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Evaluative research on the critical thinking of primary school students

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ABSTRACT

The critical thinking of primary students might be related to digital media. Based on this premise, the main objectives of this study are to analyse the level of critical thinking shown by Primary School students (Murcia, Spain), as well as to find out about the media elements they handle. A diagnostic investigation is proposed for this purpose with two writing activities that integrate socially relevant problems. The analysis based on the humanistic-interpretative paradigm of the 1272 productions yields results that show low critical levels in students aged 9 to 12. This data contrasts with the large number of media components they refer to in their productions, which generates relevant implications about the challenges education systems must take on in order to respond to today's needs.

1. Introduction

Changes have been taking place in recent years with regard to teaching-learning approaches aiming at developing competences in students that enable them to acquire knowledge autonomously, given that today's reality does not envisage difficulties in accessing any information, but rather demands reflective processes that guarantee the appropriation of this content. Nevertheless, nowadays there seems to be reasons to believe that the interpretation of that content is superficial. If that were the case, this aspect should be further investigated, so that Primary Education could stimulate the development of the students' own opinion.

In view of today's context for critical thinking (Collazos Alarcon et al., 2020; Fedorov & Levitskaya, 2015; Hernández Hernández et al., 2015; Nomen, 2019), it is one of the most relevant skills to be promoted in Primary Education due to the large amounts of information handled by students through a series of media elements. The concept of critical thinking is generally linked to a process of individual assessment of information received from outside, based on reflection and the knowledge held by the individual, making it an activity of great cognitive complexity of an interdisciplinary nature.

The development of critical thinking is amongst the ambitions of the Education 2030 Agenda according to UNESCO (2016) in its Sustainable Development Goal 4 (SDG4). Such approaches are present in the modifications that are taking place through a series of curricular expressions, which makes these thinking skills a relevant focus of interest today. Therefore, in this study, the assessment of students' critical thinking skills is a must for educational research at the moment.

The need to promote critical thinking in the classroom continues to exist in this third decade of the 21st century. The contribution of Kennedy et al. (2010) is somewhat a dated state-of-the-art review, since more than a decade later, technological conditions have changed, shaping our daily lives in a concrete way so our behaviour is contingent on applications, digital texts or web pages. This fact only increases the demands for critical thinking in the education of students. Media literacy must go hand in hand with the development of the capacity for autonomous thinking in order to interpret reality in an optimal way and not to be exposed to the automatisms of technology. Therefore, literacy experiences with young children are necessary to gradually develop this skill (Ardhian et al., 2020).

1.1. Critical thinking as a response to the needs of today's students

It has been defined differently throughout history, but both the most classic Beltrán & Pérez (1996); Díaz (2001); Ennis (1985); Lipmann (1998); Paul & Elder (2005) and current Deroncele Acosta et al. (2020); Díaz-Larenas et al. (2019); Morales Zúñiga (2014) definitions confirm a composition that integrates cognitive skills and dispositions related to the affective side. Therefore, Freire's statement (2004) about teaching how to read the world simultaneously with reading the letter culminates this conceptual analysis that allows us to approach the term and its current needs for the interpretation of content.

Today's framework is characterised by the absence of filters in the information consumed, which poses a great danger for students as users

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of the Net. It is thus essential to bring these skills to educational establishments that seem to be reluctant to quit acquiring memorised knowledge to the detriment of a competence and globalising approach that is linked to the new texts that are emerging. Everyday reading does not only occur in traditional texts, but also in advertising slogans, phrases from films or television series, and even iconographic interpretation which extends a multimodal field. Cassany (2012) argues that the advent of the internet was one of the most far-reaching changes for reading and writing due to the exponential increase in the number of interlocutors and documents that establish contact with millions of people; the scarcity of filters and controls for the production of information. According to Carr (2011) the media not only provide the material for thought, but also shape it.

The aforementioned situation makes it necessary to train our students for comprehension, understood from the progression that begins in the first years of Primary Education with a position in the background, due to the priority objective of decoding the text, until the last years of the stage, when literal and inferential reading are internalised. At this point, the focus must be on critical reading, which allows us to distinguish those invisible aspects in the text that offer the possibility of a personal positioning with questions aimed at thematic reflection. This progression in reading priorities justifies the proposal of critical reasoning in the last three years of the educational stage.

