoods, especially on social networks. With this the organization classified and defined these types of news as: disinformation, misinformation and misleading information. Still stating the contradiction of calling this news Fake News, since if a news is false, it cannot be considered news [11].

The definitions of false information for UNESCO [11] are divided into three items:

- Disinformation: Information that is false and deliberately created to harm a person, a social group, an organization or a country.
- Misinformation: Information that is false but not intended to cause harm.
- Misleading Information: Reality-based information used to harm a person, social group, organization, or country.

Another more simplified definition of "Fake News" for UNESCO states that "[...] is intentionally lying content that is launched on fake websites or social networks to harm a person or a group. UNESCO prefers to call them disinformation campaigns." [12].

The European Commission has defined disinformation as "[...] verifiable, false or misleading information created, presented and disseminated for economic gain or intentionally misleading the public." Disinformation may undermine the credibility and trust of some institutions, In addition to the power to undermine our democracy with consequences for the entire population, causing public damage to politics, health, safety and the environment, it also makes it difficult for individuals to gain access to truthful information and impedes freedom of opinion and expression [13].

In the Oxford Dictionary [14] it has the definition of the term's fake news, disinformation and post-truth that basically deal with fake news and its spread and the power

that individuals' beliefs can bring about whether they believe it or not. Your definitions are:

- Fake News: false reports of events, written and read on websites. Many of us seem unable to distinguish fake news from the verified sort. Fake news creates significant public confusion about current events.
- Misinformation: the act of giving wrong information about something; the wrong information that is given. A campaign of misinform. Ation attitudes based on misinformation.
- Post-truth: relating to circumstances in which people respond more to feelings and beliefs than to facts. In this era of post-truth politics, it's easy to cherry-pick data and reach any conclusion you like.

The World Economy Forum [15], a non-profit organization defined Fake News: "can be as slippery to define as it is to pin down. Stories may be factually inaccurate and deliberately published to underscore a certain viewpoint or drive lots of visitors to a website, or they could be partially true but exaggerated or not fully fact-checked before publication." For Reuters [16] British news agency, one of the largest international agencies in the world, defines Fake News from the viewpoint of its readers as: "[...] fake news is only partly about narrowly defined fabricated news, and very more about broader discontent with the information landscape - including media and politicians, as well as companies and platforms."

It is important to know how to identify and deal with fake news, but especially in virtual environments the information provided is poor and misleading and with some intent behind it, and it is this disinformation most read and found by people [16].

The following tables present the relations linking concepts of misinformation and false news as defined by selected institutions and agencies with the motivational factors defined by Fogg, which include: Motivation (Pleasure/Pain, Hope/Fear and Social Acceptance/Rejection), Ability (Time, Money, Physical Effort, Brain Cycles, Social Deviance and Non-Routine behavior) and Triggers (Spark, Facilitator and Signal).

Table 4 presents the UNESCO definitions of Disinformation, Misinformation, and Malicious Information, the FMB elements that relate to the definitions, and a brief explanation of this relation.

The definition of Disinformation related to the element of Motivation: Pleasure/Pain that refers to false information trying to affect certain groups through their feelings and beliefs, and the element Trigger: Spark, complementing the element of Motivation when the individual has a motivation to believe in determined subject, sometimes all it takes is a spark, a fake news, that meets this person's expectations in order for them to believe in it without checking its veracity.

The definition of Misinformation relating to the element of Motivation: Social Acceptance/Rejection, because it deals with false information but not created to harm, usually is disseminated in order to individuals acquire social acceptance from a particular group, or not telling the factual news for fear of social rejection. The definition of Malicious Information is related to the element Ability: Social Deviance, as it is true information,

Table 4. Relation: definitions UNESCO and elements FBM.

