

## DEVELOPING MEDIA LITERACY COMPETENCES OUTSIDE THE CLASSROOMS FOR FIGHTING VISUAL DISINFORMATION: THE YOUCHECK! PROJECT

**Thematic line 4** (Education and Society: Innovations in 21st Century)

**Sara Osuna-Acedo**, National Distance Education University (UNED), Spain  
sosuna@edu.uned.es

**Divina Frau-Meigs**, Savoir\*Devenir, France  
divina.meigs@orange.fr

**Thomas Nygren**, Uppsala University, Sweden  
thomas.nygren@edu.uu.se

**Flavia Durach**, National University of Political Studies and Public Administration (SNSPA), Romania  
flavia.durach@comunicare.ro



Funded by the European Union

Funded by the European Commission programme  
"Media Education for All", 2019-2020

### Abstract

In a world of information disorder it is essential that citizens understand how to deal with the flow of disinformation, especially in visual formats (photos, videos). Previous research show that people often struggle to separate a real piece of news from a fake one. In this study, we investigate the possibilities of making a tool for professional verification of fake news, InVID, useful to the public. This exploratory study sought to evaluate 1/ people's habits and attitudes to image verification and credibility online and 2/ people's perceptions of the functionalities of InVID. Participants (N=56) in the study, age 21-73, come from Spain, Rumania, France and Sweden, and have diverse professional profiles (teachers, influencers, etc.). They tested the digital tool and additional materials designed to promote their technocognition. We used a mixed methods design to analyze with questionnaires. The results obtained provide data on perceived usefulness of the tool to detect and determine the credibility of the images and deep fake. We find that participants hold diverse opinions, but in general find InVID useful and interesting. However, they also find tutorials etcetera confusing and call for a more user-friendly tool to swiftly be able to detect fake videos and images.

This study is part of the Youcheck! project which aim to: a) increase critical thinking skills around disinformation, b) raise awareness through media literacy about "fake news" as a threat to democracy, c) empower European citizens through image and video verification and d) capitalize on two European projects: InVID and ECO LEARNING. Youcheck! is a project funded by the European Commission with partners from four countries: France (Savoir Devenir and Agence France-Presse), Sweden (Uppsala University), Romania (SNSPA) and Spain (UNED).

**Palabras clave:** video verification, deep fake, media and information literacy, image credibility, critical thinking, disinformation, fake news.

## 1. Introduction.

---

Information disorder and disinformation via social media has brought a lot of public attention on the dual need for fact-checking and media literacy (EU, 2018). Fake news plays an increasingly prevalent role in the dissemination of misinformation by influencing people's perceptions or knowledge to distort their awareness and decision-making (Zhang, et al., 2019). With the growth of social media, media literacy is increasingly important in the process of forming the citizenship of the post-digital era in which we live (Jandrić, et al., 2018; Frau-Meigs et al., 2017). Since 2016, a number of fact-checking initiatives and tools have emerged as a response from the journalistic profession (Frau-Meigs, 2019). They are mostly geared to journalists, not to teachers, students or citizens at large (Lee, 2018). Research reveals an additional gap: the focus is mostly on text-based "fake news", much less on visual "fake news", though these are among the most prominent in the information and communication uses by young people and the public at large. These identified gaps in research and practice have compelled us to focus on how to prepare adults for a world where fake news will increasingly be AI-lead (deep fake era).

The aim now is to prepare citizens to understand and actively participate in the media culture around them, emphasizing responsibility and critical analysis (Osuna-Acedo et al., 2018). You Check! Project, funded by the European Commission program "Media Education for All", intends to investigate this issue and validate whether the reality check tool presented by images on the Internet, InVID, can be useful for the process of media literacy needed in the society of the 21st century.

## 2. Media Literacy for critical thinking.

---

Much is being said about "fake news" and some good practices already exist in the classroom like having journalists come and train teachers and students. But what good is there in learning about "fake news" if there is no easy way to spot them? Should we wait for the young people to be trained, when most research shows that it is older people and less educated and internet-savvy people who are the conveyors and amplifiers of fake news (Guess, Nyhan, & Reifler, 2018; Hunt & Gentzkow, 2017)?

Other research shows that teenagers are becoming huge consumers of news from social media, but we wonder if they can apply critical thinking to make sense of real-life news. In previous research it is evident how teenagers in the US, Sweden and Hong Kong struggle to determine the credibility of credible, biased and false news (Breakstone et al., 2019; Ku et al., 2019; Nygren & Guath, 2019). In the study by Ku et al (2019) they conclude that adolescents "demonstrated proficiency in news media knowledge but underperformed in evidence evaluation" (Ku et al., 2019, p. 9), highlighting how young citizens with media knowledge still need support to evaluate evidence in updated ways. Citizens need to cultivate the ability to discern between biased and false information from evidence-based information in order to make solid judgments. Noting the complexity of this challenge there is today a call for digital tools to support citizens in an era of information disorder (Wardle & Derakhshan, 2017; Nygren, 2019). Noting how fact-checkers use digital resources to corroborate information (Wineburg & McGrew, in press) it is evident that all citizens can learn from this and use digital tools in updated ways. Combatting disinformation can be quite a messy problem-solving case that needs to become a common practice to sustain participatory cultures (Jenkins, 2008; Osuna-Acedo et al., 2018). There is an urgent need for critical thinking that starts with the presentation of the problem and ends with the provision of arguments (Huljev & Cikovac, 2018).

