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## News and climate change: Opinions, degree of information and awareness of Italian university students

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**Abstract:** The main purpose of the present study was better understanding opinions, beliefs and awareness of a group of Italian university students about (1) climate change; (2) trust about news and media and (3) their self-perception of the quality, accuracy and completeness of the information they have on the topic. A questionnaire was administered to 585 students of University of Udine, in order to understand (1) their relationship with the media/media consumption; (2) the main sources of information; (3) their degree of trust and their awareness regarding the different media; (4) their habits regarding the verification of sources and (5) how much they are really interested in, and informed on, the issues of climate change.

Students declare (1) media consumption focused on new media (they declare themselves influenced about climate above all by the content of social media or by info available on the Internet); (2) a (theoretical) high attention to the issue of climate change but also (3) a scarce frequency of active search for information on this issue. The students' responses also indicate a (4) general distrust of the various media, in particular about the media that they effectively use, both in general and in relation to the topic dealt with and, (5) although they declare that they often carry out source checks and are able to list numerous signs of recognition of a false or biased news, (6) their self-perception about the quality, accuracy and completeness of the information they have on the topic is quite low.

**Keywords:** Climate Change, News, Media, Students, Awareness

### Introduction

Reflections on climate change accompany human history in various ways. The topic became relevant to scientific debate as early as the 1700s and grew in interest in the 1800s (Boykoff, Roberts 2007:4-5). However, it is with the twentieth century and the development of modern media that the topic comes to the forefront of public debate. Attention to this issue initially developed in the 1930s (Boykoff, Smith 2010:212) particularly with the New York Times which devoted important articles to the climate change and its consequences which have founded the cornerstone of the following debate internationally. After a pause in the years characterized by the Second World War, the debate was rekindled at the international level in the 1950s and then became a topic of fundamental importance from the 1980s. The media attention on climate change since the '80s has always been growing (for the years up to 2000 see Weingart, Engels, Pansegrau 2000: 265; updated data to 2006 can be found in Boykoff, Roberts 2007: 36; for an extension of these analyses to 2019, see Pianta and Sisco 2020: 4), making this issue one of the most debated, politicized and controversial topics of contemporary public debate internationally.

The importance of the media in influencing opinions about climate change has been analysed by Boykoff and Rajan (2007: 207-208); Boykoff (2008: 11); Billett (2010: 2); Boykoff and Yulsman (2013). These studies emphasize how the climate change debate is organized around a core of key variables: the scientific sphere, the political sphere and the sphere of public opinion, with the media acting as a central and connecting point (Anderson 2009: 179).

However, this guiding and connecting role is not neutral. It has been observed that, in addition to the inherent difficulty of narrating in the media issues related to "risk" and "uncertainty" (Smith 2005; Painter 2013) the media follow different logics from those of scientific debate and politics, logics based on the principles of "novelty, personalization and

dramatization" and are influenced by the problem of "balance" and "authority order" in the presentation of their content (Boykoff, Roberts 2007: 43; Boykoff, Boykoff 2007: 1193). This would produce a distortion in public discourse, a distortion that is important since public opinion on this issue depends a lot on the media, politics, and social movements and very little on scientific research (Carmichael, Brulle 2017: 232). So much so that, according to Weingart, Engels and Pansegrau, one should no longer speak only of a risk related to climate change but also of a "risk inherent in communication" (2000:261).

In this context, talking about climate change and media, for some years now we have also had to deal with new media and their specificities, also because the university students we interviewed, as we will see, inform themselves mainly using social networks and content on the web. Obviously, this is not the place to describe the communicative specifics of these new media. We limit ourselves to recalling (1) their growing importance in orienting public opinion with respect to climate change (O'Neill, Boykoff 2012) and (2) that the literature emphasizes the fact that new media can, given their characteristics of being "integrated" and "interactive" (van Dijk 2006) play a highly positive or highly negative role with respect to the issue of climate change. Anderson (2017) points out as positive effects of social media their ability to increase knowledge on the issue, to create mobilization and debate, and to increase the effectiveness of communication; however, the other side of the coin is represented by the fact that social media are also able to communicate false or inaccurate information, to mobilize skeptics and to convey denialist or critical forms of communication.

The combination of all the variables that we have quickly mentioned (importance of the topic, increasing attention by the media, influence of media on opinions and beliefs and the growing importance of the information about climate change conveyed within the new media with their specificities) produces what has been called an "information jungle" (Loy, Hamann, Reese 2020), in which it is very difficult to move and find a synthesis. The ability to search for information within the complexity of the media landscape, and particularly on the web (on the topic of "digital literacy" and its relationship to climate change, see Damico, Baildon, Panos 2018) influences opinions and the ability to understand climate change issues (Arlt, Hoppe, Wolling 2011; Boykoff 2011).

And this is where we reach our topic, focused on young people, in this case students at the University of Udine (Italy). Previous studies involving samples of students of various levels and countries agree that there is a generally high level of student concern about climate change. Lieske, Wade and Roness (2014), focusing on the Canadian case, indicate that 81% of participants in their focus groups believe that the problem of climate change is "considerable" or "severe". Cordero et al (2008: 866) in research focusing on US college students indicate that "student concern about global warming is relatively high, with 80% indicating that global warming is a pressing environmental issue". Also in the US college Wachholz, Artz and Chene (2014: 134) report similar results, indicating that two-thirds of the students surveyed "were either very worried (17%) or somewhat worried (48%)" about the climate change".

