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Knowledge, Integration and Scope of Deepfakes in Arts Education: The Development of Critical Thinking in Postgraduate Students in Primary Education and Master's Degree in Secondary Education

Víctor Murillo-Ligorred, Nora Ramos-Vallecillo *, Irene Covaleda and Leticia Fayos

Department of Musical, Artistic and Corporal Expression, Faculty of Education, Campus of Zaragoza, University of Zaragoza, 50009 Zaragoza, Spain; vml@unizar.es (V.M.-L.); irenecovaleda@unizar.es (I.C.); lfayos@unizar.es (L.F.)

* Correspondence: noramos@unizar.es

Abstract: If the appearance of digital images does not coincide with what they look like when they are presented as authentic photos or videos, we must reflect on concepts such as mimesis, truth, Artificial Intelligence and impersonation, something that is currently gaining prominence in the education of teachers and university professors. The current study presents the results of a research focused on the scope and knowledge of the so-called 'deepfake images' by the university student body of the Visual and Plastic Education subject, in the Graduate Certificate in Primary Education, and the student body of the Activity Design subject, in the master's degree in Secondary Education—Specialty in Drawing, in the subject of Activity Design, University of Zaragoza. To do so, a quasi-experimental design with qualitative methodology was used, in which of 100 students participated. As a data collection strategy, reports were used, based on semi-structured questions, for the analysis of the development of critical thinking. The achieved results allow us to verify that deepfakes put forward an innovation in the study by university classrooms. The use of these deepfake representations is a novel issue that generates some moral and ethical controversy due to the different uses it can have, where the age of the interpreter is a differentiating factor for the knowledge and the possibilities that these imaginaries present. Therefore, it is a work area belonging to the field of artistic education on which little exploration and research has been conducted. Based on the obtained results, we conclude that there is currently a better awareness on the part of artistic education, and of education itself, in general terms, regarding the knowledge by the students, the relevance of its use, and the possibilities of these technological tools, both in their creative aspect and their misinformative ones.

Keywords: art education; deepfakes; creativity; misinformation

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1. Introduction

The study of the scope of the existing knowledge in higher education on digital deepfakes focuses on a pilot project within the Visual and Plastic Education subject, in the Graduate Certificate in Primary Education at the Education Faculty, and the Activity Design subject, in the master's degree in Secondary Education—Specialty: Drawing, Image, and Plastic Arts. The aim of both subjects is to train future teachers of art education; in the case of the bachelor's degree oriented towards basic education and in the case of the master's degree oriented towards secondary and higher education. The objective is deepening and promoting the critical thinking of the students, through the practical use of aesthetic knowledge, defined around deepfake representations that increasingly, and with more democratization, come out to meet us [1]. Artificial Intelligence (hereinafter AI) is fashionable in culture, leisure, sports, politics [2], war, and pornography; in campaigns that mean equally both smear and misinformation, as well as images that address entertainment,

knowledge and reminiscence of past and historical characters, which are presented through creative and artistic images [3,4]. These two aspects, one positive and the other negative, are the two poles through which one can study the benefits and dangers of AI inside the higher education of future graduates in Primary Education and future teachers of Secondary Education. In this paper, we address the analysis of various experience reports where the knowledge concerning these new images among university students is revealed, as well as the consideration of these imaginaries within a fake ambit, the differentiation between images that correlate with the empirical reality and others that are the result of AI, in addition to their consideration as ethical and responsible images, being, lastly, the assessment of whether these images belong in artistic education.

2. The Background of Artificial Intelligence in Contemporary Societies

Contemporary art education cannot be oblivious to the "fake digital culture". The products of visual culture are neither a political movement nor an academic movement; however, they are a medium through which the political is projected, as well as questions of identity, desire and sociability [5]. For this reason, because they are intimately related to the social, through representations close to the model they imitate, they are the territory of the educational. With regard to the new contemporary images that come to our attention, we find some very specific ones, such as deepfakes. But what is a deepfake? And how to study it to learn this new reality that has arisen and has been provoked in recent times? This term is an English compound term formed by the words fake and deep learning. It is an AI technique that allows users to edit false videos of people who seem to be real, using its algorithms of unsupervised learning, known as GAN (generative adversarial network), and already existing videos or images. The outcome of this technique is a very realistic, albeit fictional video. The origin of these deepfake visualities and narratives can be traced to the iconic film Rogue One: A Star Wars Story (2016), in which Princess Leia comes to the fore and can always return with new dialogues and new actions thanks to her deepfake (See Figure 1).



Figure 1. Princess Leia deepfake as generated by ILM (Industrial Light & Magic). Source: https://lrmonline.com/news/millie-bobby-brown-is-princess-leia-in-new#deepfake-video/. Accessed on 6 May 2019.

Through these technologies, the creation or recreation of deceased people grants us a promise of duration, of permanence against the passage of time [6]. These images, created through this technology, introduce us, firstly, in the artistic fact, in the pure creation, in the fictional, the representative; they are used to revive popular people, for non-commercial purposes, just purely historical or artistic, so that they can be known by new generations. Examples of this are the return to life of Lola Flores, Salvador Dalí, or Mario Moreno Cantinflas, or the traveling circuses that include acts with virtual reality animals into their shows, to preserve that traditional essence of the circus, at a time when work with animals is no longer allowed.

Second, these images have also been used in politics, pornography, cinema, music [7] and with a greater presence and that is increasing in recent years.

Concerning this second intention, there are politicians and world leaders who have suffered discredit because of the impersonation of their identity through this technology. Two specific examples of this misuse are that of President of the United States Barack Obama in 2018 [8] or, in 2019, some manipulated videos of Democratic Party politician Nancy Pelosi when she was speaker of the House of Representatives, in which she appeared with obvious symptoms of drunkenness. Those were videos that questioned Pelosi's honourability and that had to be denied, not without problems. Zannettou et al. [9] list a number of actors associated with the development and distribution of deepfakes, which range from governments, political activists, criminals, and malicious individuals who have spread images that do not coincide with real facts through social networks [8]. An intentionality of various forms of extorsion and manipulations of the public and their opinion regarding specific issues may be the motivation behind the actions of these actors [9].

These representations bring about confusion or discord in the viewer, economic benefit, passion for a specific idea or organization, genuine and pure chaotic fun [10].