According to Landow (2009), critical thinking is based on the ability to relate many things to each other. This definition makes it possible to link it to divergent thinking (Ferrándiz et al., 2017), which brings different possibilities to a particular aspect. All of this contrasts with the reading that our students do by means of browsing and hypertexts, characterised by the risk that superficiality entails for interpretation (Mendoza Fillola et al., 2015). Therefore, it is worth reflecting on the semantics of the terms that this post-modernist society requires. Due to the existence of industrial interests that are observed in the works, we have gone from being read by a person who is called a reader to being consumed by users. These conceptions have integrated that reading has commercial purposes, instead of training purposes (López Valero et al., 2016), and requires a proper interpretation of the text.

The connections made in the study between critical thinking and literary reading have been a focus of interest for authors such as: Alvarado-Miquilena (2012); López Valero et al. (2021); Mena Araya (2020) with a communicative and linguistic approach to this skill.

1.2. Critical thinking and media on socially relevant issues

A critical vision is directly associated with the context of the students. For this reason, dealing with current issues is a great tool for its development. The studies by Carvajal & Zambrano (2021) and Castillo Cuadra (2020) on socially relevant topics contemplate this. Critical thinking is an essential skill in the educational performance of students in order to understand the social reality in which they find themselves.

This research is based on Relevant Social Issues (PSRs, as per its Spanish acronym) from the interdisciplinary vision of Ocampo Ospina & Valencia Carvajal (2019) that are related not only to the linguistic in textual comprehension and production, but also to the literary in a reading intertext of the classics used as a pretext, as well as the social, reflected in current problems that occur in our environment. Thanks to activity herein, students have the opportunity to visualise and discuss issues such as gender discrimination or the abusive use of technology.

This critical pedagogy is also linked to the increasing development of skills that filter the information received through the media, and is seen as a fundamental aspect of learning new literacies according to: Alcolea Díaz et al. (2020); Bermejo-Berros (2021); Fedorov & Levitskaya (2015); Pipitgool et al. (2020); Yulianti et al. (2021).

It is difficult to reconcile media and information education with traditional textbook-based teaching, since most contents are grouped into the visions and classifications of mainly scientific learning, with only a few small information-seeking activities being observed in order to go deeper into the content. According to Chiva Bartoll & Martí Puig (2016), teaching-learning scenarios close to reality should be created mainly aiming at creating a true pedagogy of empowerment.

We are part of a society with a high consumption of media, which means that the skills to encode and decode audiovisual images play everyday citizenship functions. However, educational intervention has not had a parallel progression (Albarracín Vivo, 2021) due to the false premise that the mere fact of consuming media can guarantee media learning (Aguaded, 2012). The truth is that our students are used to interpreting and producing information in different formats in a superficial way. The study by García-Ruiz et al. (2014) shows lower percentages in terms of in-depth technological use, which hinders the media mastery that is currently required.

The above ideas should not mislead to the idea that we are dealing with a generation that we only victimise in front of the media, but that we should recover the practices that take place outside schools and incorporate them into formal teaching-learning processes (Chartier & Scolari, 2019). In recent years, literary education has been given great relevance, and our study shows its great potential for the treatment of socially relevant issues in the classroom, since it gives rise to the activity of fieldwork. This connection finds important precedents in the work of Fernández-Fígares & Martos García (2017); Redondo Moralo & García Rivera (2017) associated with socially live issues in ecology (García Única, 2017); dealing with ecocriticism; García Rivera & Martos Núñez (2020) linked to counter-hegemonic discourses.

This research analyses the level of critical thinking shown by Primary School students located in the Region of Murcia (Spain), as well as the media elements they handle. The participants in the activity carried out in the fieldwork decide to incorporate these media components spontaneously in their productions, as they are part of their daily routine. For this reason, the link between critical thinking and the media components that appear in the students' compositions generates a novel investigation.

2. Methodology

2.1. Research design

This study is approached from the methodology of a symbolic interactionism and evaluative research, aimed at understanding the processes through which the symbols we use to communicate and adapt to our environment are elaborated, as well as their inclusion in new actions. It can be assumed that this approach is very much aimed at language studies in education (Gómez Núñez et al., 2020). This model is relevant for examining the phenomenon studied holistically and is based on a humanistic-interpretative paradigm that aims to evaluate the critical capacity shown by students in the last three years of Primary Education with respect to the situations given in the pretexts of the creative writing activities that were proposed. It also focus on the analysis of the media elements that appear in the students' productions.