Di Giusto, Lavalley and Tai-Yi Yu (2018) working on a questionnaire submitted to a sample of university students in Taiwan, report that 65% of their students declared themselves to be "somewhat concerned" and 28% "very concerned," about climate change problems.

A high level of concern is also found by Özdem, Dal, Öztürk, Sönmez and Alper (2014) on a sample of seventh grade students in Turkey.

Acquadro Maran and Begotti (2021) in the case of students from the University of Turin (Italy) note that "most participants stated they paid either some or a lot of attention to information about climate change (89%), while only 11% stated they paid little or no attention".

This high level of attention and concern does not, however, seem to be reflected in a real awareness of the students analysed of the real assets of the topic. In fact, the literature identifies a large number of misconceptions about the basic causes and consequences of climate change on the part of the students analysed (Chang, Pascua, 2016, on students of secondary school in Taiwan; Wachholz, Artz and Chene, 2014, on college students, USA; Cordero, 2000, on Australian university students; Liarakou, Athanasiadis, Gavrilakis, 2011 on

Greek secondary school students; Punter, Ochando-Pardo, Garcia, 2011, on Spanish secondary school students; Shepardson, Niyogi, Choi and Charusombat, 2011, on US secondary students).

It seems that "they lacked a rich conceptualization of the issue" (Shepardson, Niyogi, Choi and Charusombat, 2009, with reference to seventh level students of three different schools in the Midwest, USA) and that they often reproduce some typical mistakes: Gowda, Fox and Magelky (1997) assess the range of "mistakes" that are made by US high school students on this issue (inflated estimates of temperature change, confusion between ozone depletion and global warming above all).

Huxster, Uribe-Zarain and Kempton (2015) describe how U.S. undergraduate students frequently confuse climate change with other environmental issues and they do not have an understanding of climate change that matches the scientific model.

Cordero, Todd and Abellera (2008) found the same misconceptions when they interviewed 400 college students attending San Jose State University who participated in a study that focused on climate change science (i.e. students who should, thanks to this specific educational activity, be more and better informed).

Shepardson et al. (2009) suggest that the origin of these errors lies in low levels of information, in the fact that most of the information comes from television and in the confusion between the messages young people receive on this issue.

In fact, in all the studies mentioned above, prior to around 2010/2012, the main source of information for young people on climate change was unquestionably television (see, for example, Gowda, Fox and Magelky, 1997; Liarakou, Athanasiadis, Gavrillakis, 2011). After the advent of the internet and social media, however, studies began to indicate the new media as the main source (along with television, however, which resists as a reference media: Acquadro Maran, Begotti, 2021) with the consequent emerging issue of reliability and different trust to be given to different sources and different messages that, from 2016 onwards, begins to translate into the issue of how to manage the so-called "fake news" on climate change. The recent work of Cheng and Gonzalez-Ramirez (2020), for example, analysed a group of American college students and observed how these students 1) inform themselves mainly using new media and the net; 2) how they simultaneously give a higher level of trust to the media they use less, i.e. the traditional and "institutional" ones; 3) and that they do not seem so skilled and active with respect to digital literacy. Our research began with these observations in mind.

## **Hypothesis, research method and general description of interviewees**

Student opinions were collected in a pilot study via questionnaires disseminated across all students enrolled at University of Udine in the autumn of 2019, just before the pandemic emergency and the consequent alteration in consumption and agenda setting proposed by the media. A total of 585 students participated in the research (39% men and 61% women). This means that about 3.7% of the 15600 students enrolled at the university at that time decided to answer the questionnaire. Their ages ranged from 18 to 28 years, with a median age of 23. Participants took part in the research on a voluntary basis, and no compensation (or extra credit) for their participation was provided.

31.9% of the questionnaire respondents are enrolled at the University of Udine in humanistic or linguistic degree courses; 10.6% in medical degree courses; 16.7% in degree courses related to law or economics and finally the remaining 40.8% in degree courses characterized as "hard sciences".