In fact, deepfakes are closely related to so-called fake news, so in vogue currently. If we trace one of the first projects about the creation of false images through AI processes, we found the origin in a project of the company N-Vidia (Blinded for peer-review). In 2017, through the combination of existing images of real profiles from people in social networks, extracted using big data technology, portraits of non-existent people were created. They look recognizable due to familiarity with the photographic document, but they lack any causal relationship, since they do not keep memory of any reference.

Besides these examples, during the current war in Ukraine since the Russian invasion, there has been in 2022 an event that marks the turning point in the use of these visualities for identity theft, which has not passed unnoticed. Thus, we find the emergence on social networks and digital platforms on 16 March 2022, of a deepfake of President Volodymyr Zelensky calling for the surrender of Ukraine and the return of the region of Dombás. This act was the first time that AI in the form of a deepfake was used as a weapon of war, for the destabilization of armies, in the society of knowledge and information (See Figures 2 and 3), something that Agarwal (2019) already envisioned as a future possibility in politics [2].

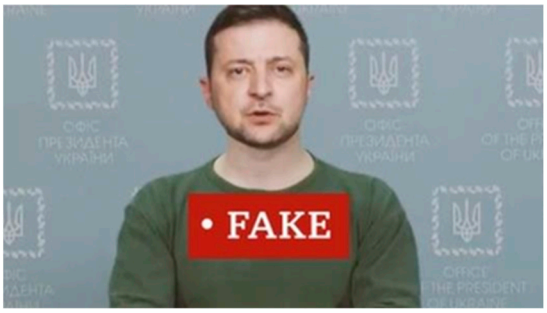


Figure 2. Deepfake Zelensky and Putin transmitted via social networks. Source: https://www.bbc.com/news/technology-60780142, accessed on 23 January 2023.

This has opened up a polarised debate on the need for a regulatory framework for AI that has pitted thinkers, entrepreneurs, engineers and tech moguls in the form of CEOs such as Elon Musk against each other, who, for the moment, have not reached any kind of consensus on how to put limits on the AI industry.

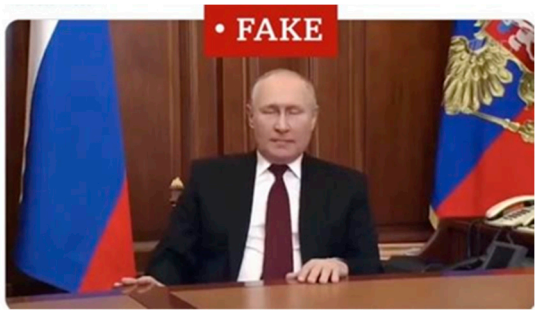


Figure 3. Deepfake Zelensky and Putin transmitted via social networks. Source: https://www.bbc.com/news/technology-60780142, accessed on 23 January 2023.

3. Theoretical Framework: Audience, Education and Deepfakes

The relationship that is established between a deepfake and a viewer is the same as with any other type of realistic image. The familiarity with the model, its realistic aesthetics and its appearance as a truthful image means that the model presented is not mistrusted. This circumstance moves the spectator to perform actions, such as, in the case of Lola Flores, to buy beer. All these representations present themselves as subjects, and as objects, in the duality of the same effect provoked by the image. To represent means to present oneself as something that represents and every representation, every sign or process of presentation, includes a double dimension: a reflexive dimension, presentation of oneself; a transitive dimension, which represents something—a dual effect—the effect of subject and the effect of object [11].

These dualistic processes demand a participatory response from the public. Paulo Favero [12] points out that the images that circulate in contemporary digital habitats are, at the same time, agents that produce actions and representations that carry meanings. Salvador Dalí or Lola Flores are two icons of 20th century culture that are presented as digital technologies in terms of the imperatives of the image, between performativity and agency, between mobility and participation [13]. A participation that is nourished by affects, by the senses through which it acts and by the feelings of those who participate and connect [14]. The recognisable figures of those who present themselves to us, have to do with the figure of Banquo's ghost at Macbeth's table who returns to draw attention to us [15]. As Brea [6] points out, it is as if they could open the way to the Mephistophelian pact, we institute them perhaps as promises of memory: memory that expands the lived towards the others—in whom the self expands into the collective of which every image teaches—but also and above all towards the future—and its other inhabitants [6].

The response demanded by the deepfake from the spectator is found in the dialogues themselves, which promote these imaginaries, inviting us to act. The deepfakes tell us what to do and how. Giving up arms in Zelenski's case, visiting an exhibition and what to expect from it with Salvador Dalí, that is, the intentionality they have for the spectators, is confronted, and equalised to the extent that the material conditions of the technology, which fall within a logic of economic and banking rationality, are made possible.

Thus, deepfake technologies are situated in their appearance in the world by virtue of the conviction of providing a gift from those who are wise to those who are ignorant [16]. The use of popular cultural figures to influence at a particular moment in time gives these images the capacity to be emblematic, to express ideas and to present themselves as a role model [17].

The immaterial construction of the reality that is driven by these procedures picks up the yearnings of the finitude of a past time. A presentation of images with a mnemonic vision provided by technology. The separation of the concepts of reality and fiction are diluted in their borders, "projecting both on the construction of virtual situations in which representation and presence, absence and memory are lowered" [13]. The level of relaxation of the above is based on the digital aspect of the images, which, without losing its condition of presence, becomes more present through the messages it transmits. Likewise, the

component of absence is mitigated with the presentation of these digital images that transport us as spectators to past times or situations that have not been in the sense of Barthes [18].

However, and in the light of the above, the study is based on an enquiry that is based on the urgency of the latest visual events, and there is not yet a solid theoretical panorama that can be reflected in this section. Culture and education lack the necessary reflection addressed by the scientific community to be able to relate other previous or parallel studies to the one presented. As this is research that breaks with established models, we find that there is no theoretical apparatus to serve the purposes of the research. The same happens with most of the references used, coming from visual culture in its different approaches, but far from glimpsing the underlying theoretical problems and the theses that should emerge in this understanding of the fictional and the false. However, it is true that there are academic studies that map the landscape of the incorporation and development of these AI techniques in numerous fields of study and point to education itself in general terms in one case, or related to technical fields related to biomedicine or engineering through systems and applications in others [19,20].