<i>Institution</i>	<i>Term used</i>	<i>Definitions</i>	<i>Elements FBM</i>	<i>Relation: Definitions and Elements FBM</i>
UNESCO	Disinformation	Information that is false and deliberately created to harm a person, a social group, an organization or a country	<i>Motivation: Pleasure/Pain</i>	The definition of misinformation as an information intended to harm a person or a group is related to the elements of Motivation pleasure/pain, as it tries to affect certain groups through their feelings, creating triggers for greater commotion
			<i>Trigger: Spark</i>	The Trigger as Spark is the false information created to harm, when the trigger combined with the pleasure/pain element is projected, this factor can affect certain people or groups
	Misinformation	Information that is false but not intended to cause harm	<i>Motivation: Social Acceptance/Rejection</i>	This definition can be related to the element Motivation: Social Acceptance/Rejection, as it deals with the necessity of informing or believing in something to be socially accepted or failing to inform or believing in something for fear of social rejection
Misleading information	Reality-based information used to harm a person, social group, organization, or country	<i>Ability: Social Deviance</i>	This definition deals with true information that is stolen and spread, most of the times illegally, with the purpose of harming a person or group. This definition is related to element Ability: Social Deviance that deals with a behavior that goes against the standards and rules in order to cause damage	

Source: Research Data, 2019.

but generally retrieved through illicit means and disseminated with the intention of creating harm, causing the individual’s behavior to fit into Social Deviance, requiring going against social norms.

Table 5 exhibits the definition of Disinformation from European Commission, the FMB elements that relate to the definitions and a brief explanation on these relations.

Table 5. Relation: definitions European Commission and elements FBM.

<i>Institution</i>	<i>Term used</i>	<i>Definitions</i>	<i>Elements FBM</i>	<i>Relation: Definitions and Elements FBM</i>
<i>European Commission</i>	Disinformation	Verifiable, false or misleading information created, presented and disseminated for economic gain or intentionally misleading the public may undermine the credibility and trust of some institutions. In addition to the power to undermine our democracy with consequences for the entire population, causing public damage to politics, health, safety and the environment, it also makes it difficult for individuals to gain access to truthful information and impedes freedom of opinion and expression	<i>Motivation: Social Acceptance/Rejection</i>	These types of information impedes the freedom of information and expression that relates to element Motivation: Social Acceptance/Rejection, being that people are ashamed (social rejection) for informing “news” that could be fake or the necessity of informing any news, veracious or not, with the intent of being socially accepted
			<i>Ability: Brain Cycles</i>	This definition can be associated with the Ability: Brain Cycles meaning that it makes difficult to access to true information, as ordinary people usually don't have the habit of investigating certain information and news
			<i>Ability: Time and Money</i>	Generally, the false information are of easy access and understanding, this factor can be related to the element Ability: Time and Money, since it often brings brief and free information to the people
			<i>Ability: Social Deviance</i>	By spreading false information that attack the democracy affecting the whole population, the definition relates to the element Ability: Social Deviance, that requires going against the norms and rules.
			<i>Trigger: Facilitador</i>	The definition of disinformation refers to the easily accessed and comprehended (easy language) false news that relates to the element Trigger: Facilitator that aims to facilitate people's access to information, its understanding and even dissemination

Source: Research Data, 2019.

European Commission's disinformation definition is related to the Motivation: Social Acceptance/Rejection element by defining that false information precludes liberty of opinion and expression, and that individuals may feel coerced into believing and disseminating certain information and emitting others so that they are socially accepted and avoid social rejection. Ability elements are the ones that best fit this definition and they are: Brain Cycles (by making it difficult to access true information), Time (for bringing false information quickly and briefly, saving time) and Money (for bringing false information free) and Social Deviance (by trying to achieve democracy with false information).

Table 6 presents the definitions of Fake News, Misinformation and Post-Truth developed and published by Oxford Dictionary, FMB’s elements associated to the definitions and a brief explanation on these associations.

The definition of Fake News has relation to the Brain Cycles Ability element, because it may require a lot of thinking in order to find veracity in an information and Social Deviance, when talking about false event reports, being a fabricated information requires going against society’s norms and rules.

Misinformation is linked to the Social Deviance Ability due to the act of providing false information being considered wrong and requires going against society’s rules

Table 6. Relation: definitions Oxford Dictionary and elements FBM.