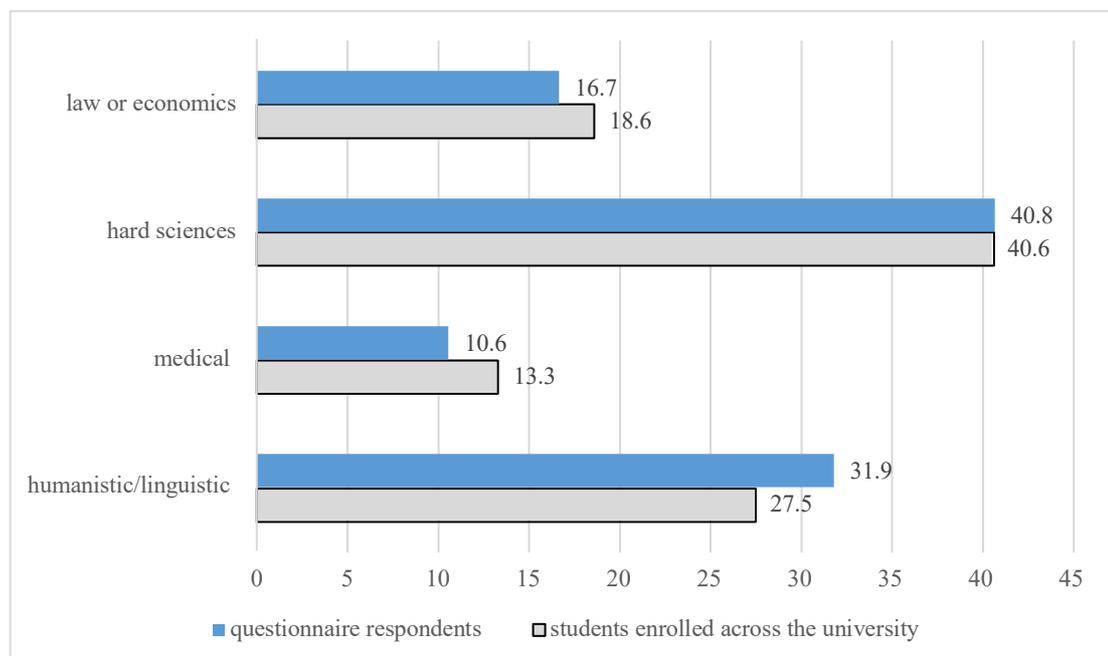
This distribution of responses is generally in line with the overall distribution of students in the various degree courses at the university, with a slight underestimation of students on medical, legal and economic courses and an overestimation of students on humanities and language courses (Graph 1). Both gender, age and type of degree course, as we shall see, are significantly correlated with different styles of media consumption, different opinions and different perceptions regarding the issue of climate change.

The questionnaire was structured around 17 questions, two of which were open-ended, in order to understand 1) students' opinions and their degree of concern about the topic of climate change; 2) students' media consumption; 3) the trust they place in the various media; 4) their perception with respect to the quality of news on the topic; 5) their perception about the specific influence of the so-called fake news on their opinions on climate change.

In other words, we first tried to reconstruct the main ways in which students inform themselves about climate change and the trust they place in the various media they use. Then, in order to verify their actual level of knowledge and awareness on the issue, instead of questioning them on the scientific evidence related to climate change as done by several researches reported in the previous paragraph, we tried to estimate 1) how actively they seek information on the topic and 2) their self-perception regarding how complete and credible they believe the information they have is; 3) how much they think fake news influences opinions on the topic; and 4) what their effective digital literacy and ability to define and recognise fake news on climate change seems to be.

Our main hypotheses are:

- 1) that students declare a high level of interest and concern on the topic of climate change;
- 2) but at the same time do not frequently engage in active practices to directly seek information on the issue;
- 3) that their main source of information on the topic is the new media;
- 4) that they demonstrate a certain degree of awareness towards the specific risks of the information that is conveyed in these media (specifically, about "fake news");
- 5) that their level of trust in the media is rather low (in agreement with the findings on similar issues made by other surveys, e.g. see the 2019 Edelman Trust Barometer) and consequently
- 5) that their self-perception of the completeness, accuracy and credibility of information available to them on climate change is not very high.