Therefore, we must refer to the few authors that are mentioned and the few previous studies [9,21–23], this research being a spearhead in the educational world and in other tangential ones such as Moxey [15], when he refers to the enrapture of the images that surround us and the lack of judgement in the face of the familiarity of the models, something that is undoubtedly identified with the images studied by Virilio [24] through the support or the mimetic impulse.

Authors who have addressed the question of the effects of presence in these deepfakes, preceded by holographic images, which is also extensible to those created through AI, point out in the case of Gumbretch [22] that this presence is as important as the effects of meaning [15], as the ability to affect us, their aesthetic and poetic appeal, and their status as presentation add complexity to our understanding of the new current imaginaries. The key to understanding these images lies in materiality as a formative element in understanding deepfakes as social images [25]. An approach that recognises the centrality of materiality and allows us to look at and use images as socially salient objects, as active and reciprocal rather than simply implications of authority, control, and passive consumption on the one hand, or aesthetic and supremacist discourses on the other. This is questionable given recent events, when they are used precisely for the supremacist control of some societies over others, and when we talk about their implications for war.

Therefore, in this sense, the two tensions on which the theory is based continue to be those of the materiality and meaning of these imaginaries. This is complicated by the lack of veracity, if not verisimilitude, that these images present [26].

Against this backdrop, where AI has a history that has marked some disinformational milestones in recent years (Zelenski's deepfake, the appearance of Nancy Pelosi with symptoms of drunkenness through a manipulated video, etc.) and a promising future ahead, with no end in sight, artistic education is a priority in which to address these issues. The relevance of making future teachers and professors literate in the current state of the imaginary takes on an unusual prominence and of great transcendence for the social and educational aspects of the new generations. The discourses and cultural critical pedagogies [1,27,28] become highly topical, for the awareness and critique of what surrounds the educational, media and simulacral context, which, this time, we do in visual terms. Aguirre [29] points out that it is interesting to unmask the ways in which the political is embodied through the aesthetic [30], just as it is necessary to generate, through education, scenarios of dissent that allow for the reconfiguration of new forms of participation in the inherited regimes of the sensible [28,31].

Equally, and in another way, as teachers we must learn to coexist with these new technological tools in the education of the present and look to the future.

In another sense, the images created by AI techniques also have a positive side, where deepfakes also meet us and are integrated into everyday life, jumping from what only

a few years ago was something extraordinary in the cinema, to the reality of concerts for all audiences, television advertisements dedicated to commercial products, in their presentation as claims for monographic exhibitions about authors who are not among the living, as is the case with the appearance of Salvador Dalí in the exhibition at the St. Petersburg Museum in Florida in 2019, under the title of Dalí Lives. In this positive sense is where deepfake images connect the past with the present, bringing back disappeared figures, and there are numerous examples such as the aforementioned and other more current ones that television has shown as authentic artistic creations of relevance, awarded for this, such as the result of the startup Metaphysic that managed to progress through to the final round of the North American talent show America's Got Talent, where the deepfakes of the jury of the competition appeared in real time as if they themselves were the ones who were performing. The actors were transformed by AI techniques into their digital doubles, to the disbelief of the viewers' own eyes and those of the jury, who saw themselves replicated on the screen.

They are postulated as something imaginary that expresses itself in terms of visual indifference, of technicality and mechanistic brought to the fore by the literal aesthetics of the technical images themselves. The loss of distinction between reality and representation, between reality and fiction, and the persuasion of the spectator by appealing to stereotype, are the field of study of visual culture in education. Regarding modernity, it does not take place without faith or that which is believed in undergoing a destruction, without the discovery of the lack of reality in reality; a discovery linked to the invention of other realities [32]. Arts education must work to foster a critical spirit through the study, learning and literacy of the new digital imaginaries. Ideas and purposes bring this work to the forefront, where the future graduates of primary education must know fundamental parts of the perceptive reality that surrounds us.

4. Objective and Hypothesis

The main question to which this research work responds concentrates on analysing the knowledge, interest and need that exists, in relation to the possibilities presented for its development in primary and secondary classrooms, in the so-called deepfakes that are increasingly abundant in the knowledge and communication society.

The aim of this study was to find out the perception of university students about deepfakes taking into account the socio-demographic variable of age, due to the following considerations:

- Critical thinking competence increases with age, with lived experiences and not only with university education [33].
- The maturity of the student is what really influences the application of critical thinking competence in his or her social and personal life [34].

Based on this objective, we state the following hypotheses:

H1. *There are differences in the knowledge of the deepfake phenomenon in relation to the age of university students.*

H2. *University students consider the images created by means of AI as fake.*

H3. *University students can differentiate a deepfake image from an image from empirical reality.*

H4. *University students consider that the use of these types of images of deceased persons for profit is unethical.*

H5. *There are differences in the consideration of these types of images within the field of art education.*

5. Methodology

The working methodology was a quasi-experimental design with a qualitative methodology based on reports with semi-structured questions. Experience reports were chosen as the data collection tool. It was also implemented in class with an intervention model, with 3 sessions, the first one for sharing, the second one for explanation and the third one to ask the questions in the report. We consider that it is adequate to the object of study since the objective was to know each student's ideas about the relevance of labour on deepfakes within artistic education.

5.1. Informants and Procedure

On the basis of a convenience sample generated in situ with students studying for their master's degree in secondary education, future teachers in the area of art education, due to the accessibility of the research team to the sample, informants were selected who were representative of the student body in terms of gender, academic stage and average class size. A convenience sample of 100 students is presented, university students aged between 20 and 49 years, with a mean age of 29.70 years. Of these, 50 are 20 years old (20 years) and 50 are over 20 years old (+20 years). They are divided between Graduate Certificate in Primary Education (73 participants) and the master's degree in Secondary, High School, Vocational Training, and Languages, Artistic and Sport Education, within the speciality of Drawing, Image, and Plastic Arts (27 participants). Of these, 64 women and 36 men took part in this study, which was carried out using a qualitative methodology.

As for the procedure, as well as the analysis of the data used in this study followed the ethical criteria established by the good practice guidelines of the Committee on Publication Ethics [35] and the basic principles of the Helsinki declaration for research involving human subjects [36]. Before starting, they were reminded that the data would be processed for research purposes only, the process of anonymization during processing was guaranteed, as was the safeguarding of their anonymity in the resulting studies. They were also informed of their right to withdraw from the study.