In Youcheck! project, the key tool is the InVID visual verification plugin, to foster critical thinking about pictures and videos shared on social networks and help debunk fakes as a rapid response. The initiative also develops a toolkit to ensure that self-learning and online learning can take

place outside the classroom. Fostering citizens' agency with digital tools like InVID and adopting a solution-oriented approach to debunk "fake news" appears as an efficient way to change both people's understanding of the "fake news" phenomenon and their daily behaviour with regard to (dis-)information.

### **3. Verification of information as key to debunk text- and image-based disinformation.**

---

To focus on rapid response to debunk disinformation, it is important to get used to being attentive to certain factors in the message, such as the source, inconsistencies, subjectivity, sensationalism in manipulated images (Vishwakarma, Varshney, & Yadav, 2019). Automated fact-checking is often geared towards text analysis and analysis of images seem challenging for many people (García Lozano et al., 2020; Kim et al., 2018; Shen et al., 2019). Citizens need cognitive abilities adapted to technology to navigate information in an era of disinformation (Lewandowsky et al., 2017; Rich, 2018).

This calls for a revised approach to media education, to strike a balance between using human critical thinking and social cognition together with a technological tool that mimics some of the human thought processes (Frau-Meigs, 2011). Such an approach can focus on techno-cognition, which is an inter-disciplinary approach to the design of information architectures that incorporates principles borrowed from behavioral economics to 'nudge' (Thaler & Sunstein, 2008) against the spread of misinformation, "combined with a cognitively inspired program to educate the public and improve journalistic practices" (Lewandowsky et al., 2017, p. 362). This approach has apparent links to theories of civic online reasoning (McGrew et al., 2018), highlighting how journalistic principles and technology need to go hand in hand to educate and support citizens and safeguard democracy.

The use of social media for news production causes significant challenges for the verification process. The main objective of Youcheck! is to combat online disinformation by improving digital visual literacy competences as part of the larger framework of critical thinking. This is done using InVID as a teaching gateway to Media Literacy in schools and among adults as well. The more specific objective of Youcheck! is to gather various data to create a non-expert version of the professional InVID tool, optimizing the plug-in thanks to testing results and enriching it with pedagogical scenarios and self-paced tutorials, quizzes and games.

InVID hold functionalities related to techno-cognition and focus on image verification and credibility. Functionalities make it possible (1) to retrieve metadata about videos and images, (2) to fragment videos into key-frames to allow image-similarity search in other contexts, (3) to perform advanced search queries on Twitter, Facebook and YouTube (4) to compare the efficiency of search engines (Google, Yandex, Baidu...), (5) to look inside images through a magnifying lens, (6) to analyse an image with forensic filters (to detect alterations within its structure such as quantization, frequencies, colours, pixel coherence). All these itemized functionalities correspond to cognitive processes (retrieve, fragment, search laterally, compare across data sets, apply filters...). They are part of the heuristics of critical thinking, that can be both text- and image-based. They should be part of the basic media literacy competences for all.

### **4. Methodology.**

---

#### **4.1. Main objectives.**

Our general research has four main objectives, which can be summarized as follows: a) to increase the critical thinking skills of European citizens regarding disinformation, b) to raise

awareness through media literacy about "fake news" as a threat to democracy, c) to empower European citizens through image and video verification and d) to unify and capitalize on efforts to promote two European projects currently in force: InVID and ECO LEARNING.

In order to reach these objectives, Youcheck! focused on issues of credibility of online images and on testing the user-friendliness of InVID plug-in with a random sub-set of the general public or "beta testers". Using a mix method approach, the pilot study has been conducted in four countries (France, Romania, Spain, Sweden), with a total of about 56 adult beta testers in February 2020.

This exploratory study sought to evaluate 1/ people's habits and attitudes to image verification and credibility online 2/ people's perceptions of the functionalities of the InVID visual verification plug-in, as well as the other resources of the toolkit ("classroom", "interactive" ...).

#### **4.2. Participating sample.**

The total sample of the research is distributed among different professional sectors. 56 registers have been collected of different professional profiles (teachers, influencers, digital marketing specialists, etc.) answered other questionnaire to give their opinion about InVID tool, after having been practiced with its beta-testers. In this study, we will focus on the results obtained exclusively from the questionnaire filled in by beta-testers in the four countries.

The beta testers sample was composed of 41,1% of men and of 53,6% of women. The age of the sample is very diverse, including people whose year of birth is between 1947 and 1999, i.e. the oldest member is 73 and the youngest 21. The most common ages are 26 and 37. As for the distribution by country of residence, 24% live in Spain, 15% in Romania, 12% in France and 5% in Sweden. The data of the study will be presented in this order.