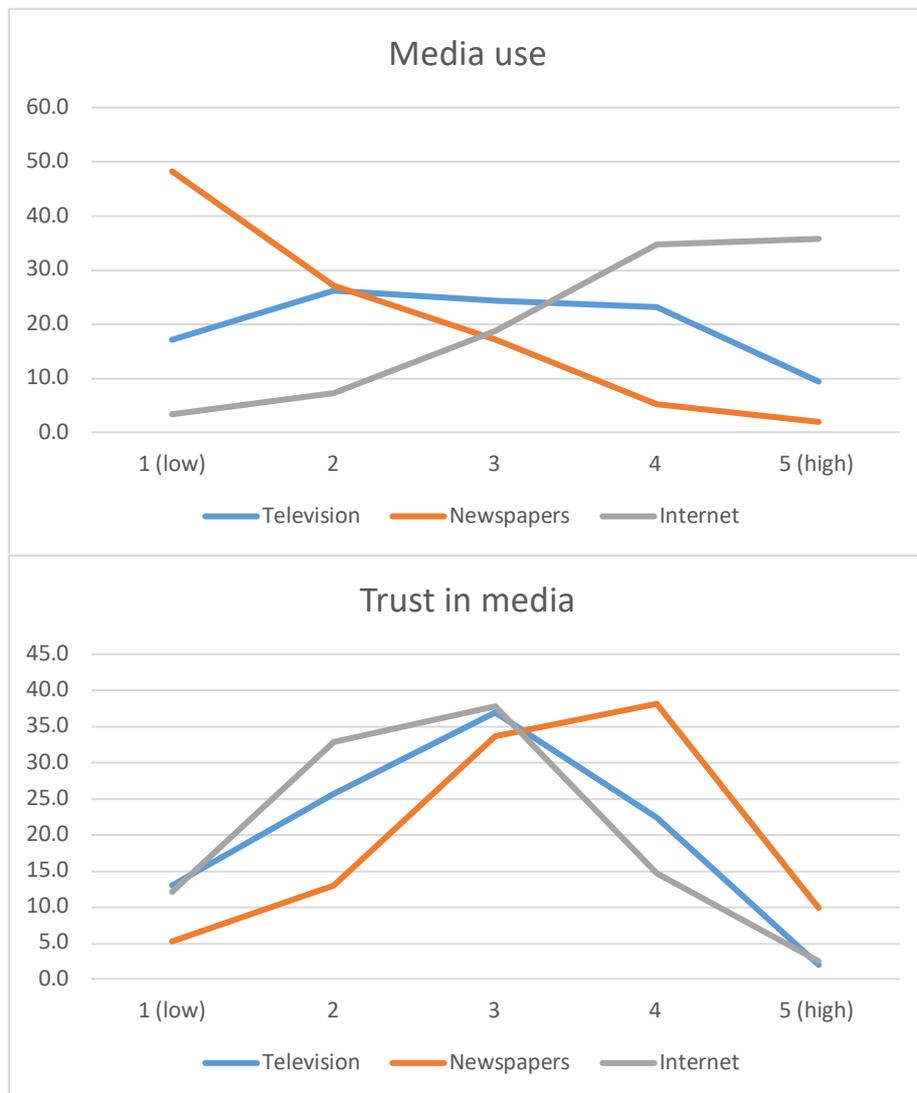


Graph 1. Distribution of completed questionnaires by type of degree course compared to the total number of students enrolled in the same courses at the university of Udine (%)<sup>1</sup>.

<sup>1</sup> Source: Planning and Management Control Area - University of Udine Data Warehouse.

## Media consumption and trust in different types of media

When asked what media they use to get informed, our students predominantly use the Internet, with a specific focus on "online articles" as opposed to more generic *social* content. Next, they use television and in particular the news and are not very familiar with printed newspapers. These data, basically taken for granted, are interesting if compared to the answers we obtained regarding the trust they place in the various types of media. Trust in media types is inversely proportional to their use. The trust they express in the media is generally low, and in any case tends to increase in the case of the least used media and to be lower in the case of the media they actually use (Graph 2).



Graph 2. Consumption and trust in media. Scale 1(low)-5(high).

Larger surveys conducted on the Italian population in the same period, for example the Edelman Trust Barometer (2019) provide low average data regarding trust in the media, with trust percentages that seem in line (or slightly higher) with those expressed by our students

(although a direct comparison, due to the different form of data collection is obviously not possible). Our students, therefore, in general seem to be characterized as rather distrustful of the informative contents they use.

The frequency with which they inform themselves seems to be quite high, with two thirds of the sample stating that they inform themselves "at least once a day" (67,2%) and almost all the rest "several times a week" (28,4%).

The gender variable is significantly correlated with media use. Females use television and news to inform themselves more, while reading print newspapers is more masculine. The degree of trust placed in various media also varies by gender. Women trust the news coming from the web less than men, and on the contrary they trust television, news programmes and above all newspapers (which, however, as we have seen, they tend not to read) more than men. Also in this case the observation that we made earlier, according to which more trust is placed in media that are not used, returns.

Also the age variable is significant with respect to the fruition of information from the media, even if the age range realized by our research is rather limited. Dividing the youngest (18-23 years old) and the least young of our sample (over 24 years old) we notice that the least young tend to get information more often, they have counter-intuitively a greater use of Internet as an information medium compared to the youngest, they use less television and above all they denote a significantly lower degree of trust towards news coming mainly from television and newspapers, but also towards news retrieved on the net (also here, the greater use of Internet to get information is correlated to a lower trust towards this media).

We have divided the approximately 40 different types of degree courses attended by our interviewees into four macro areas, in order to check whether there are significant correlations with the type of studies chosen. We have identified (1) a humanities and languages area; (2) an economics and law area; (3) a medical area and finally (4) the area of the so-called "hard sciences".

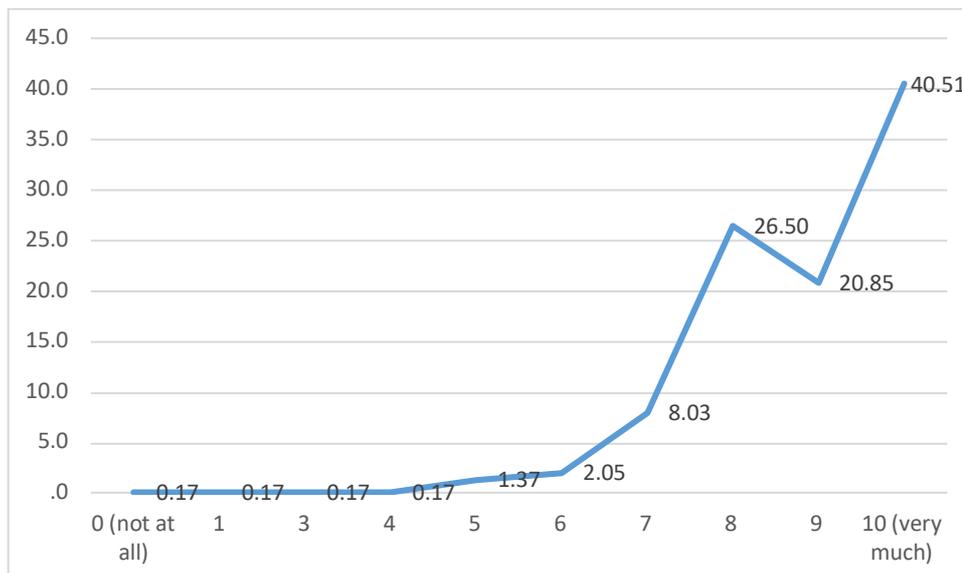
The frequentation of paper newspapers seems to be limited to the students of economics and law, where we also find a greater use of television compared to the other subgroups. The medical area is instead the one that uses less the Internet to get information than the others. With regard to the trust placed in the various media, trust is significantly higher in students of economics and law (especially with regard to television and newspapers). The medical area is the one that shows the least trust in news and television, while the students of the humanities and sciences are the ones who declare the least trust in news from the Internet. The students of the hard sciences are instead those who inform themselves less actively and less often (even if, as we will see, they are the ones who believe they are better informed on the issue of climate change).