5.2. Instruments and Variables

The perception of deepfakes will be studied by means of an instrument generated ad hoc. This is due to the non-existence of a defined instrument for the study of this subject. A total of 100 individual and semi-structured experience reports were conducted through the Google Form platform. They were carried out during the months of February and May 2023, depending on the time availability of the informants, with an approximate duration of 45 min. The reports were organised with 5 questions that initially had to be answered with a closed answer "YES/NO" and then an open answer to justify the initial choice.

The questions were designed based on the taxonomy proposed by Bloom (1971), which ranges from the ability to collect information to judging an outcome [37].

The questions were as follows:

1. Do you know what a deepfake is?
2. Based on the imaginaries seen in class, can we consider that the images created by AI belong to the domain of the fake?
3. Based on the imaginaries seen in class, understood as deepfakes, can one distinguish between images from empirical reality and images coming from virtual reality understood as representations?
4. If one of the possibilities in their intention is economic, is it ethical to revive popularly known figures, already deceased, to generate money through AI?
5. Do you consider that it belongs to the domain of artistic education to deal with the education of these visual and audiovisual products?

The responses were then transcribed verbatim for further analysis [38]. The report was designed by the researchers of the study and contained questions related to the following themes: (1) knowledge; (2) recognition; (3) representation; (4) ethics and (5) education.

This creation process was assessed by a panel of experts made up of university lecturers in educational sciences, didactics of plastic expression and educational psychology, obtaining a Kappa index of intra-observer agreement of over 90%.

5.3. Educational Approach

The activity is developed from the study of the topic Visual Culture and its Education: New Imaginaries, having three sessions for its realization, during two consecutive weeks. Researchers were involved in the design/teaching of the course.

In the first session, the teacher/researcher begins by questioning the participant students about their knowledge about the level of influence of current digital imaginaries, and more specifically about the use of holograms, reflections, and deepfake images that are used in entertainment, culture, politics and war. The teaching strategy of brainstorming was used to develop the project, encouraging action research with active participation by the teaching staff/researchers.

At the second session, a theoretical session occurs where different situations in which these images have a significant relevance are shown and explained. An expository methodology is applied, supported by visual and audiovisual resources taken from the web and social networks.

In the third and final session, the students answer a questionnaire designed according to the hypothesis that we want to work with in this study.

5.4. Data Analysis

After transcription of the 100 semi-structured responses, an analysis of the data was carried out using the constant comparative method [39]. The comparison will be made by systematically comparing events, situations and contexts. Furthermore, different types of comparisons will be made at each stage of the analysis.

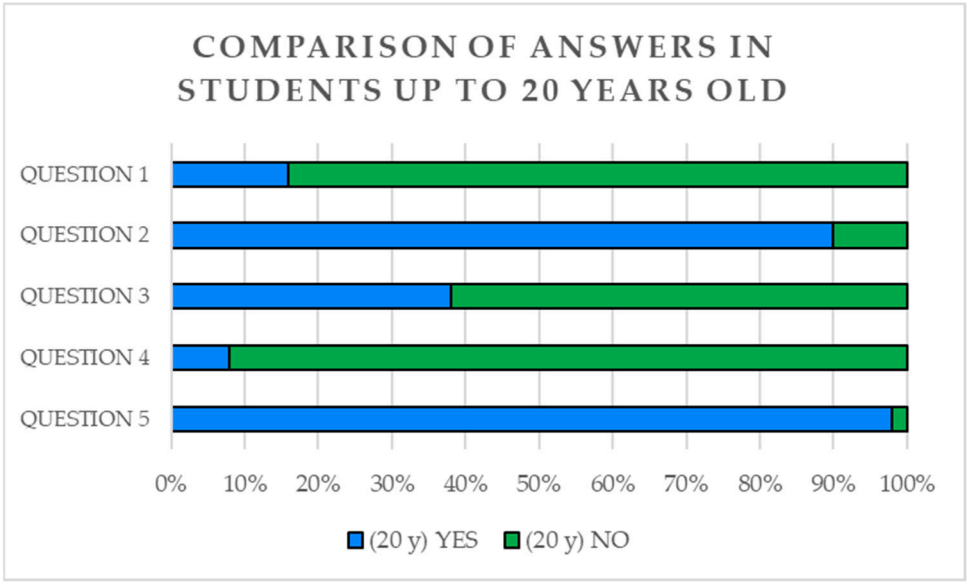
Repeated data reductions were carried out [40]. This began with an extraction of units of analysis from the context in order to carry out a coding of core categories. To categorise these codes, they were grouped around phenomena discovered in the data that were particularly relevant to the research hypotheses, with reference to the initial established cores of interest and with attention to possible emerging categories [41]. This section was carried out using NVivo 12 qualitative software.

6. Results

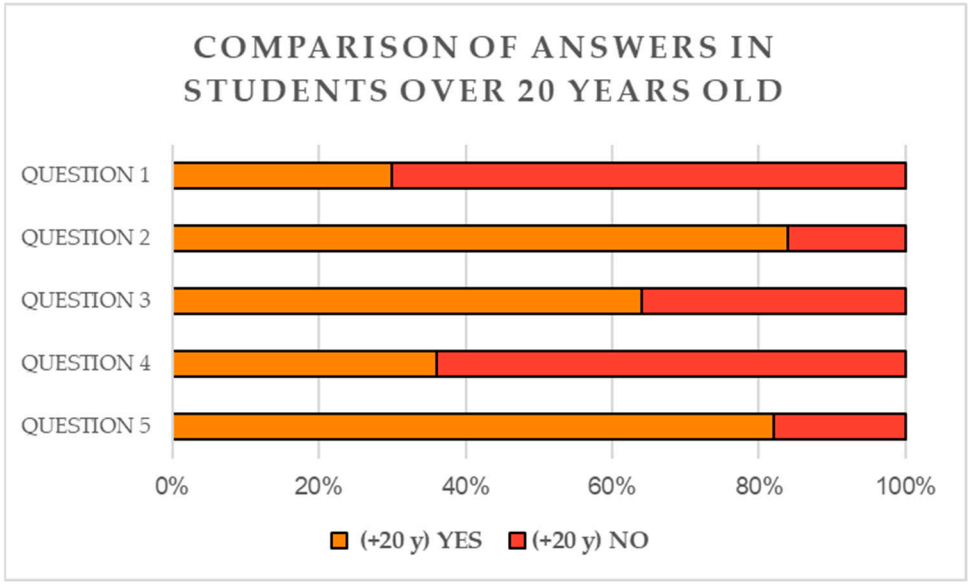
We begin by presenting an analysis of the results obtained in the experience reports about the affirmative or negative responses in relation to the themes proposed by the research group.