<i>Institution</i>	<i>Term used</i>	<i>Definitions</i>	<i>Elements FBM</i>	<i>Relation: Definitions and Elements FBM</i>
<i>Oxford Dictionary</i>	Fake News	False reports of events, written and read on websites. Many of us seem unable to distinguish fake news from the verified sort. Fake news creates significant public confusion about current events	<i>Ability: Brain Cycles</i>	The definition addresses public confusion, since it’s common for the population to be unable to distinguish the true from the false and identify the truth of news, this factor may be related to the element Ability: Brain Cycles, in order to identify the truth of Information it might require a lot of thinking
			<i>Ability: Social Deviance</i>	Dealing with fake reporting, this concept is about the Social Deviance Ability, when the dissemination, or creation, of false information requires going against the norms and rules
	Misinformation	The act of giving wrong information about something; the wrong information that is given. A campaign of misinform. Ationattitudes based on misinformation	<i>Ability: Social Deviance</i>	Misinformation’s definition deals with informing or reporting something wrong and it relates to the Social Deviance Ability element, as it requires going against society’s norms and rules
	Post-truth	Relating to circumstances in which people respond more to feelings and beliefs than to facts. In this era of post-truth politics, it’s easy to cherry-pick data and reach any conclusion you like	<i>Motivation: Pleasure/Pain and Hope/Fear</i>	This definition relates to the Hope/Fear and Pleasure/Pain from the Ability element, as it involves people’s feelings and beliefs, giving them more importance than to the facts
			<i>Trigger: Spark</i>	Relating to Trigger: Spark, the definition acknowledges that when people believe in certain things it gets easier to believe in the information and when a Spark of grand commotion arises regarding a certain subject, it makes it more relevant and people answer to their feelings and beliefs more than to the facts

Source: Research Data, 2019.

and norms. The definition of Post-Truth relates to the Motivation: Hope/Fear and Pleasure/Pain elements, for its definition involves individuals' feelings, beliefs and ideologies, and may cause them to believe false information for the predisposition in believing in what is being informed and giving hope that such information is true.

Post-Truth definition relates to the Spark and Facilitator Trigger element, for when people present the easiness to believe in a certain information it gets simpler to make it happen once a spark occurs by giving the subject big commotion, making it is easier to the individual believe in what they want to believe.

Table 7 presents the definition of Fake News by the World Economic Forum, the FMB elements that relate to the definitions, and a brief explanation on that.

Fake News definition is linked to the Pleasure/Pain Motivation element, since it's a false information originated from an individual's point of view, perhaps addressing subjects that cause a predisposition to the user's approval as truthful, even when they might be fake and Social Acceptance/Rejection because it deals with a false information that affects the point of view of the individual that might be being influenced by social acceptance or rejection.

Ability element: Time, on directing users to websites with false information, sparing their time. And lastly, the Trigger element: Facilitator, by directing the user to a website with just one click, facilitating their contact with false information and a lot of times, interfering their access to true information, and Signal, that could only serve as a reminder of a certain subject that the individual already has the predisposition to believe in.

Table 8 presents the links that can be found between the definition of Fake News conceived by Reuters and the FMB elements, also a short explanation on their relations.

Fake News' definition fits only two elements, the first one is Motivation: Pleasure/Pain on saying that those news happen because of the discontentment of a scenario and certain false information can bring people to act instinctively through their beliefs and ideology. The second element is the Trigger: Spark that along with the Motivation: Pleasure/Pain, can make this individual believe even more in certain information.

From this analysis it was possible to understand the relationship of concepts with FBM, we can identify some characteristics that are used by designers when trying to stimulate a target behavior with the objectives of fake news. Basically the formulation of false information uses some mechanisms of ability, Motivation and triggers, especially the last two factors, which can make it easy for the individual to share false information with just one click, motivating the individual to perform such task with emotional, sentimental and ideological issues and raising triggers by showing discontent or anger about a given subject previously analyzed and pre-arranged by the user.

By relating the amount of times the elements appear, the Motivation presented eight occurrences, four of those were Pleasure/Pain, one Hope/Fear and three were Social Acceptance/Rejection. The Ability element also appeared eight times, two in Time, one in Money, two in Brain Cycles, three in Social Deviances and none in Physical Effort and Non-Routine Behavior. The element Trigger occurred six times, three of those as Spark, two as Facilitator and one as Signal.

Table 7. Relation: definitions World Economic Forum and elements FBM.