As for a focus on information content from social media, we asked our students how often they check these news stories against other sources (not about climate change, but in general). Our respondents state that they check this news very often. 32.1% of them say they do it "almost always", to which we must add 37.4% who say they do it "often". It is obvious that this is a self-declaration and that the perception of what it means to verify a news item is a very individual fact. We will deepen this aspect of verification and fact checking in the next paragraphs. For now, we just observe that 1) males and 2) students in medical areas are the subgroups that show a greater propensity to verify general news coming from social networks.

## **The importance of environmental protection and views on climate change**

We asked our interviewees to express, on a scale of 1 to 10, how important environmental protection is to them. The answers to this question are a plebiscite in favour of the importance of the topic: 87.1% of students answer between 8 and 10 on the scale. Among them, 40.5% of the interviewees declare the utmost importance, expressed with the number "10". Those who declare a rating equal to 5 or less are approx. 2.1% of the overall sample (Graph 3).

This very high level of attention to the topic appears to be in line with the aforementioned research by Cheng and Gonzalez-Ramirez on American colleges (2020). However, it should be noted in our case that the questionnaire was distributed to students with a title that immediately stated the environmental and climate change issue as the *focus* of the interview. This probably caused an auto-selection: it can be assumed that people not very interested in the topic were also not very interested in answering the questionnaire. Conversely, a person who is very interested in the topic may have greater motivations in filling it out. More interesting is the internal articulation of this data and the differences that can be found in our database. Given the crushing of the answers towards one of the poles of the scale, in the following interpretation we will privilege only the most clear-cut answers, that is to say the interviewees who expressed their interest in the subject with the highest mark on the scale, that is to say “10”.

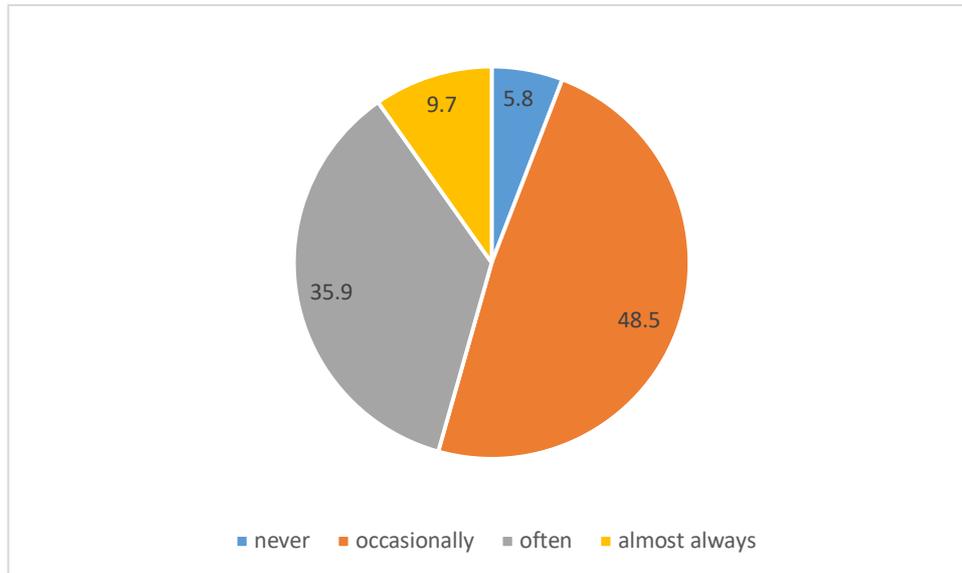


Graph 3. “How important it is for you to protect the environment”. Scale 1-10 (%).

Isolating the students with a relatively higher age, starting from 24 years old, it can be seen that this age group is significantly more attentive to the topic than the younger ones in the 18-23 range. The youngest students give the highest rating on the importance of the theme of the environment for 36.2%. This percentage rises to over 50% in the "older" age group. The same applies to gender: females consider environmental protection more important than males (highest interest: 42.3% against 37.7%). The variable linked to the average trust index of the interviewees also appears to be positively correlated with the importance of the topic of the environment: in other words, interviewees characterized by greater trust in the media in general tend to express themselves more clearly on the importance of the topic than those who have less trust in the media.

Less easy to interpret, but absolutely clear in the trends of the data, are the differences related to the type of studies: students of the humanistic area are the most clearly aligned with respect to the importance of the topic (46.3% of these students declare the highest degree of importance scale). About 5 percentage points below (41%) we find the students of the scientific area. Students in the medical area express themselves in this way "only" in 36.1% of cases, and students in the area of law and economics fall to 30.9%.