We can see how there is a predominant option in the students belonging to the age range of twenty years old (20 years) in all questions, except in the question referring to the possibility of differentiating the images generated by AI, where the answer is more similar to that of the other age range (+20 years). Most of the students in this age range (+20 years) are unaware of this kind of imagery. Most of them consider that they belong to the field of false information, and that it is unethical to use the image of deceased people for profit. In addition, they consider that this type of images should be incorporated into the Arts syllabus for Primary Education (See Scheme 1).

The data reflected in the experience reports concerning the older students (+20 years) reveal that in this age group the answers are not so polarized. Even though there is a greater number of students who do not know this visual resource, another group does know of its existence and knows how to describe it. They also consider these images to belong to the field of fake news. We must emphasize that, in this demographic group, they consider that they can recognize this type of images (See Scheme 2).



Scheme 1. Results of the experience report conducted on students up to 20 years old. Note. Source: Own work.



Scheme 2. Results of the experience report conducted on students over 20 years old. Note. Source: Own work.

The following is an analysis of the results obtained in the experience reports regarding the categories established in relation to the answers on the study of deepfakes in the primary and secondary education stages.

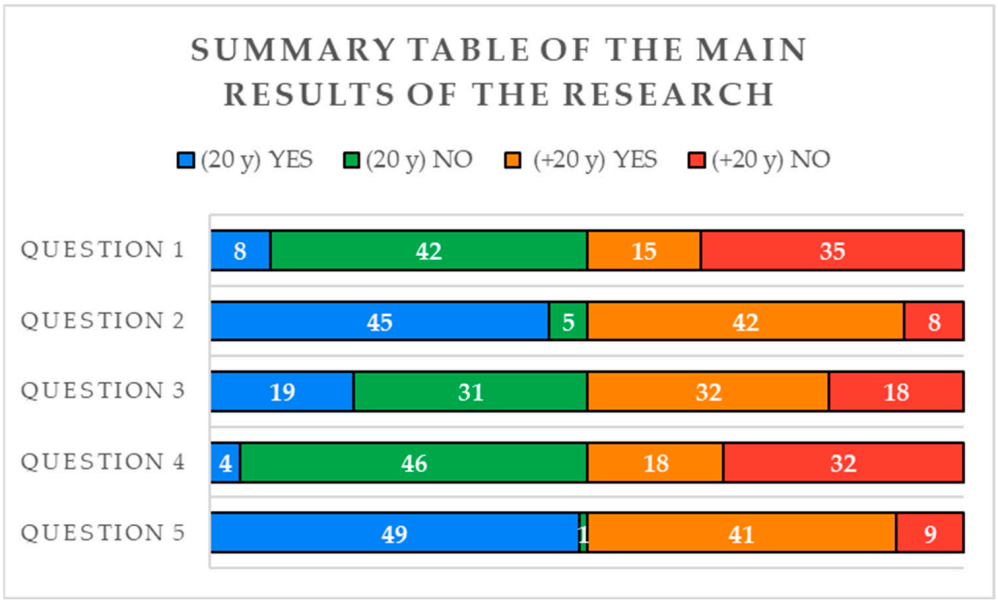
As for the argumentative part of the reports, the quality of the answers was good in general, although the students (+20 years) showed a higher degree of reflection and argumentation.

The university students consider it to be a relevant subject for analysis, both in primary and secondary classrooms and at university level, due to its topicality and growth. They consider the relevance for primary and secondary school pupils of learning to differentiate reality from representations. They find it difficult to differentiate false images from real ones and consider that this is a form of manipulation that they and their future pupils face in their daily lives. The role of arts education in helping pupils to make this differentiation is highlighted. Another aspect that was mentioned was the importance given to visual

literacy to ensure that primary and secondary school pupils can distinguish between real images and representations.

Both age groups underline the interest of working on this aspect in the classroom from the area of arts education due to the increasing presence of technologies.

One of the aspects highlighted, mainly by students under 20 years of age (20 years), is the need to learn how to manage images on social networks, considering that technology is evolving at a faster rate than knowledge and management of this type of communication system. University students consider that by studying this imaginary, they develop critical thinking leading to autonomy of thought, which is essential for primary and secondary school students (See Scheme 3).



Scheme 3. Summary of the results obtained in the experience reports made to all participants. Note. Source: Own work.

7. Discussion

Since its development in postmodern terms [42], art education brings images closer to the understanding and attention to the new narratives and visualizations that shape our world.

H1. *There are differences in the knowledge of the deepfake phenomenon in relation to the age of university students.*

Although in general there is a high level of ignorance of the phenomenon, students (+20 years) state that they are more aware of this phenomenon. Since Rogue One: A Star Wars Story kicked off AI in a democratised way, we have witnessed an exponential and growing blurring of the boundaries between the physical and digital worlds in entertainment, culture, politics, and warfare. We are witnessing a growing universe where simulacrum seizes the experiences to convert them not into reality but into reality of the events to be interpreted. The education in visual culture adds more resources, learnings, and concerns to the teacher. In the visual, we place Photography, Video, Digital Art, Net.Art, Cinema, Comic, Poster design, etc., languages that require a specific training and that allow a self-expression for the child compared to other techniques, media, or resources [43]. In addition, in these times, the use of virtual reality is increasingly more used and democratized in everyday life, through its utilization in advertising and, for some time, in the importance

that it acquires in a few monographic exhibitions of deceased artists. Something that our studying is not consciously aware nor critical with the images that come out to meet you. When shown AI videos of popular deceased people, they had no different reaction to the presentation of empirical videos [20].