<i>Institution</i>	<i>Term used</i>	<i>Definitions</i>	<i>Elements FBM</i>	<i>Relation: Definitions and Elements FBM</i>
<i>World EconomicForum</i>	Fake News	Can be as slippery to define as it is to pin down. Stories may be factually inaccurate and deliberately published to underscore a certain viewpoint or drive lots of visitors to a website, or they could be partially true but exaggerated or not fully fact-checked before publication	<i>Motivation: Pleasure/Pain and Social Acceptance/Rejection</i>	This definition informs that the false news is published with the intent of exalting a certain point of view and it correlates to the Pleasure/Pain Motivation element that may address a determined subject that the users might possess predisposition to believe in. Also correlating to the Social Acceptance/Rejection Motivation element, since the users' points of view are often related to their social behavior and their worries on being accepted or rejected in a certain social group
			<i>Ability: Time</i>	Fake news directs the users to specific websites, this factor connects to the Time Ability element because if the user's desired target behavior saves them time, this behavior is easier to happen, for example reading news with only a click
			<i>Trigger: Facilitator</i>	This factor relates to the Trigger element: Facilitator as it facilitates user access to fake news with just one click, knowing that fake news directs users to specific websites
			<i>Trigger: Signal</i>	This definition can be related to the element Trigger: Signal, as it can serve as a reminder of some subject from certain point of view, and along with some element of motivation and ability, it becomes more effective

Source: Research Data, 2019.

Table 8. Relation: Definitions Reuters and Elements FBM.

<i>Institution</i>	<i>Term used</i>	<i>Definitions</i>	<i>Elements FBM</i>	<i>Relation: Definitions and Elements FBM</i>
<i>Reuters</i>	Fake News	Fake news is only partly about narrowly defined fabricated news, and very more about broader discontent with the information landscape - including media and politicians, as well as companies and platforms	<i>Motivation: Pleasure/Pain</i>	This definition is related to the Motivation element: Pleasure/Pain and Hope/Fear when it comes to fake news, presenting partially from a discontent of a specific scenario, generally involved with users' beliefs and ideologies
			<i>Trigger: Spark</i>	The definition of Fake News acknowledges news that bring discontentment from a specific scenario, also relate to the Trigger element: Spark, being that the user that sees a fake news already has involvement with the subject and with just a spark they become more likely to believe in such information

Source: Research Data, 2019.

Considering that the elements that related the most to the definitions developed by the agencies and institutions presented were Motivation and Ability, when dealing with sub-elements, the ones that had the highest occurrence within each element were Motivation: Pleasure/Pain, Skill: Social Deviance and Trigger: Spark as trigger.

Knowing that for Fogg [10] a target behavior to be successfully performed, they must involve all Motivation, Ability and Trigger elements, so false information must have at least one subdivision of each element.

Given the growing proportion of disinformation and fake news, UNESCO, the European Commission, IFLA (International Federation of Library Associations and Institutions) and FackCheck are some of the institutions that make materials available to prevent and identify false information. UNESCO talks about the damage caused by false information and how it can harm our personal lives and society as a whole in relation to politics, health, violence, rights and social exclusion. Therefore, to combat disinformation, you should only share content on the Internet when you are sure it is truthful

and have critical thinking, questioning the information before disseminating it [11]. The European Commission brings as a way to combat disinformation on social media a set of activities carried out to all involved, from social media platforms, institutions, individuals, among others [13]. IFLA's Fake News prevention can be considered one of the most shared and well-known by internet users, it presents ways and questions we must do to identify if a news is false or true. How to raise some questions about the news: is it a joke? Affect beliefs or ideologies? Do you receive any support that may influence the report? When was it published (many old stories spread like new ones)? What is the source and author? In addition, you need to pay attention to attention-grabbing news and if you still have any questions about the news, consult an expert (librarian) or verification websites [17].

These ways of identifying fake news presented by IFLA were based on the FactCheck [18] article published in 2016. In addition to the items we must be aware of presented by IFLA, FactCheck still has a need to verify the support on which the information is and if it is some kind of joke, being news intentionally false such as satire.

6 Conclusion

During the process of interaction between humans, we have a need to influence or change each other's thoughts and behaviors, from parents wanting their children to do what they want, to salespeople who want to sell products to customers. This phenomenon is linked with social psychology, called social influence where one person tries to induce another to a desired behavior, but this is just one of many ways to change human behavior. There is also behavior change in conjunction with attitude change that involves new personal beliefs and preferences [19].

Both of these behaviors' changes can fit FBM and in consequence to the creation, publication and sharing disinformation. As seen in Tables 4, 5, 6, 7 and 8, the definitions presented are linked to the FBM factors exhibited in the Tables 1, 2 and 3, some on a large scale such as Oxford Dictionary (six sub-elements) and European Commission (six sub-elements), followed by Word Economic Forum (five sub-elements) and UNESCO (four sub-elements) and others on a small scale, like Reuters (two elements).