However, this theoretical great attention to the environment is not reflected in an active search for information. Almost half of the interviewees (48,5%), declares to look for information on this issue only "every now and then" and 5,8% expresses itself even more clearly saying that they never do it (Graph 4).



Graph 4. "How actively you seek information on the phenomenon of climate change".

The over 24 years old age group declares a slightly greater propensity than the younger ones to actively search for information on the topic. The attitude to this research is obviously positively correlated also to the frequency with which people declare to get information through the media: those who declare to expose themselves more to the various media describe themselves as more active also with regard to the search for information. Students enrolled in medical or scientific areas are those who have most searched for information on the phenomenon of climate change.

The fact that our interviewees in general do not appear to be particularly active in seeking information on the subject is reflected in the fact that they seem to be aware that they are not very well informed about it.

Only 28.9% of the interviewees declare themselves to be "well informed about climate change". 65.3% say they are well informed, but "not in depth", to which we have to add the remaining 5.8% who clearly expresses that they are not well informed at all.

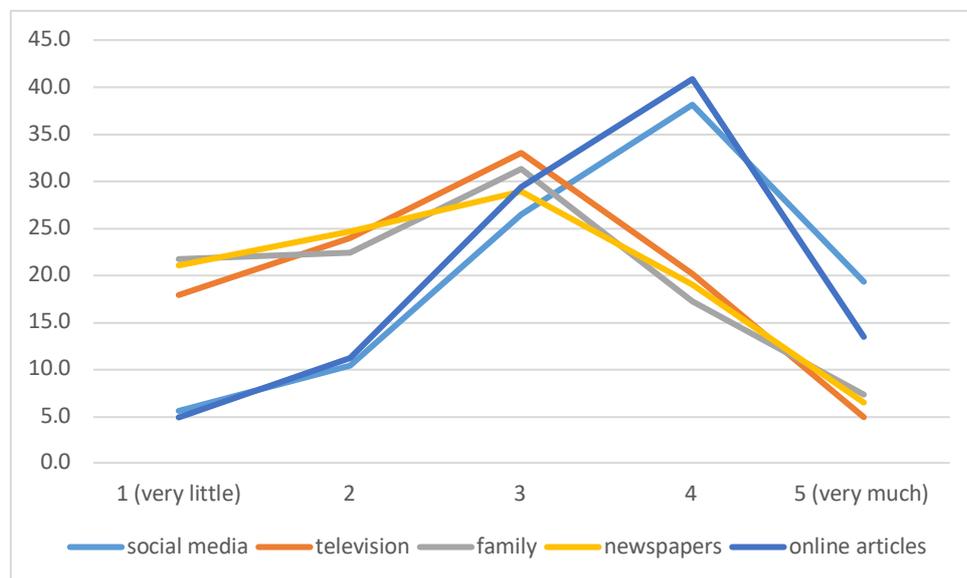
It is males who consider themselves the most informed on the subject of climate change (who, as we shall see, are also the most pessimistic about the quality of information on the subject). The respondents who consider themselves best informed on the issue of climate change are the students of science courses, followed by those of economics-law, and also the sub-group of respondents who were most confident about the quality of media information in general.

## Opinions on climate change and the media

But what is the opinion of our interviewees on the issue of climate change? The questionnaire offered the possibility to answer in three ways: 1. "the climate is not changing"; 2. "the climate is changing and human kind is responsible for it"; 3. "the climate is changing but human kind is not responsible for it". To say that the responses obtained are polarized on one answer would be reductive. Three interviewees, equal to 0.5% of the sample, tell us that in their opinion the climate is not changing. Twenty-two respondents, or 3.8%, tell us that the climate is changing but independently of human activities. The remaining 560 respondents (95.7%) all polarize on the remaining option. In this regard, it is useful to note that a content analysis parallel to this research we are conducting (on the topic of climate change and Italian

newspapers) tells us that the problem of "false balance" (Boykoff 2011; Brüggemann, Engesser 2017; Petersen et al. 2019) in the Italian media does not exist: our content analysis shows how the representation of contrarian or denialist views are essentially absent from the mainstream media debate. In this sense, it is difficult to understand whether this absolute plebiscite of our students on the answer "the climate is changing and human kind is responsible for it" is due to a clear awareness towards the topic or to the lack in the Italian media of a debate open to multiple positions.

When asked about the media or social contexts that most influence opinions on the issue of climate change, our interviewees tell us that they gathered most of their information on this issue from the Internet (social networks and online articles) while declaring little influence from television, the printed press and even less from the family environment (Graph 5). However, the absolutely majority opinion presented by the Italian media is also absolutely majority in the data collected on the opinions of these students, who are perhaps more influenced than they think with respect to the opinions on this topic.



Graph 5. Influence on opinions about climate change (scale 1-5).

In any case, our students declare themselves aware that the media do not deal with the subject in an adequate way. 71,1% of those interviewed say that the media deal with the subject in a way that is "not very" (65,3%) or "not at all" adequate (5,8%). Less than a third of respondents think they are well informed about climate change (28.9%).