H2. *University students consider the images created by means of AI as fake.*

Most of the students think that they are part of falsehood. Therefore, the hypothesis has been confirmed by what was presented in the experience reports. Once the difference between one type of image and another has been explained, they do consider that they belong to the fake world, but they also state that it may be difficult or impossible to discern or warn them.

H3. *University students can differentiate a deepfake image from an image from empirical reality.*

Students (+20 years) consider that they are able to distinguish deepfake images as opposed to students (20 years) who, for the most part, cannot distinguish or recognise deepfake images. This H3 is the hypothesis that yields an interesting polarisation of the results. It highlights that the age factor in the answers is a determining factor.

However, and in spite of this, the students (+20 years) do not qualify how they can systematically recognise these images, because they specify in specific cases how they identify these images as opposed to others, highlighting in which cases it is evident that the image is a deepfake, and when it is not. For example, they note that artistic deepfakes of deceased cultural figures presenting current events or current advertising campaigns are easily recognisable from the chronology of the story. However, it can be more complicated when it comes to living, well-known people, when we lose the referentiality of the facts and they may appear in places where the character could well be located [44].

Thus, some consider that AI-created images themselves are increasingly imperceptible to the eye, as opposed to those that show empirical reality. The majority believe that in the present day of 2023 it is still possible to distinguish these images created by AI technology. However, they predict a future where it will be very difficult or impossible to identify one image from another due to the pace and speed of technological progress.

Both those who are currently able to distinguish the real from the fake and those who are not emphasise that what sets the pace at present for a greater or lesser distinction is technological determinism. This idea reinforces what was stated at the beginning of the text about the figure of Banquo's ghost at Macbeth's table, as we are not certain that what we encounter in the present and in the future may be real or invented. The documentary nature of images, of chronicling what is happening, has already been called into question and will be an increasingly controversial issue that threatens and endangers today's democracies themselves [45].

H4. *University students consider that the use of these types of images of deceased persons for profit is unethical.*

The students consider the use of this type of images of deceased people for profit-making purposes to be unethical. Although there are very few differences between the two groups analysed, students (20 years) are more critical in relation to this issue. They realise this and are critical when they empathise with the loved ones or the deceased person, when they react against its use as ethical.

For all these reasons, reality, representation, spectacle and simulation go hand in hand, creating a reality in itself [46], which needs to be worked on in the training of future arts education teachers and professors. This work involves students and teachers alike by adopting critical teaching–learning [47]. Critical thinking can be taught through meaningful dialogue and problem solving as the most appropriate methodologies [34].

H5. *There are differences in the consideration of these types of images within the field of art education.*

The future graduated students from the Faculty of Education consider that this type of imaginary should be worked on in primary classrooms from the point of view of artistic education. Therefore, in contemporary art education, we can study, in the emergence of new imaginaries and consumption formats for entertainment, culture, and advertising, the new representational practices that involve a new way of accessing knowledge for individuals. Thus, we find proposals that put us in front of deceased popular figures such as Salvador Dalí who, in 2019, greeted visitors at the Saint Petersburg Museum in Los Angeles, during the exhibition Dalí Lives; or Maria Callas in concerts on her world tour during 2021; all of these images that come to our attention and, to which, attention from artistic education should be paid. The constant dissolution of the physical and digital worlds, where the boundaries between what is real and what is representation are blurred, are the object of study in a scope of work where visual literacy, perceptual discrimination, and the critical spirit, play an important role in the education at any formative stage. The postmodern curriculum has been influencing the critical thinking of students about images and the incorporation of new narratives through visual culture in education since the beginning of the 21st century.

However, it turns out that from an opposite side there is misinformation, bad intentions, and disrepute. The appearance of the Zelensky deepfake (See Figure 2) during the Russian invasion of Ukraine in March 2022 makes us reflect and ponder that images and now their power acquire a new meaning; how destabilizing agents and misinformers place images in the frontline of battle. Likewise, the smear campaigns against politicians like Nancy Pelosi, with a video with obvious symptoms of drunkenness of the American leader had to be declared untrue by herself and her office.

All these cases lead us to ethical and moral debates, since reality is assaulted by the representation, simulation and falsification of images that want to belong to the domain of the empirical, not being able to do so because they are a product of creation and not of empiricism [48]. And furthermore, from a legal point of view, what happens when people already deceased are shown? The law is clear about what is allowed when using images or fragments of videos in which a deceased person appears. Instead, and just like with other technologies, the law does not specify what is to be done with deepfakes. In principle, and since the image rights of a person disappear when this person dies, the heirs or closest relatives would be the ones to authorize the use of the image of the deceased in a deepfake. This will logically depend on the legislation of each country or state. These visual manifestations that cling between the absence and the presence, the memory, and the promise of the future, the past and the lived, the historical and the fictional, are exhibited as immediate images that tell events of the present, as if they had come back to life.

Considering that only significant differences were observed in the question referring to the discernment of the images and that this was significative in relation to the age range, we place the interest and discernment in generational terms. The students (+20 years) answered affirmatively, as opposed to the students (20 years) that considered that they could not tell them apart. Age is a factor that, concerning technology, becomes a gap. We perceive that the younger students bear an alienation in these terms of loss of discernment between reality and representation; something that, we suppose, will increase because new versions of the aforementioned programs and applications will be more powerful and more hyper-realistic in the immediate future [33].

We must bear in mind that, although critical thinking must be developed beyond the school or university, the university must be the place where it is encouraged in order to create free and creative subjects [29].

8. Limitations and Prospective Studies

This work has some limitations, such as the lack of a previous strong theoretical body. There is currently no conception that goes into the study of deepfake images in art

education, something that will undoubtedly provide this time to which we must remain attentive as teachers and researchers.

For this reason, and for future research, the aim is to broaden the scope that deepfakes have in the most recent times. For example, the appearance in Spain of images that, by means of AI, 13 and 14 year old children from a secondary school have manipulated photographs of their classmates, with the aim of undressing them and sharing them on social networks, with the damage that this entails. The families have now reported the facts and the cases are in court. The relevance of AI and deepfakes is a reality that we must deal with in the classroom, in order to learn about its positive side and even more about its negative side.