2.2. Participants

The 636 participants belonged to six different educational institutions in the Autonomous Community of Murcia (Spain), which had different characteristics. The choice of these participants at an advanced age (9–12 years old) is conditioned by the consolidation of certain knowledge linked to the area of Spanish Language and Literature necessary for the development of the proposed activities. The methodology used for the selection of participants was by maximum variation sampling (Quintana Peña, 2006), which is used for capturing the characteristics that typify the reality of the area. According to Colás Bravo et al. (2009), it corresponds to a non-probability sampling, as it has not been a random selection, but rather a judgmental sampling, in which the participating schools have been chosen taking into account the diversity in terms of population criteria and socio-economic level. Participants are

shown in the figure below (Figs. 1 and 2).

2.3. Instruments

The instrument for collecting information used in the study is linked to the written compositions produced by the students, which amounted to 1272 productions, 81 of which were eliminated due to the impossibility of decoding the information due to the handwriting of the writing. Finally, a total of 1191 narratives were analysed, broken down into 598 belonging to activity one linked to the Pinocchio pretext and 593 to activity two integrating the altered image of Aladdin. These written compositions allowed their content analysis to obtain the critical level of the story, as well as the media elements mentioned in these productions. It should be noted that the number of narratives created (1272) by the students is twice the number of participants (636), as each student carried out both activities. Gómez Núñez et al. (2020) defines content analysis as an inductive analysis of the transcribed material, which leads us to establish a system of categories, creating a hierarchy in terms of the specificity of the themes or labels included.

2.4. Procedure and data analysis

The first fieldwork that was carried out was for the pilot test, which was conducted in two schools. After observing the feasibility of the study, its suitability for the ages proposed and the visualisation of relevant partial results, we continued with the two activities proposed for the research, which consisted of the creation of two narratives based on the illustrations designed by Tom Ward Studio (2017). These acted as a pretext and showed in their content characters associated with children's literature in situations that incited the students' critical vision, as they communicate socially relevant problems. These pictures are shown below:

This analysis of the information was conducted in three phases: firstly, the productions were digitalised by scanning all the activities carried out in the classroom, with the aim of introducing them into the computer programme Atlas.ti, and the subsequent creation of a hermeneutic unit; secondly, the categories used for the analysis were created, by means of a mixed system which combines a deductive process based on broad categories and the association of meanings obtained from the productions. Thus a model based on the information collected was generated which specifies all the meanings, allowing us to affirm that the levels have been created *ad hoc*. Subsequently, these categories were submitted for validation by three experts in the discipline, who scored the levels appropriately in terms of relevance, clarity and appropriateness. Finally, we proceeded to the detailed study of each production, linking each text to a category of critical level described below:

- Level 1: There are no problems linked to the media or gender discrimination in the story created. Examples of narratives in this category include: *Pinocchio* is a YouTuber; *Aladdin* wins the video console tournament.
- Level 2: A problem is introduced in the story, but no solution is offered. Examples of stories found at this level are: a day without light for *Aladdin; Pinocchio* dreams of his mobile.
- Level 3: An issue is referred to in the narrative and is solved. The quotes that appear in this category are: *Pinocchio* acknowledges that he has to reduce the time devoted to technology so as to play with his grandfather and his friends. *Aladdin* and *Jasmine* establish a schedule for the equal sharing of household chores.

In this phase, the media elements cited by the students in their stories were also analysed in the productions without being part of the picture that acted as a pretext, which ensured that these components were reflected in the narratives as a result of the personal initiative of the participants. This category was called: media elements of the text.

The above-mentioned process made it possible to extract the data shown in the following section, since the analysis of the two activities carried out by the students in the categories of critical levels and media elements of the text produce the results necessary for the precise achievement of the objectives.

3. Results

The results of the study allow us to know the critical levels shown by the students' written texts, and the subcategories of association are thus included in this section, in which all the students' productions can be clearly introduced. In this first activity the critical levels are related to the issues derived from the media, due to the image that acted as a pretext in the task proposed to the students for the creative writing of a story. The illustration showed Pinocchio taking a selfie with his grandfather, which prompted the creation of a narrative that incorporated these media elements with the resolution of socially vivid problems related to today's media.

The figures shown in this section are organised according to the density and substantiation of the code (i.e. the number of productions that have been related to each subcategory). The meaning networks have been extracted from the Atlas.ti software. This software was used in the study for the content analysis, both of the critical levels category and the different media elements cited by the participants in their written productions.