Other characteristics of the sample taken into account in the study are the level of education and the profession they exercise. 37.7% of the sample are university postgraduates, 34% are graduates, 22.6% are doctors, 5.7% have secondary education and there is no member with primary education only. Finally, 49% of the sample belongs to educational fields (e.g. teachers, researchers, students), 28.3% work in Social Media (e.g. manager, influencer, consultants, SEO), 17% of the sample works in the field of communication (e.g. journalism, social communication) and the remaining 9.7% work in various occupations (business, computer and industrial engineering, filmmaking and medicine).

#### **4.3. Procedure.**

A questionnaire was given to the beta-testers, which they filled in after experimenting with the InVID tool from their website. The study sample was briefed on the objectives of the study and on ethical issues, including voluntary participation, privacy and the confidentiality of data. The questionnaires to beta-testers were used to obtain statistical data -descriptive- and qualitative data on different aspects related to image verification and the utility of the digital tool InVID. There was also a set of "open questions" to collect perception of the usability of the tool as a whole, the preferred functionalities and the suggested improvements for future use. Quantitative data collection was carried out, based on the neo-positivist research paradigm (St. Pierre, 2012). The generalizations made in this study are only possibilities, not certainties.

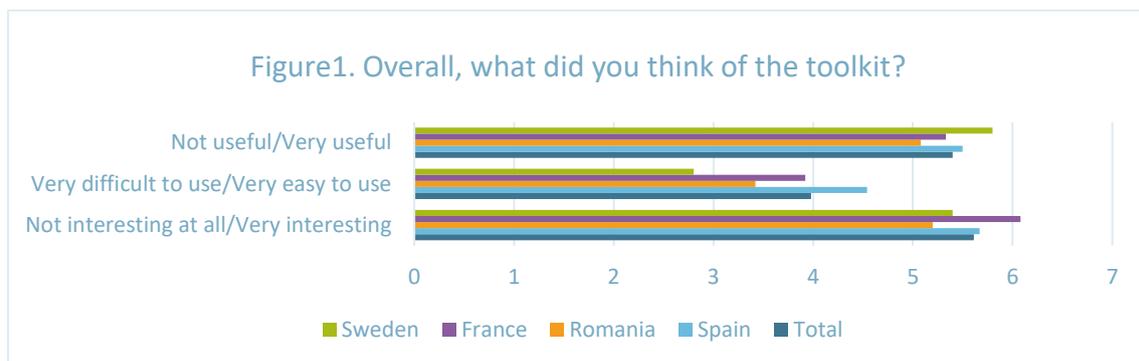
The quantitative and qualitative data were obtained from the answers that beta-testers gave to the questionnaires about their uses, habits and attitudes to fake news, disinformation and the InVID tool. The questionnaires allowed the classification of the answers and the association of certain variables with indicators of socio-types (e.g. gender, age, education). These data were then treated with the SPSS software (Statistical Package for the Social Sciences). With the

questionnaires, we guaranteed that the presence of the researcher did not affect the answers of the beta-testers, which allowed the standardization of the answers given by the sample (Corbetta, 2007).

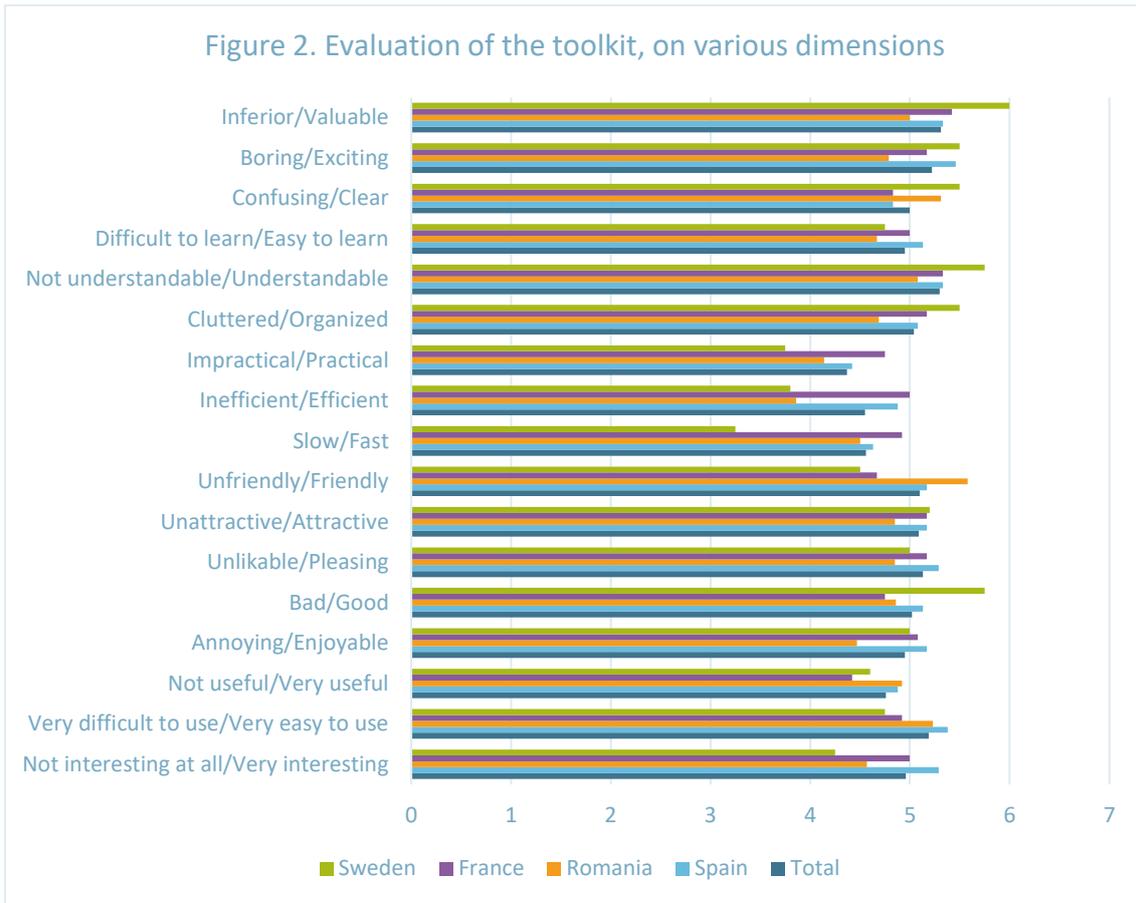
#### 4.4. Data analysis.