## The impact of the Internet and social media on communication

Having the opportunity to interview a large number of students on the topic of climate change, we did not miss the chance to ask them some broader questions on the issue of so-called "fake news" and more generally on the impact that they believe the advent of the Internet and social networks has had on the overall information landscape. We therefore formulated two specific questions, leaving the students free to answer them in an open form.

The number, articulation and completeness of the argumentation of the answers obtained was very high, with few students who evaded the questions, went off topic or did not clearly express their opinions: overall these "non-answers" reached only 15.6% of the questionnaires collected. We know the difficulty of making the interviewees answer to the open questions and moreover the questionnaire allowed the possibility of evading some part of it: this makes

us assume that these topics are of real interest for these young university students, who did not miss the opportunity to express their opinions about them.

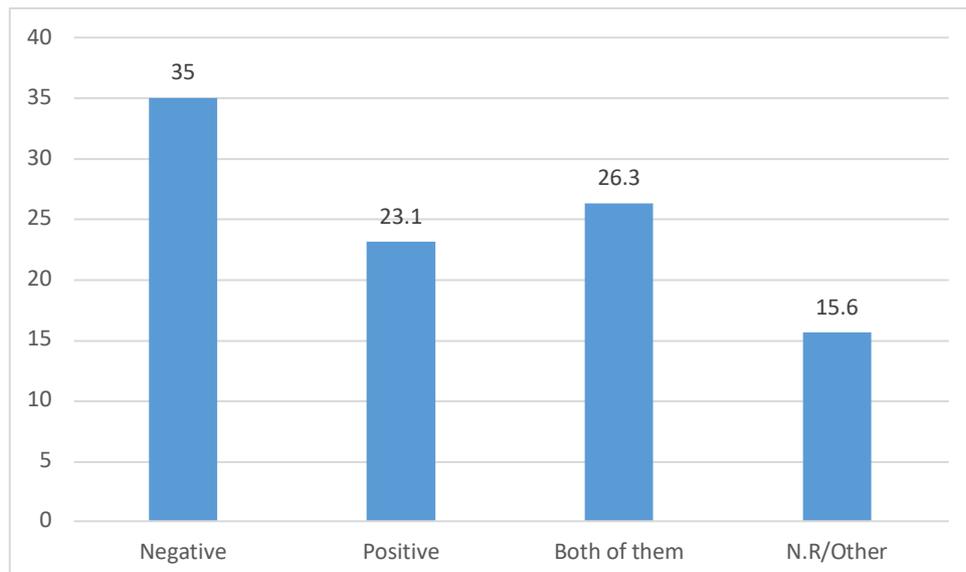
The first question was about the impact of social on the information landscape. We asked "In your opinion, has the advent of social media affected the way we get informed? If yes, in what ways?"

Obviously it is difficult to summarize the results of an open question and in the case of this question in particular the use of summary indices, such as word frequency, did not seem appropriate or particularly informative. We therefore tried to categorize the overall tone of the response, dividing the field between (1) those who told us that basically the advent of the Internet of social networks has had a positive effect on the quality and quantity of information and on the overall information landscape; (2) those who said the opposite, emphasizing the negative aspects of these innovations; (3) and those who, finally, a rather large group of responses, made explicit both these aspects, emphasizing positive and negative sides of the same phenomenon (Graph 6).

Negative responses are clearly in the majority and cover 35% of respondents, thus over a third of our sample. The main argument is related to the increased difficulty of really understanding the facts when faced with too much information and the consequent difficulty of discerning true information from false ones. Other types of answers, less frequent, emphasize the social changes that the advent of the Internet and social networks would have had in terms of what they say results in a "greater superficiality" on the part of people or the advent of a less careful, less critical and more conformist behavior in front of the news (some respondents go so far as to use the expression "flock of sheep" to summarize this last aspect). Even fewer, but nonetheless significant, were the answers given by students who evidently have a greater specific competence in this world and who underlined the negative effects of echo chamber's, filter bubble phenomena, and so on, without anyone, and this seems to us very significant, specifically highlighting the information distortions linked to targeting, profiling and the impact of algorithms on the information landscape.

This group of pessimistic answers is contrasted by 23,1% of the interviewees who expressed themselves in clearly positive terms with respect to the impact that Internet and social networks would have on the information landscape. These students emphasize the positive aspect of the possibility to access much more information than in the past: this is the most frequent type of answer. Then, there are the answers that emphasize the increased speed of finding and circulation of news and information and someone expresses explicitly underlining that the greater amount of information, combined with the speed and ease of reference, makes possible a greater activity of fact-checking and verification of the information itself. Finally, the number of students who stressed the positive aspect of "without charge" access to information is also significant.

More numerous than those who expressed themselves in clearly positive terms, are the respondents who have balanced, in their response, both positive and negative sides of the advent of the Internet and social networks. We categorized 26.3% of the responses in this way. There is not much to add with respect to the themes dealt with by these respondents, as they are the same as those we found in the field of "positive" and "negative", simply juxtaposed to each other. To give an example of a typical type of response of this kind, we could quote: "it brought more information but also more difficulty in understanding and discerning information". And so on.



Graph 6. "In your opinion, has the advent of social media affected the way we get informed? If yes, in what ways?" (positive/negative synthesis)

### **So-called "fake news" and the ability to recognize them**

The second open-ended question aimed to investigate the awareness and opinions of the interviewees on the topic of so-called "fake news" and in particular on how it is possible to recognize it and thus distinguish "false" from "true" information. The question was formulated as follows: "In your opinion, how can you recognize fake news?".