Bringing the deepfake phenomenon, which is so fashionable in the media and AI applications, into the territory of art education is a necessity given the emergence and constant overflows that these images produce in their encounter with people, entertaining in some cases and misinforming or destabilising in others. This is something that should not escape the education of future teachers, with the perspectives that the present moment throws towards the immediate future.

9. Conclusions

Our study initiates an awareness on the part of artistic education, and education itself in general terms, regarding the students' knowledge, the relevance of use and possibilities of these technological tools, both in their creative side as in misinformation. All this has been approached by critical thinking and the practical use of aesthetic knowledge, with which we reach the following conclusions:

First, it is considered as a current issue for both student groups (20 years and +20 years), as it draws attention due to their interest and contemporaneity; and it presents a novelty in the study made in university classrooms concerning the training of Primary Education teachers. It has been introduced and we are living with it without establishing a critique in education, as it affects students and future generations, it needs to be studied now and urgently.

Second, age is a differentiating factor about knowledge and possibilities that these imaginaries offer. The answers are homogeneous inside each age range, while there are significant differences between groups.

Third, the ability to distinguish between reality and representation already supposes a problem in students (20 years). Meanwhile, the students (+20 years) are still capable of discerning one type of image from the other. The development of critical thinking is, in these terms, to be found in the encouragement of enquiry and suspicion with new imaginaries.

Fourth, the use of these imaginaries is going to be a topic to generate, now and in the future, moral and ethical controversy, taking into consideration that its use can be very diverse and have different purposes, both ludic and cultural, as well as malicious and uninformative.

Fifth, we corroborate that a good part of the study of these imaginaries belongs to the domain of artistic education, since that is what those who will dedicate to teaching in the immediate future have let us know.

Finally, this study, although a pilot one, yields some evidence that will be reinforced, contrasted and mostly investigated in successive works. This is an approach to the iconic from critical thinking that introduces great potentialities for education in visual and audiovisual terms. A coexistence that raises awareness of the plurality of the world in contexts where an integrating dialogue allows us to travel through the hybrid territories that digital images offer us today. This educational process has a clear social function, of dissemination and visual literacy that favours an understanding and enjoyment of the environment. A current and necessary scenario in the context of the media, which deepens reflection on the hegemony of images and the forcing of new views and perspectives on technological images.

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References

1. Mclaren, P. *Pedagogía Crítica, Resistencia Cultural y la Producción del Deseo*; Aique: Buenos Aires, Argentina, 1994; ISBN 978-950-701-212-9.
2. Agarwal, S.; Farid, H.; Gu, Y.; He, M.; Nagano, K.; Li, H. Protecting World Leaders Against Deep Fakes. In Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition Workshops, Long Beach, CA, USA, 15–20 June 2019; pp. 38–45.
3. Lyu, S. Deepfake detection: Current challenges and next steps. In *IEEE International Conference on Multimedia & Expo Workshops*; ICMEW: London, UK, 2020. [CrossRef]
4. Sharma, M.; Kaur, M. A review of Deepfake Technology: An emerging AI Threat. In *Advances in Intelligent Systems and Computing Book Series*; AISC: Palo Alto, CA, USA, 2021; Volume 1397. [CrossRef]
5. Mitchell, W.J.T. Interdisciplinarity and Visual Culture. *Art Bulletin* **1995**, *77*, 540–541.
6. Brea, J.L. *Las Tres Eras de la Imagen*; Akal: Madrid, España, 2010; ISBN 9788446031390.
7. Spivak, R. "Deepfakes": The newest way to commit one of the oldest crimes. *Georget. Law Technol. Rev.* **2019**, *3*, 339–400. Available online: https://georgetownlawtechreview.org/deepfakes-the-newest-way-to-commit-one-of-the-oldest-crimes/GLTR-05-2019/ (accessed on 25 April 2023).
8. Fletcher, J. Deepfakes, Artificial Intelligence, and Some Kind of Dystopia: The New Faces of Online Post-Fact Performance. *Theatre J.* **2018**, *70*, 455–471. [CrossRef]
9. Zannettou, S.; Sirivianos, M.; Blackburn, J.; Kourtellis, N. The Web of False Information: Rumors, Fake News, Hoaxes, Clickbait, and Various Other Shenanigans. *J. Data Inf. Qual.* **2019**, *1*, 3309699. [CrossRef]
10. MacKenzie, A.; Bhatt, I. Lies, Bullshit and Fake News: Some Epistemological Concerns. *Postdigital Sci. Educ.* **2018**, *2*, 9–13. [CrossRef]
11. Marín, L. La description de l'image. *Communications* **1970**, *15*, 186–209. [CrossRef]
12. Favero, P. *The Present Image: Visible Stories in a Digital Habitat*; Palgrave Macmillan: New York, NY, USA, 2018; ISBN 103319694987.
13. Martínez-Luna, S. La imagen interconectada: Participación, mímesis, cuidado. In *Acción y Poder de la Imagen: Agencia y Prácticas Icónicas Contemporáneas*; en García Varas, A., Ed.; Plaza y Valdés: Madrid, España, 2019; pp. 17–45. ISBN 978-84-17121-29-7.
14. Ulm, H. Devenir digital: Notas para una genealogía del aparecer», [ponencia]. In *en 3º Coloquio Internacional de la Red Latinoamericana de Investigaciones en Prácticas y Medios de la Imagen*; Universidad Alberto Hurtado: Santiago de Chile, Chile, 2019.
15. Moxey, K. *El Tiempo de lo Visual: La Imagen en la Historia*; Sans Soleil: Vitoria, España, 2015; ISBN 978-84-942922-5-5.
16. Freire, P. *Pedagogía del Oprimido*; Siglo Veintiuno: Madrid, España, 1997; ISBN 13 9788432301841.
17. Bredekamp, H. Teoría del acto Icónico. Akal: Madrid, España, 2015; ISBN 978-84-460-3875-7.
18. Barthes, R. *La Cámara Lúcida. Nota Sobre la Fotografía*; Paidós: Barcelona, España, 2007; ISBN 84-7509-621-2.
19. Ezzaim, A.; Kharroubi, F.; Dahbi, A.; Aqqal, A.; Haidine, A. Artificial intelligence in educatio -State of the art. *Int. J. Comput. Eng. Data Sci.* **2022**, *2*, 221–233.
20. Zhang, C.; Lu, Y. Study on artificial intelligence: The state of the art and future prospects. *J. Ind. Inf. Integr.* **2021**, *23*, 100224. [CrossRef]
21. Bitouk, D.; Kumar, N.; Dhillon, S.; Belhumeur, P.; Nayar, S.K. Face swapping: Automatically replacing faces in photographs. *ACM Trans. Graph. (TOG)* **2008**, *27*, 1249–1250. [CrossRef]
22. Gumbretch, H.U. *Production of Presence: What Meaning Cannot Convey*; Standford University Press: Stanford, CA, USA, 2004; ISBN 9780804767149.
23. Huber, C.; Kuncel, N.R. Does College Teach Critical Thinking? A Meta-Analysis. *Rev. Educ. Res.* **2016**, *86*, 431–468. [CrossRef]
24. Virilio, P. *Estética de la Desaparición*; Anagrama: Barcelona, España, 1998; ISBN 84-334-0092-7.