First of all, the beta-testers gave their general opinion about the InVID tool, after having used it for a certain time, which has been represented in statistical averages. As we will see in all the following graphs included in this section, the dark blue line represents the data obtained in the total sample, the red line the data from Spain, the grey line the data from Romania, the yellow line the data from France and the light blue line the data from Sweden.

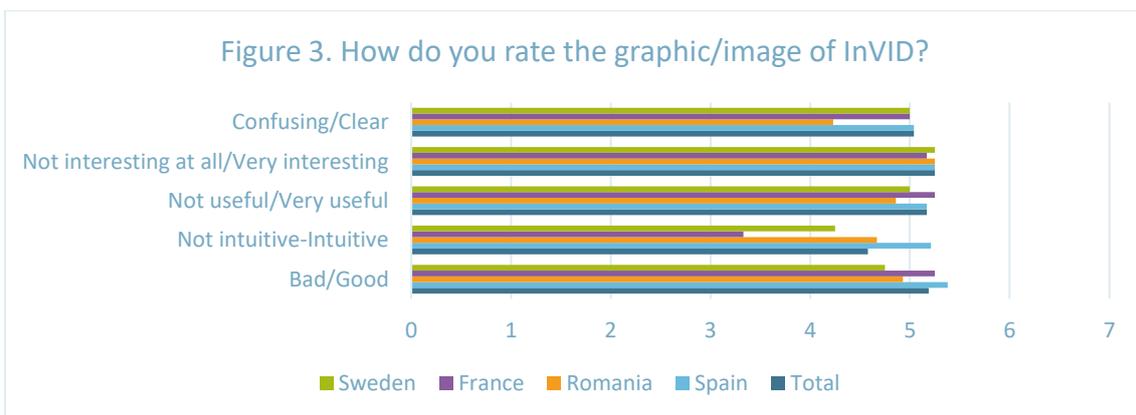
In Figure 1, we can observe the evaluation made by the beta-testers of each country regarding the utility, ease of use and interest of the InVID tool, in general terms. The average response of Spain is very similar to the average of the total countries in terms of the usefulness and ease of use of InVID. However, it is far from the average of the total sample in the aspect of ease of use. In the case of Romania, the averages are always lower than those of the total. France maintains averages similar to the total, except that it stands out in a much higher average than the total sample. Finally, Sweden is the country that is furthest away from the averages of the total in all three aspects, especially in usefulness and user-friendliness.