Also in this case we obtained a relevant number of answers and a rather complex and overlapping articulation of themes. For this reason, it does not seem appropriate to us to search for a synthetic quantification. We will therefore limit ourselves to proposing, from a qualitative point of view, a list of the main themes and their internal logical articulation.

The most recurrent concept in the answers is certainly that of "source". In order to recognize fake news, according to many answers, it is necessary to take into consideration the so-called "authoritative", or even "reliable" sources, in the idea that false news can only be found in "unofficial" sources. The concept of source is also mentioned by the interviewees who underline the importance of actively searching for more information to be able to unmask false news: the basic idea is that on the same piece of news it is necessary to look for more sources and compare them, or go and look for the same piece of news on sources that are known, or simply go back to the source of the news to verify its validity.

The same kind of reasoning is made by those who don't use the word "source" but more generally say how important "active research" is to unmask fake news. Here the key word is "search": looking for the news on more newspapers or searching for more data about it on the Internet is a similar opinion to the concept seen before of referring to more sources, or to more authoritative or credible or reliable sources or even to "more neutral" sources on the subject.

In the same logic are those who tell us that, in order to unmask a fake news, it can be useful to look for information directly on sites that deal with debunking or, carrying out the logical opposite of what we have described so far, but basically it is the same mechanism, to search the network for evidence that would support the fake news: in this case it would be the failure to find the evidence that supports the fake news to decree its falsity. These students are accompanied by a large number of responses that emphasize in a broader and more abstract way the same concept: these students tell us that you can fight fake news by "informing", "verifying", "studying", "deepening" or doing "fact checking". Similar but even broader are

the reflections of those who tell us that in order to combat fake news a form of "critical reasoning" is necessary, or it is important to "doubt" as a basic attitude, or it is simply necessary to "use common sense".

Of a different tenor are the answers of those who do not reason in terms of the structure of the information panorama (the sources, etc.) nor in terms of the activity, attitude or competence of those who read the news, but rather trace the possibility of understanding that a piece of news is false to the formal characteristics and content of the news itself.

In other words, according to these answers the proof that a news item is false is found in the news item itself in the form of various clues such as: the paradoxes and incoherence that characterize it; the fact that only that news story says a certain thing and that's not reflected in other media; the exaggeration or partisanship of the argument; the completeness/correctness of the data cited; the lack of links and references; the type of rhetoric used; the "it sounds too good to be true"; the presence of "clickbait" headlines or "call to action" like "pass it around"; the signature or lack thereof; the graphics or other exaggerated or connoted formal elements; the presence of writing errors; the emphasis on the emotional-scandalism aspect.

With regard to the list we have just compiled, we would like to underline that the students who had expressed themselves in positive or negative terms in the previous question, seem more confident about the possibility of being able to distinguish fake news by its content or its formal elements or with an active research activity. Vice versa, students who had provided an articulated answer in both positive and negative terms in the previous question, and therefore had already expressed a more articulated and complex reasoning, seem less confident about the possibility of tracing the distinction between what is true and what is false. It is in this group of students that we receive the most "pessimistic" answers, those who emphasize that fake news "are difficult to recognize", or that "you can't always recognize them" up to the most radical "it is not possible to recognize them". The whole thing goes on to even broader, and somehow "philosophical", reasoning, such as the response of the student who wrote to us: "the real question is: are we able to recognize fake news from reality? Or is our reality fake news?".

## Conclusions

Students, as we expected, are very interested and concerned about climate change. When asked to give their opinion on the subject, almost all of them tell us that "the climate is changing and that human activity is the cause".

At the same time, however, when asked about their real rather than abstract behaviour, they confess that they do not frequently seek practical information on this issue.

Their main source of information is the content carried on the web. The second media is television (but very detached) and practically do not use paper information (even if in any case we find the echo of the news coming from paper sources, to the extent that they live on the network in the form of shares, posts of informative pages, etc.).

They do not seem, as expected, to trust the media, but it is interesting to note that this trust is higher for media they do not use and lower for media they do use. Gender has a clear influence on these opinions, with women being more distrustful, particularly of news coming from the Internet, but also more passive than men in actively seeking information and verification.

In general, they seem to have a good level of awareness of the risks of communication mechanisms, especially those transmitted through the network. In most cases they emphasise the negative aspects of online information, although positive considerations are not lacking. And they seem, at least in theory, to be quite aware of the possibility of encountering false news.

They also declare themselves rather confident with the possibility of verifying the news and on their ability to unmask the so-called "fake news": a part of the sample, in particular the younger ones, expressing themselves in more naive forms (those who tell us that they find the evidence of fake news within the news itself in the form of obvious features) and another part

instead emphasizing awareness, critical attitude, attention to the quality of sources, practical activity of research, data comparison and so on.

In general, however, the high level of theoretical interest in climate change drops sharply when we move from ideal statements to statements about actual information research practices. And even if their answers are comforting with respect to their theoretical awareness of the problem, their low level of trust in the media combined with their infrequent activity of actually searching for information on the subject ultimately translates into their awareness of not having particularly complete, credible and accurate information on the subject of climate change.

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