Fig. 3 shows the organisation of the results for the 598 productions

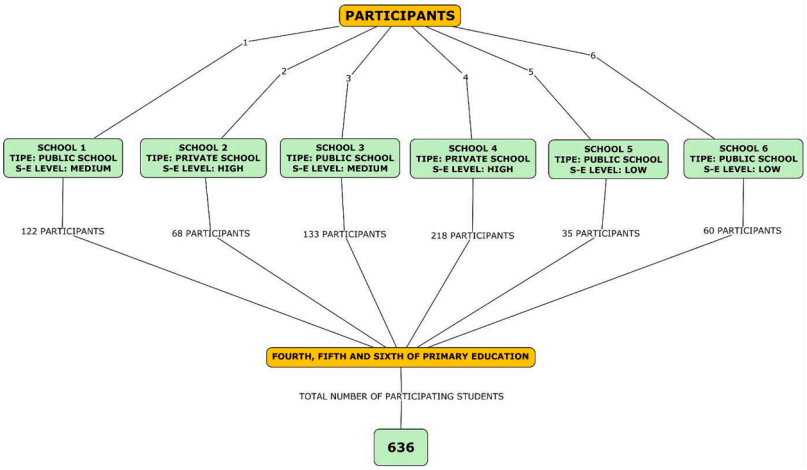

Fig. 1. Total number of participating students.

Fig. 2. Pictures of the proposed activities.

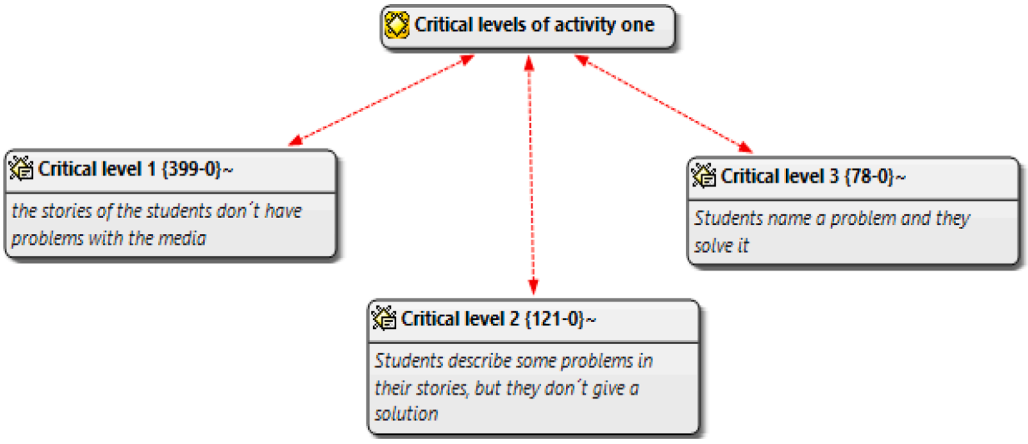

Fig. 3. Critical levels shown by students in Primary Education in the first activity.

that made up the total sample of the first activity. Their distribution in the three subcategories created for the analysis was as follows: critical level one, which refers to the fact that there are no problems related to the media in the stories created, includes a total of 399 productions, representing 66.72% of the participants. On the other hand, critical level two, characterised by describing a problem in the stories, but not offering solutions to it by the students, includes 121 productions, which represents 20.23% of the total. Finally, critical level three, in which problems are mentioned and solved in the stories created by the students, has 13.04%, i.e., 78 narratives. As can be seen in the description of the nodes, these levels have a progressively lower nature with respect to the critical view shown by the participants in the story, with one being the lowest level and three being the highest. The red arrows shown correspond to the naming of the network as a family of codes, which explains the number 0 that appears to the right of the brackets, being the semantic association with other codes; the number on the left shows the