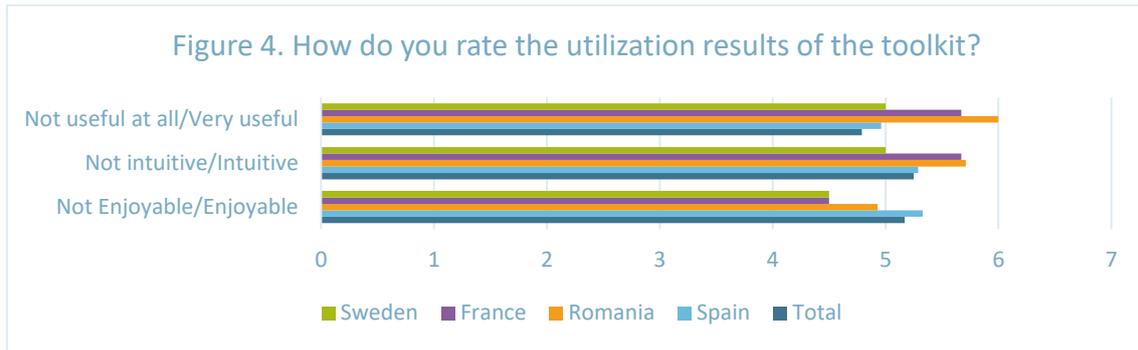
When the sample is asked to rate the toolkit that includes InVID, they are being asked to make their ratings regarding seventeen aspects inspired by the InVID tool, among others, clarity, ease of learning, comprehension, organization, efficiency, speed, ease, etc., as shown in Figure 2. It is worth highlighting some significant differences in averages with respect to the Total. The Spanish sample considers that the InVID toolkit is more exciting, easy to learn, efficient, user-friendly and interesting than what is reflected in the average of the Total. The Romanian sample, on the other hand, has a more negative view of the InVID tools, as it considers them less valuable, exciting, organized, efficient, attractive, pleasant and interesting than the total averages; although it highlights the friendliness of the interface with respect to what is expressed by the other countries. The French sample emphasizes the practical and efficient value of the tools contained in InVID, and believes in contrast that the interface is unfriendly, the opposite of participants from Romania.



In Figure 3, and when the Spanish sample gives its opinion on the InVID graphics and images, it maintains similar ratings to the average of the total, in that they think they are more intuitive graphics and images. In the case of the Romanian sample, they stand out from the total in that they consider graphics and images to be less clear. On the other hand, the French sample also stands out from the Total in one aspect, less intuitive graphs and images. Finally, the Swedish sample maintains lower averages in intuition and pleasantness



With regard to the results of the use of the InVID toolkit, Figure 4 shows that Spain, Romania and France have higher averages when it comes to rating the usefulness and intuition of the results with respect to the averages of the total. Participants from Sweden and France find the toolkit less enjoyable.



It should be noted that 88.9% of the total beta-testers in the four countries answered that they had never used a tool similar to InVID for the detection of the veracity of images. Only 11.1% answered that they had used TinEye, Checknews and Google Image, which means that, the previous moment of checking InVID before answering the questionnaire, was the first time they faced this kind of tools. This contrasts with the data obtained to the questions about the usefulness of InVID in their profession and whether they would recommend its use to colleagues and friends. More than two-thirds of the sample found InVID useful for their profession and would recommend it to colleagues and friends.

Regarding the qualitative interpretation of the data provided by the sample in their open responses to the questionnaire. On the other hand, the response of the total sample on whether they had used the right-click functionality of InVID in their test was as follows: 51.8% of the sample answered "yes", 9.3% answered "no" and 38.9% answered "I didn't know it was possible", which may suggest that this aspect is not very well explained in the InVID tool.

If we focus on the Spanish sample, they think that the most useful aspect of InVID is the Analysis tool, the content and context detection of the information and the search for key images. On the other hand, the easiest thing to analyze with InVID is the reverse search on YouTube, although there is a third of the Spanish sample that selects all the tools as easy to use. Comments in the open questions to highlight what they find most useful about InVID are: "I especially liked their YouTube plug-in. I'm especially concerned about the video fake and have tried it with 3 different videos. The analysis of the video, the comments, and the map have seemed to me super interesting and very original with respect to what I knew until now", "identify areas of an image that have been altered or are a collage of images from different sources and also look for the rights of a video", "that can educate citizens to report false news", "analysis, control, security ... new management of content against misinformation and fakes" and "gather many tools that we are already using". On the contrary, they also comment: "I did not understand too well how the tool works, very little intuitive. What I have managed to decipher is what it does on Youtube, which finds the related theme of the video, but I don't find it very practical for my day-to-day work". Comments to highlight what they find easiest about InVID are: "it's very easy to choose any tool and put the hyperlink. What's questionable is all the information provided later in the dropdowns. I speak English well, but some terms seemed confusing or made me think of different meanings", "the integration with the mouse makes it very easy to upload files and links" and "for youtubers it's great to be able to decipher all the information". Finally, when analyzing the Tutorials, Classroom, Interactive and Forensics tabs of InVID, we found that most of the Spanish sample had a quick look at the tutorial before starting to use InVID. More than half of the Spanish sample considers the InVID tutorials to be difficult, confusing and complicated. On the other hand, a third of the Spanish sample considers the Classroom as quite interesting, informative and useful; the Interactive as quite interesting, clear and useful; and the Forensics as quite useful, clear and easy. To conclude with the qualitative data collected from the Spanish sample, to the question of what would change to improve InVID, the answers

obtained have been "it does not need changes", "a more friendly interface", "to explain more its pedagogical utility", "to improve the interpretation of social networks", "to give more potential to the right button of the mouse", "to improve the translation of Spanish", "to incorporate a first level easy to use that does not need reading of tutorials", "to connect with the filters for detection of false news of the social networks", "to incorporate a powerful database or level of big data for the detection of false images", "to improve the filter of results" and "to give it a more current aspect".