However these definitions hint that fake news develops a positive or negative motivation for the reader to share it, a skill to disseminate it with just a click sharing it in social media, and also have several triggers that could be understood as scandalous headlines or as biased towards beliefs and ideologies that drive the individual to share it.

The relation presented in this paper aims to show that the concepts related to false information comply with all the factors developed by Fogg in his behavior model. Through this analysis it is possible to learn more about how false information is formulated and how it can influence human behavior. Hopefully with the conclusion of this research, there will be some development of future studies on human behavior and how individuals deal with false information, especially in digital environments, in order to seek effective mechanisms to solve the dissemination of disinformation.

References

1. Losee, R.M.: A discipline independent definition of information. *J. Am. Soc. Inf. Sci.* **48**(3), 254–269 (1998). <https://ils.unc.edu/~losee/book5.pdf>
2. D’Ancona, M.: Póis-verdade: a nova guerra contra os fatos em tempos de fake news. Faro Editorial, São Paulo (2018)
3. Alcott, H., Gentzkow, M.: Social media and fake news in the 2016 election. *J. Econ. Perspect.* **31**(2), 211–236 (2017). <https://www.nber.org/papers/w23089>
4. Fogg, B.J. <https://www.behaviormodel.org/>
5. Burke, P.: Uma história social do conhecimento: de Gutenberg a Diderot. Zahar Ed., Rio de Janeiro (2003)
6. Castells, M.: A sociedade em rede, 7th edn. Paz e Terra, São Paulo (2003)
7. Buckland, M.: Information as thing. *J. Am. Soc. Inf. Sci.* **42**(5), 351–360 (1991)
8. Capurro, R.: Epistemologia e Ciência da Informação. V Encontro Nacional De Pesquisa Em Ciência da Infomração. UFMG, Belo Horizonte (2003). http://www.capurro.de/enancib_p.htm
9. Moutinho, K., Roazzi, A.: As teorias da ação racional e da ação planejada: relações entre intenções e comportamentos. *Avaliação Psicológica* **9**(2), 279–287 (2010). http://pepsic.bvsalud.org/scielo.php?script=sci_arttext&pid=S1677-04712010000200012
10. Fogg, B.J.: A behavior model for persuasive design. In: Proceedings of the 4th International Conference on Persuasive Technology – Persuasive 2009 (2009). <https://doi.org/10.1145/1541948.1541999>
11. UNESCO. <http://www.unesco.org/new/pt/brasil/communication-and-information/freedom-of-expression/media-development/disinformation/>
12. UNESCO. http://www.unesco.org/new/fileadmin/MULTIMEDIA/FIELD/Brasilia/pdf/brz_ci_what_are_faknews_por_2019_01.pdf
13. European Comission. <https://ec.europa.eu/digital-single-market/en/tackling-online-disinformation>
14. Oxford Dictionary. <https://www.oxfordlearnersdictionaries.com/>
15. Charlton, E.: Fake news: what it is, and how to spot it. World Economic Forum (2019). <https://www.weforum.org/agenda/2019/03/fake-news-what-it-is-and-how-to-spot-it/>
16. Nielsen, R.K., Graves, L.: “News you don’t believe”: audience perspectives on fake news, pp. 1–8. Reuters (2017). https://reutersinstitute.politics.ox.ac.uk/sites/default/files/2017-10/Nielsen&Graves_factsheet_1710v3_FINAL_download.pdf
17. IFLA. <https://www.ifla.org/publications/node/11174>
18. Kiely, E., Robertson, L.: How to spot fake news. FactCheck (2016). <https://www.factcheck.org/2016/11/how-to-spot-fake-news/>
19. Rodrigues, A.: Psicologia social para principiantes: estudo da interação humana, 13th edn. Editora Vozes, Rio de Janeiro (2011)
20. Capurro, R., Hjørland, B.: O conceito de informação. *Perspectivas em Ciência da Informação* **12**(1), 148–207 (2007). <https://doi.org/10.1590/S1413-99362007000100012>
21. Freire, G.H.: Ciência da Informação temática, histórias e fundamentos. *Perspectivas em Ciência da Informação* **11**(1), 6–19 (2006). <http://www.scielo.br/pdf/pci/v11n1/v11n1a02>