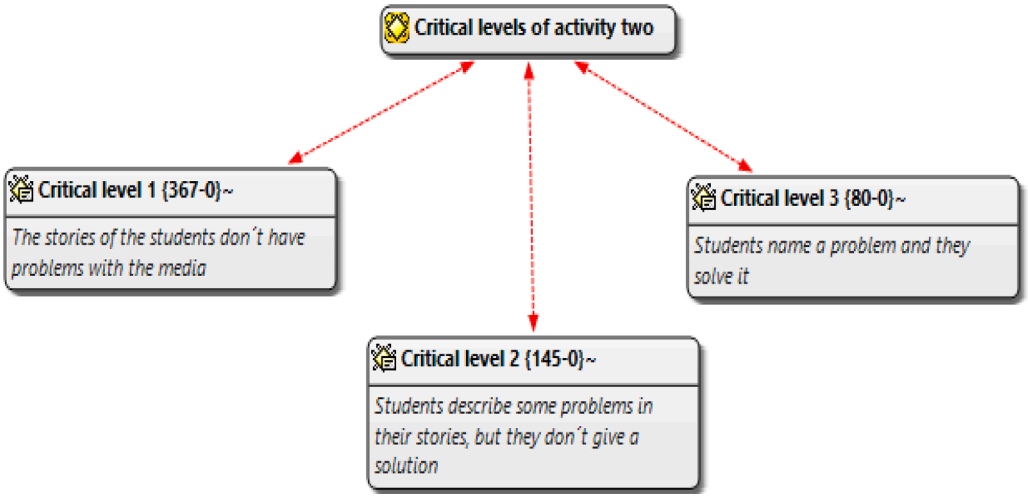

Fig. 4. Critical levels shown by students in Primary Education in the second activity.

frequency of narratives created by the students that belong to that category.

Furthermore, it should be noted that the numerical data provided in the Figures are not the result of quantitative statistics, but of qualitative analysis through interpretation, which is carried out by reading the students' compositions. Thus, the frequencies we name have meanings related to the number of productions found within a subcategory.

Fig. 4 shows the results obtained in the study with reference to the second activity, which used the altered image of Aladdin as a pretext for writing new stories that could include socially relevant problems. The construction of the semantic network that originates this Fig. 4, follows the same organisational treatment as the previous one and distributes the 592 productions created by the participants in the three subcategories conceived in its analysis, materialised in 367 stories linked to a critical level one that reflects 62% of the compositions without citations to socially live issues; in second place, 24.45% -145 productions- are related to critical level two, in which only issues related to the unequal distribution of household chores are cited, as prompted by the pretext; the third critical level encodes 80 stories, i.e., 13.49% of the participants who mention problems linked to gender discrimination observable in the altered image of Aladdin and also offer solutions during the narration.

Fig. 5 provides those media components named by the students in their productions as a creative consequence in activity one, since they did not appear in the picture used as a pretext, which provides the study with the qualitative content of the influence of the media, through the typology of the media.

This categorical search ends up with 25 components, listed in the following order of frequency: 69 productions contain game consoles; 62 video games; 61 productions name different types of mobile phones, according to their brands and models; 53 name media personalities and people, including footballers, singers, youtubers, movie characters, etc. 50 productions contain different social networks, *Instagram, TikTok* and *Facebook* are the most frequently referred to; 40 stories name the *YouTube* platform; 28 refer to tablet devices; 25 participants include computers; 24 TVs; 15 films; 12 compositions refer to internet surfing; 9 mention cameras; 8 write-ups name mobile apps, time machines and robot; 7 with subscribers; 6 name likes offered on different web platforms; 4 stories include influencers; 2 Amazon and advertising; and finally with a frequency of 1 production we find chat, blog, radio, memes and virtual reality goggles.

On the other hand, in the second activity, the distribution of the media components referred to by the students followed an order of frequencies that can be seen in Fig. 6, with the most cited media element in the upper left-hand corner: the mobile phone, with 74 citations, the number 1 appearing to the right of the bracket shows that it is linked to the category of media elements not linked to the pretext. This is followed by social networks with a frequency of 67 stories, applications with 64 references, as well as media personalities and people with 62 compositions that include these concepts. YouTube is commented on in 47 creations. This is followed in order of number of references by the computer with 34, the tablet with 32 and the television with 30. With lower results in the 593 productions analysed in this activity two are: web pages with 15 references, robots with 13, the selfie with 11, virtual shops with 10, films mentioned in 9 narratives, the time machine in 5 stories and, finally, radio in 2 productions.