In the Romanian comments, the most useful features of InVID were, in the view of the respondents, Forensic, Analysis, Keyframes, and Magnifier. Others mention the Video rights function as a way to rapidly check whether they can use a given material or not. As for specific assessments of the most useful features, Analysis is highly appreciated for "providing a lot of information", Keyframes for "making the easiest verification of genuine versus doctored videos", and Forensic for providing an overview of all aspects of interest to the user. The opportunity to do reverse searches on numerous search engines is also highly appreciated by the Romanian beta testers. Respondents had the best experiences (in terms of easy use) with Magnifier ("it is very clear what it does"), Forensic ("Once you understand how to make the interpretation, it becomes very easy"), Metadata and Video rights ("easy to use for drafting into other materials specific to social sciences"), YouTube thumbnails reverse search and Twitter advanced search. In terms of improvements to InVID, there is almost total consensus among answers on the necessity to make it more user friendly. The interface seems to be the weakest feature of inVID: "It needs a more intuitive interface, using a pleasant color palette. And I would change the background music for the tutorials"; "It needs a more intuitive way of indicating what each tool does. It took me a lot of time to realize that the 'i' icon has this role". Others suggested functional changes such as, merging more functions into one for a faster use of InVID, introducing searches for websites, apart from social media sites, or translating the Menu and Tutorials into Romanian.

For the French sample, comments in the open question to highlight what they find most useful about InVID suggest that it is the verification of credibility of images that attracts most users. "I like seeing the provenance of an image, especially through reverse search and forensics." Another user notes: "I like being able to find the first appearance of an image and compare to the new context it is used in". In particular forensics and meta-data are deemed useful, which fits with techno-cognition approach and the enhanced and augmented competences facilitated by the tool. Comments to highlight what they would like to improve in the tool underline the ambition of InVID and are satisfied with its existence and think the tool needs more time to mature. However, all beta testers point to the need for more user-friendly interface if not tool, asking for "change of the current graphic interface to make it more modern". Some would like "the centralization of already existing tools in a single, dynamic solution". Others ask for "an intuitive dimension", similar to other existing apps and relate their experience to other habits they have of navigating online (though they do not mention using other verification tools). Finally, some would like an "alert system", to make the plug-in more useful. They tend to wish for a quick ready to use response tool, that would make some signal appear near a picture or video recognized as fake: "it would be much more intrusive but not everybody has the reflex to signal such fakes or to add their knowledge under a photograph or video".

In the Swedish comments we find that participants see the tool as useful in light of the challenge from disinformation. Especially the possibility to corroborate images and the forensic tool is mentioned. For example "It is a good idea to be able to check up pictures and videos to see if they are real or manipulated. An increasingly important question" and "The ability to exercise intellectual self-defense using the analytical tools. This more in private life than in work life, to

be honest". Some beta-tester also found the tool somewhat confusing to navigate. First of all participants had trouble locating the plug-in. Tutorials was mentioned by one participant as "the weakest link" since it has a "confusing design" and "not very good instructional videos". "The videos are short which can be good if you want to learn a specific thing but they are too short if you want to get an introduction and overview of the tool. Personally, I think there should be a 10-15 minute video with explanatory speaker voice that gives an overview of what to do and how to do it and then several short videos for special parts. The short video clips in less than 1 minute are available and can be good when you already know the tool and want to get an update on a specific step" (Male CEO). Another beta-tester called for a more user friendly and simple design. Not least since he did not start in the tutorials or classroom. In contrast, a third participant found the tool quite easy to use. However, this participant also found that "you can get the same information using Google" underscoring that the new thing about Invid is the "Forensic too, which I think looks promising, but very difficult to interpret! If you can get on with it, it's interesting. I also wonder how the tool will stand in a world with rapid developments in animation, voice synthesizers, etc. "

#### **4.5. Discussion.**

Within the boundaries of the You Check project, we have envisaged InVID as a helpful tool for image/video verification. In its design and functionality, InVID closely follows the principles of techno-cognition (see Lewandowsky et al., 2017). It is important to investigate the specific ways in which untrained users actually engage with, and take advantage of the technological affordances of InVID, especially given that this tool was initially designed for professional journalists who are already familiarized with video and images verification.

Our cross-national sample of beta testers responded to InVID in an overall positive manner. The results indicate good scores in terms usefulness, and capacity to raise interest, and moderately good scores for ease of use. The latter aspect was further emphasized in the open questions, where many users from all countries expressed dissatisfaction with the interface. In the perceptions of the beta testers, InVID scores best in terms of being valuable, exciting, understandable, and easy to use, and worst in being practical, efficient, and fast (total scores). Furthermore, one should pay particular attention to developing and improving the self-learning features of media literacy tools by working on better, clearer, more comprehensive tutorials, and by helping citizens make full use of the database with interactive examples. In the case of adult internet users, the usefulness, attractiveness, and general satisfaction with InVID are crucial for determining them to actively engage in fact checking processes and to make them more aware of the ways in which the audio-visual digital media contribute to the spread of disinformation.