25. Edwards, E.; Hart, J. (Eds.) *Fotografías Historias de Objetos: Sobre la Materialidad de las Imágenes*; Routledge: Berlín, Germany, 2004; ISBN 978-0415254410.
26. Murillo-Ligorred, V. Alfabetizados contemporáneos: De anuncios televisivos y circos ambulantes a otros espectáculos culturales deepfakes. In *Perspectivas Contemporáneas de la Educación Artística: Métodos, Creación, Investigación y Buenas Prácticas Docentes*; Murillo-Ligorred, V., Revilla Carrasco, A., Caeiro-Rodríguez, M., Eds.; Servicio de Publicaciones Universidad de Zaragoza: Zaragoza, España, 2023; ISBN 978-84-18321-70-2.
27. Giroux, H. Rejecting Academic Labor as a Subaltern Class: Learning from Paulo Freire and the Politics of Critical Pedagogy. *Fast Capital.* **2011**, *8*, 35–40. [CrossRef]
28. Rancière, J. *Sobre Políticas Estéticas*; Museu d'Art Contemporani de Barcelona, Universidad Autónoma de Barcelona: Barcelona, España, 2005; ISBN 84-490-2.410-2.
29. Aguirre, I. Hacia una narrativa de la emancipación y la subjetivación desde una educación del arte basada en la experiencia. *Docencia* **2015**, *57*, 5–15.
30. Rancière, J. *La División de lo Sensible. Estética y Política*; Consorcio: Salamanca, España, 2002; ISBN 9788495719140.
31. Brea, J.L. *Estudios Visuales: La Epistemología de la Visualidad en la Era de la Globalización*; Akal: Madrid, España, 2005; ISBN 978-84-460-2323-4.
32. Lyotard, J.F. *La Condición Posmoderna*; Cátedra: Madrid, España, 2000; ISBN 84-376-0466-4.
33. Greengard, S. *Will Deepfakes Do Deep Damage?* ACM: New York, NY, USA, 2019; ISBN 0001-0782/20/1.
34. Abrami, P.; Bernard, R.M.; Borokhovski, A.; Wade, A.; Surkes, M.A.; Tamin, R.; Zhang, D. Instructional interventions affecting critical thinking skills and dispositions: A stage 1 meta-analysis. *Rev. Educ. Res.* **2008**, *78*, 1102–1134. [CrossRef]
35. COPE. The COPE Report 1999. Guidelines on good publication practice. *Fam. Pract.* **2000**, *17*, 218–221. [CrossRef] [PubMed]
36. Médica Mundial, A. Declaración de Helsinki de la Asociación Médica Mundial. Principios éticos para las investigaciones médicas en seres humanos. *An. Del Sist. Sanit. De Navar.* **2009**, *24*, 209–212. [CrossRef]
37. Bloom, B.S. *Taxonomía de los Objetivos de la Educación: Clasificación de las Metas Educacionales: Manuales I y II*; El Ateneo: Buenos Aires, Argentina, 1971; ISBN mkt0004568066.
38. Gibbs, G. *El análisis de Datos Cualitativos en Investigación Cualitativa*; Morata: Madrid, España, 2012; ISBN 978-84-7112-685-6.
39. Glaser, B.G.; Strauss, A.L. *The Discovery of Grounded Theory*; Aldine.MacKenzie: New Brunswick, NJ, USA, 2006; ISBN 0-202-3026-1.
40. Flick, U. *El Diseño de Investigación Cualitativa*; Morata: Madrid, España, 2015; ISBN 978-84-7112-806-5.
41. Krippendorff, K. *Content Analysis: An Introduction to Its Methodology*; SAGE Publications, Inc.: Thousand Oaks, CA, USA, 1980; ISBN 0-7619-1544-3. Available online: https://bit.ly/3bmaPv0 (accessed on 28 April 2023).
42. Efland, A.; Freedman, K.; Stuhr, P. *Postmodern Art Education: An Approach to Curriculum*; NAEA: Reston, VA, USA, 1996; ISBN 13.978-0937652893.
43. Mirzoeff, N. El derecho a mirar. *En Rev. Científica De Inf. Y Comun.* **2016**, *13*, 29–65.
44. Rodríguez Abellán, C. Deepfakes ¿El fin de la Realidad? Universidad Politécnica de Cataluña. 2021. Available online: https://www.threepoints.com/estudios/deep-fake-el-fin-de-la-realidad (accessed on 27 May 2023).
45. Hern, A. I Don't Want to Upset People: Tom Cruise Deepfake Creator Speaks out. The Guardian. 2021. Available online: https://www.theguardian.com/technology/2021/mar/05/how-started-tom-cruise-deepfake-tiktokvideos/ (accessed on 5 April 2023).
46. Debord, G. *La Sociedad del Espectáculo*; Pre-textos: Barcelona, Spain, 2007; ISBN 9788481914429.
47. Westerlund, M. The Emergence of Deepfake Technology: A Review. *Technol. Innov. Manag. Rev.* **2019**, *9*, 39–52. [CrossRef]
48. Bezanilla-Albisua, M.J.; Poblete-Ruiz, M.; Fernández-Nogueira, D.; Arranz-Turnes, S.; Campo-Carrasco, L. El Pensamiento Crítico desde la Perspectiva de los Docentes Universitarios. *Estud. Pedagógicos* **2018**, *44*, 89–113. [CrossRef]

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