Fig. 7 summarises in a graph the percentages referring to the critical capacity shown by the students in the fieldwork, which allows us to unify the total number of written compositions in response to the objective set, since we observe data that agglomerate in the level of critical thinking one the majority of narratives created spontaneously, more specifically, this level obtains percentages close to 65% and implies an interpretation of socially live issues in images that is far from desirable. Next, after a pronounced margin, we find critical reasoning level two, with percentages of around 20% of the participants who managed to introduce the problems of pretexts in their stories, but did

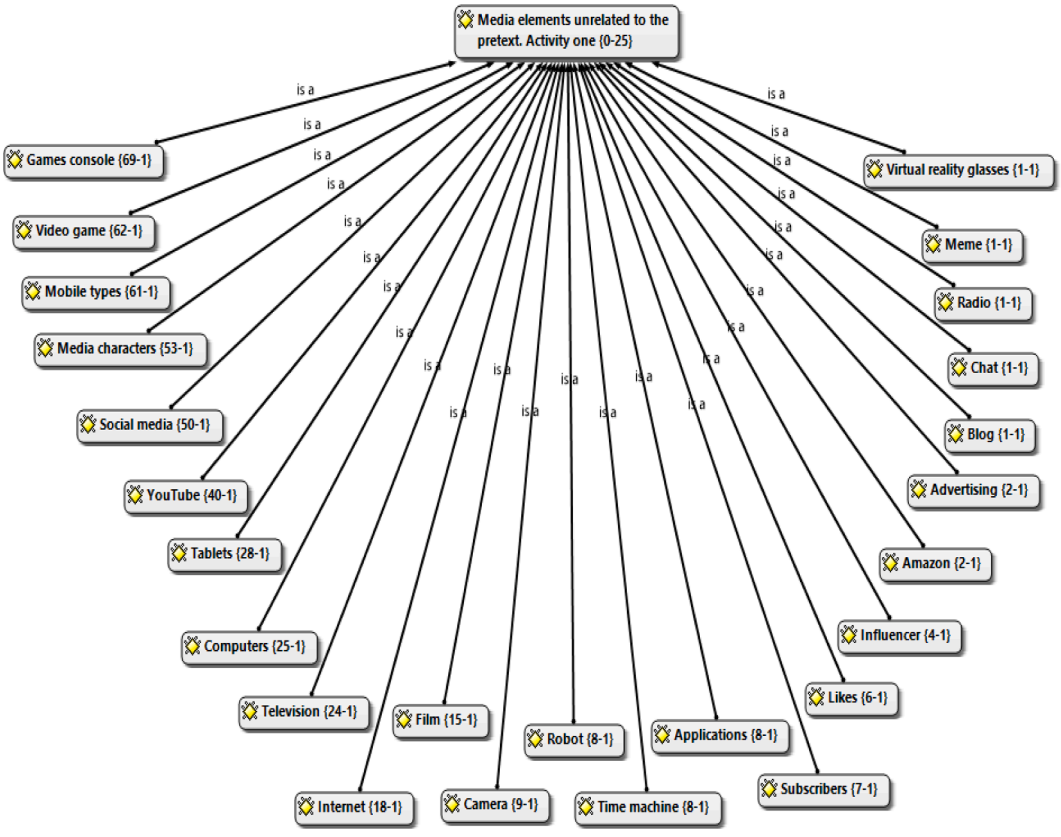

Fig. 5. Media elements referred to in the first activity.