Overall, the positive attitudes of beta testers towards InVID encourage us to believe that this particular tool can and will assist adults in applying critical thinking to make sense of real-life news. Irrespective of their professional and educational background, they need to be able to evaluate videos and images in updated ways, and to internalize some crucial practices of critical thinking (see Wineburg & McGrew, in press). While building critical thinking competencies is one of the more usual educational outcomes in schools, there is need to target adults as well, especially since they can play a significant role in unwillingly spreading disinformation, as the research of Hunt & Gentzkow (2017) and Guess, Nyhan, & Reifler (2018) suggests. InVID can contribute to the media literacy competencies of adults in the following ways: (1) raising awareness of the alteration of images and videos, or even complete fabrications (deep fakes) are becoming a strategy for disinformation; (2) refocusing attention from text-based fake news to visual fakes; (3) empowering citizens to use digital tools to determine credibility of the online news; (4) stimulate, though the use of its toolbox (Analysis, Keyframes, Thumbnails, Twitter

Search, Magnifier, Metadata, Video Rights, and Forensic), quick healthy reflexes of assessing evidence in a critical manner; (5) build the habit of using technical solutions, such as - but not limited to - InVID; (6) stimulate rapid responses to debunk disinformation.

While acknowledging that the small sample of beta testers in each country cannot provide truly representative results, we will make a few comments on possible cultural differences in perceiving, using and evaluating InVID. On some dimensions, different countries evaluate the strengths of the tool very differently. The Spanish sample showed more positive attitudes towards InVID, whereas the Romanian respondents had the least positive views, compared to the other countries. For the French respondents, practicality and efficiency are especially valuable, whereas for the Swedish beta testers these elements are of lesser interest. Romanians are more appreciative of the interface, whereas the French sample is more critical. Similar critical attitudes of the French beta testers can be identified with respect to the intuitive character of graphs and images in InVID. The results from using InVID are also diverse with Romanian and Spanish beta testers rating usefulness, intuitiveness, and pleasantness of the results higher than their counterparts do. In sum, InVID is perceived as a useful tool irrespective of the social context in which is being used. There is also a commonly shared, less positive perception on the current weaknesses of the interface and the Tutorials across all countries.

## **5. Conclusions.**

---

While concerns with the preeminence of disinformation in the digital media grow, there is an equally growing need for empowering users to engage with news and information in more responsible, critical ways. While media literacy interventions in classrooms can follow a more traditional pedagogical approach, equipping adults with critical thinking and media literacy skills is particularly challenging. We find a viable path in following the principles of techno-cognition to educate and support citizens in their civic online participation. The technical tool we support focuses on improving digital visual literacy competences as part of the larger framework of critical thinking, as well as on prompting rapid response strategies of the digital audiences to debunk disinformation. By testing the user-friendliness of InVID plug-in with a sample of the adult public, we find that with adaptations and updates, InVID may assist citizens that are neither journalists nor professional fact checkers. In future research we call for more research on how a user friendly tool based upon InVID may support citizens to detect and judge the credibility of digital news received in visual formats and how this can support the development of media literacy skills and critical thinking.

## **6. Acknowledgements / Thanks / Appreciations.**

---

This work was funded by the YouCheck! project (LC-01244282) of the Preparatory Action “Media Literacy for All (2018)” of the European Commission.

## **7. References.**

---

- Breakstone, J., Smith, M., Wineburg, S., Rapaport, A., Carle, J., Garland, M., & Saavedra, A. (2019). *Students' civic online reasoning: a national portrait*. Retrieved from <https://purl.stanford.edu/gf151tb4868>
- Corbetta, P. (2007). *Metodología y técnicas de Investigación Social*. Madrid: Mc GrawHill.