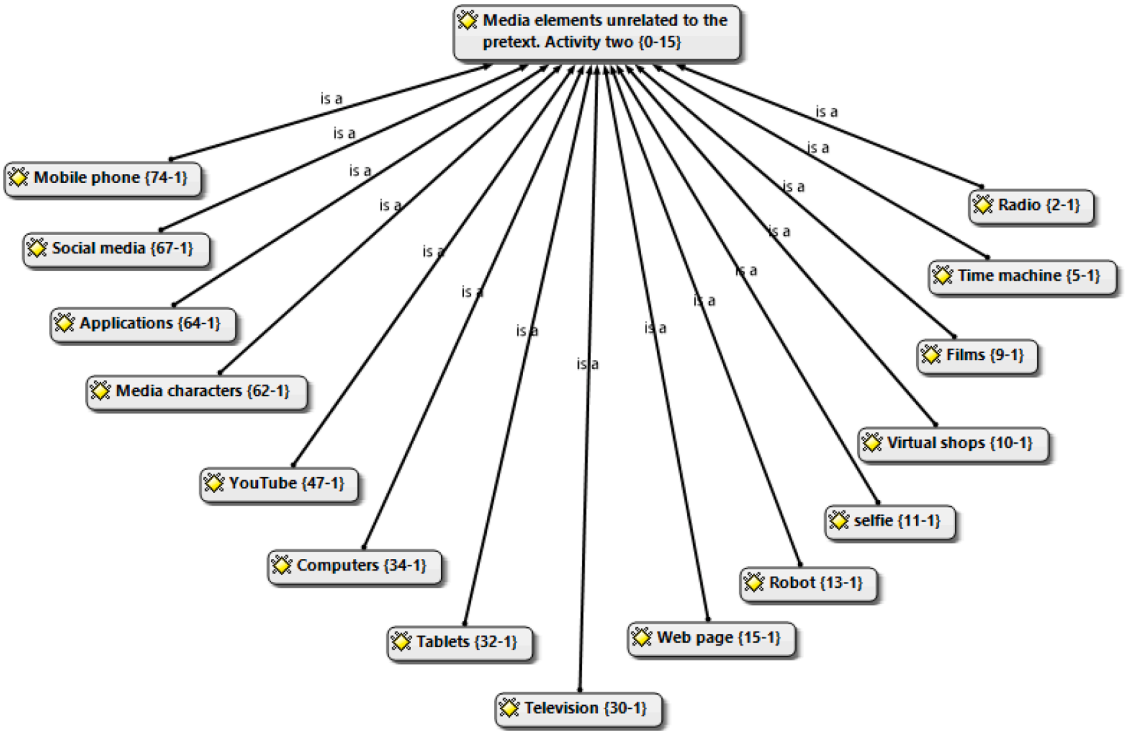

Fig. 6. Media elements referred to in the second activity.

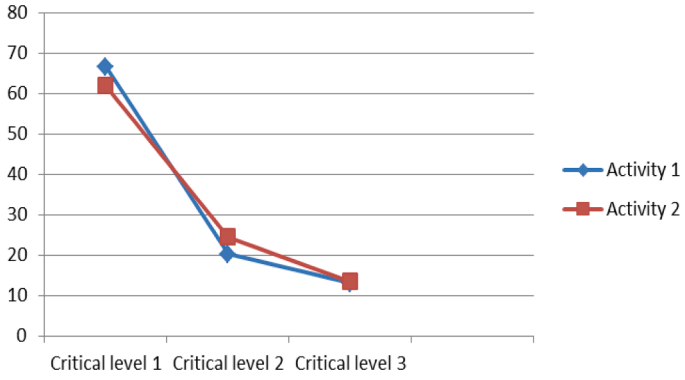

Fig. 7. Critical levels expressed by students in both activities.

not provide solutions to them. Finally, productions located at critical level three seem to show rather low percentages associated with 13%. It can be assumed that only the latter percentage of students have the ability to react critically to socially relevant issues that can be observed in media images or personal experiences.

4. Discussion

The first objective of this diagnostic assessment is to find out the results about the critical levels shown by the students with respect to the situations that acted as the pretexts of the proposed activities. This set of data, which we have analysed above in Fig. 7, seems to show that the critical levels of Primary School students are very low. The small differences that we obtain in both activities may be the result of a greater difficulty in making the problematic situation visible in the technological and media panorama. And it can be clearly seen in the second activity, since it shows in the pretext a situation in which an unequal vision is offered with respect to the distribution of domestic chores.

The problem linked to the critical capacity of students is not something inherent to any geographical location, but rather at an international level, efforts must be made to incorporate these competencies that are essential for the performance of daily activities for interpretation, problem solving and decision making, as shown in current studies of Safiah et al. (2020); Mena Araya (2020); Pérez-Morán et al. (2021); Siew & Mapeala (2016).

On the other hand, the results shown by the students through the references of a large number of media elements cited in both activities promote the idea of associating them with everyday experiences in which the use of these components is an essential habit, since the students have been able to introduce them in their writings. According to Aguaded et al. (2015), the media literacy of the Spanish population has very low rates in all its dimensions, which is linked to their low capacity to critically understand the media, as well as to evaluate the diversity of content it integrates.

The data obtained both in the category of levels of critical thinking and in the media elements referred to by students lead us to reflect on the large amounts of information that our students process on a daily basis, as well as the situations they encounter in the school and family environment that require a critical vision. And the question that haunts us is whether these rates of identifying and resolving socially relevant issues are valid for students to be able to function in today's society. If the aim is to educate in values such as equality and respect, the answer should be clearly negative. Otherwise, our students may never be able to consolidate academic knowledge, since they will not be able to apply it to reality, entering into a social network where the storage of information in the students' heads is less important than their understanding and appreciation of it.

In addition, this unstoppable rise in media use and the skills demanded by today's situation can be seen in different teacher training efforts as shown by Alcolea Díaz et al. (2020); Collazos Alarcon et al. (2020); Gómez-Gómez & Botero-Bedoya (2020); Wilson et al. (2011), as well as relevant institutions such as UNESCO.

With regard to the treatment of socially live issues in Primary Education classrooms, it is worth highlighting the relevance of children's literature through the social interaction of the characters and the themes proposed, as it favours the critical attitude of the students according to

Redondo Moralo & García Rivera (2017); Albarracín Vivo (2021); Duchimasa-Ochoa & Huiracocha-Ordóñez (2021); Albarracín Vivo et al. (2020). It therefore seems an appropriate setting for debates that nurture a proper judgement on socially relevant issues.

These connections between reading and writing in the context of a particular social purpose generate novel concepts such as literacy (Zavala Cisneros, 2008) or critical reading (Encabo Fernández, 2014), since they focus their current efforts according to García & García (2017) in fighting the stereotypes presented in the dominant texts of our culture. This also links socially relevant issues to divergent thinking, due to the students' ability to offer multiple answers to a situation, which leads to an in-depth analysis and understanding of the situation.

The media influence that students seem to show contrasts with low levels of competences; it is clear that there is a need for new literacies in Primary Education (Rodríguez Cortés, 2014), amongst which is AMI (Media and Information Literacy, as per its Spanish acronym) which according to Ramírez-García & González-Fernández (2016) is blurred in our curriculum, and according to García-Ruiz et al. (2014), it is a citizen's right. Therefore, there is a growth in the number of studies associated with AMI in this educational level: Aguaded et al. (2015); Cruz-Diaz et al. (2016); Castro-Martínez & Díaz-Morilla (2021).

It is also important to highlight the relevance of the different levels of curricular specification, starting with the educational authorities of each country, up to educational action in the classroom by teachers, from their different expressions, the formation of their own thinking in the last years of Primary Education should be promoted, which entails reflection on any content and a critical vision, which is essential for a society that demands discernment and a thorough questioning of most of the information that is received.

5. Conclusion

The results of this study show that the levels of critical thinking in Primary School students are lower than those required by today's needs, given that the vast majority of students aged 9 to 12 did not have the capacity to decode the socially relevant problems incorporated in the pretexts of the activities proposed. This finding is exacerbated if the focus is placed on the number of students who provide solutions to these socially live issues, which are rather isolated cases, since the percentages obtained are less than 15% of the 1190 productions made by the participating students and analysed individually.

Such low levels of critical thinking are in stark contrast to the vast amounts of information that our students deal with on a daily basis. The results of this study show the relevance of media elements in their daily lives, as they have been able to cite numerous components in their stories, which in turn allows us to know which devices are most used in their daily lives.

The consequences of the shortcomings found in the critical capacity of students, together with the handling of large amounts of information, force us to envisage the new literacies required by current education systems, as they have to integrate the needs implied by a society characterised by the ease of producing and consuming content, with the aim of preparing students to develop optimally in the possibilities and risks posed by the information and communication society.

New initiatives are therefore needed in schools to ensure that critical thinking is not something alien to students, but a skill they are familiar with. It is our intention to make the content of this paper compatible and complementary with previous work on the aspect referring to media influence (Black, 2012; Boonjeam et al., 2017). Such initiative must also have a reference in critical thinking development programmes and their evaluation. Schools still have significant needs in terms of students' autonomous or divergent thinking (Florea & Hurjui, 2015; Radulović & Stančić, 2017). Even more so at a time when emerging technologies occupy a prominent place in the social and cultural sphere.

Another relevant aspect in the study is the connection of critical thinking with divergent thinking, as students who have created the stories with an adequate critical level had to reflect and evaluate the pretexts presented in the activity, as well as produce answers to the given situations.

In recent years, changes in educational curricula have been taking place internationally, and these changes are orientated towards the digital world as a factor that transforms the needs of students. This study contributes to making visible the difficulties that students show in tasks relevant to their daily lives, through learning that does not focus on the handling of technology and media, but on the skills required for their use. This detection brings the need to improve these thinking skills through their incorporation into media literacy, which is the focus of current educational processes.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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