- EU. (2018). *Action Plan against Disinformation. Joint communication to the european parliament, the european council, the council, the european economic and social committee and the committee of the regions.* Retrieved from [https://ec.europa.eu/information\\_society/newsroom/image/document/2018-49/action\\_plan\\_against\\_disinformation\\_26A2EA85-DE63-03C0-25A096932DAB1F95\\_55952.pdf](https://ec.europa.eu/information_society/newsroom/image/document/2018-49/action_plan_against_disinformation_26A2EA85-DE63-03C0-25A096932DAB1F95_55952.pdf)
- Frau-Meigs, D. (2019). Information Disorders: Risks and Opportunities for Digital Media and Information Literacy? *Media Studies* 10, 19, 11-27 <https://hrcak.srce.hr/ojs/index.php/medijske-studije/issue/view/392>
- Frau-Meigs, D., O'Neil B., Tome, V., & Soriano, A. (2017) *Digital Citizenship Education: An Overview and new perspectives*, Strasbourg: Council of Europe Publishing. <https://rm.coe.int/prems-187117-gbr-2511-digital-citizenship-literature-review-8432-web-1/168077bc6a>
- Guess, A., Nyhan, B., & Reifler J. (2018) «Selective Exposure to Misinformation: Evidence from the consumption of fake news during the 2016 U.S. presidential campaign », <http://www.dartmouth.edu/~nyhan/fake-news-2016.pdf>
- Huljev, A., & Cikovac, D. (2018). Responsible teaching: the development of critical thinking and media literacy of the public sphere as a necessity and obligation. *MEGATRENDS AND MEDIA*, 230, 230-243. <https://bit.ly/2IsftFR>
- Hunt, A., & Gentzkow, M. (2017). «Social Media and Fake News in the 2016 Election» *Journal of Economic Perspectives*, 31 (2): 211-36. DOI: 10.1257/jep.31.2.211
- Jandrić, P., Knox, J., Besley, T., Ryberg, T., Suoranta, J., & Hayes, S. (2018). Postdigital science and education. *Journal Educational Philosophy and Theory*, 50 (10), 893-899. <https://doi.org/10.1080/00131857.2018.1454000>
- Jenkins, H. (2008). *Convergence Culture. La cultura de la convergencia de los medios de comunicación*. Barcelona: Ediciones Paidós Ibérica S.A.
- Kim, H., Garrido, P., Tewari, A., Xu, W., Thies, J., Nießner, M., . . . Theobalt, C. (2018). Deep Video Portraits. *arXiv preprint arXiv:1805.11714*.
- Ku, K. Y., Kong, Q., Song, Y., Deng, L., Kang, Y., & Hu, A. (2019). What predicts adolescents' critical thinking about real-life news? The roles of social media news consumption and news media literacy. *Thinking Skills and Creativity*, 33, 100570. <https://doi.org/10.1016/j.tsc.2019.05.004>
- Lee, N. M. (2018). Fake news, phishing, and fraud: a call for research on digital media literacy education beyond the classroom. *Communication Education*, 67(4), 460-466.
- Lewandowsky, S., Ecker, U. K., & Cook, J. (2017). Beyond misinformation: Understanding and coping with the “post-truth” era. *Journal of Applied Research in Memory and Cognition*, 6(4), 353-369.
- Lozano, M. G., Brynielsson, J., Franke, U., Rosell, M., Tjörnhammar, E., Varga, S., & Vlassov, V. (2020). Veracity assessment of online data. *Decision Support Systems*, 129, 113-132. <https://doi.org/10.1016/j.dss.2019.113132>
- McGrew, S., Breakstone, J., Ortega, T., Smith, M., & Wineburg, S. (2018). Can students evaluate online sources? Learning from assessments of civic online reasoning. *Theory & Research in Social Education*, 1-29.
- Nygren, T. (2019). Media and Information Literacy in News Feeds and Education. In U. Carlsson (Ed.), *Understanding Media and Information Literacy (MIL) in the Digital Age*: Department of Journalism, Media and Communication (JMG), University of Gothenburg, UNESCO.
- Nygren, T., & Guath, M. (2019). Swedish teenagers' difficulties and abilities to determine digital news credibility. *Nordicom review*, 40(1), 23-42.

- Osuna-Acedo, S., Marta-Lazo, C., & Frau-Meigs, D. (2018). From sMOOC to tMOOC, learning towards professional transference. ECO European Project. *Comunicar*, 55, 105-114. <https://doi.org/10.3916/C55-2018-10>
- Rich, M. D. (2018). *Truth decay: An initial exploration of the diminishing role of facts and analysis in American public life*: Rand Corporation.
- Shen, C., Kasra, M., Pan, W., Bassett, G. A., Malloch, Y., & O'Brien, J. F. (2019). Fake images: The effects of source, intermediary, and digital media literacy on contextual assessment of image credibility online. *New Media & Society*, 21(2), 438-463. doi:10.1177/1461444818799526
- St. Pierre, E. A. (2012). Another postmodern report on knowledge: Positivism and its others. *International Journal of Leadership in Education*, 15(4), 483-503. <https://doi.org/10.1080/13603124.2012.696710>
- Thaler, R. H., & Sunstein, C. R. (2008). Nudge: improving decisions about health. *Wealth, and Happiness*, 6.
- Vishwakarma, D. K., Varshney, D., & Yadav, A. (2019). Detection and veracity analysis of fake news via scrapping and authenticating the web search. *Cognitive Systems Research*, 58, 217-229. <https://doi.org/10.1016/j.cogsys.2019.07.004>
- Wardle, C., & Derakhshan, H. (2017). *Information Disorder Toward an interdisciplinary framework for research and policymaking*. Strasbourg: Council of Europe.
- Wineburg, S., & McGrew, S. (in press). Lateral reading and the nature of expertise: Reading less and learning more when evaluating digital information. *Teachers College Record in press*.
- Zhang, C., Gupta, A., Kauten, C., Deokar, A. V., & Qin, X. (2019). Detecting fake news for reducing misinformation risks using analytics approaches. *European Journal of Operational Research*, 279(3), 1036-1052. <https://doi.org/10.1016/j.ejor.2019.06.022>