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# Audiovisual Riddles to Stimulate Children's Creative Thinking

## Adivinanzas audiovisuales para ejercitar el pensamiento creativo infantil

ABSTRACT
Solving riddles involves association of ideas, analysis of metaphors, and discovery of analogies. Therefore, promoting this type of children's entertainment is a way to develop creative thinking. However, there is a problem: traditional riddles are literary forms that correspond to a pre-digital era. How can we increase its acceptance among the digital natives? One way might be creating audiovisual riddles specially designed for YouTube. In this research we made five prototypes of audiovisual riddles with different creative characteristics and validated them among 8-12 years old students. The validation results helped us to identify the attitudes, reactions, interpretations and ways of thinking of children when they try to solve such riddles. We also identified the resources of language and creative formats that fit best in audio-visual riddles. The outcome of this research emphasizes the need to correctly formulate the audio-visual riddle statements and their «clues» for children; this way we assure an intellectual and emotional satisfaction when solving them. It also concludes that reading or listening to traditional riddles are cognitive and sensory experiences that are very different from interacting with the same riddle in a multimedia language. Finally, we discuss and analyze the mediating role of the teacher and the importance of collaborative learning in educational projects using digital technologies.

RESUMEN
Para resolver una adivinanza hay que asociar ideas, analizar metáforas, descubrir analogías. Por eso, impulsar esta forma de entretenimiento infantil es un modo de ejercitar el pensamiento creativo. Sin embargo, existe un problema: las adivinanzas tradicionales son formas literarias que corresponden a una época pre-digital. ¿Cómo lograr, entonces, que tengan mayor aceptación entre los nativos digitales? Una posible solución sería crear adivinanzas audiovisuales diseñadas especialmente para YouTube. En esta investigación se realizaron cinco prototipos de adivinanzas audio-visuales con características creativas diferentes y se validaron con estudiantes de tercero a sexto grado de educación primaria. Los resultados de la validación permitieron identificar las actitudes, reacciones, interpretaciones y modos de razonamiento de los niños y niñas cuando intentan resolver este tipo de adivinanzas. También se identificaron los recursos de lenguaje y formatos creativos que funcionan mejor en una adivinanza audiovisual. En las conclu-siones se destaca la necesidad de formular correctamente los enunciados de las adivinanzas audiovisuales y sus respectivas «pistas» para que los niños y niñas tengan la satisfacción intelectual y emocional de resolverlas. Se precisa, además, que leer o escuchar una adivinanza tradicional representa una experiencia cognitiva y sensorial muy distinta que interactuar con esa misma adivinanza en un lenguaje multimedia. Finalmente, se discute y analiza el rol mediador del docente y la importancia del aprendizaje colaborativo en los proyectos educativos que emplean tecnologías digitales.

KEYWORDS / PALABRAS CLAVE
Riddles, creativity, education, children, audiovisual, language, media, digital.
Adivinanzas, creatividad, educación, niños, audiovisual, lenguaje, medios, digital.

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## 1. Introduction

### 1.1. Riddles: creativity and rituality

The traditional riddle, whether in verse or prose, includes a variety of resources and creative formats. Within these we find similes: «small as a mouse, guards the house like a lion» (a key); the description: «it has teeth but doesn't eat, it has a beard and is not a man» (a corn cob); the narration: «in a dark house there was a dead and a living person, the dead asks the living: will you last (duras)? And the living answers: no» (a peach, in Spanish: durazno); comparisons: «Why is a bear like a fallen tree?» (A bear lumbers and a tree becomes lumber); the paradox: «What Is the worst thing about being 'Armando Guerra' (which means 'stirring up war')» – Marrying someone called 'Zoila Paz' (which means 'I am peace'); questions with a set formula: «What did the moon say to the sun?» (You are so grown-up and yet are not allowed to go out at night); mind-bogglers: «Which animal looks most like a dog?» (a bitch); curtain raisers: «first scene: a female monkey appears, second scene: a road roller appears, third scene: the female monkey appears flattened, what is the name of the play?»: la monalisa is a play on words, monalisa meaning the famous painting and mona = female monkey + lisa = flattened; the double meaning: «a bicycle can't stand on its own because it is two-tired».

According to Miaja de la Peña (2008), the structure of the riddle usually includes four elements:

- Introduction formula. For example, «Tell me fortune teller», «What will it be?».
- Concluding formula. For example, «Guess if you can», «he who cannot guess is a big fool».
- Orientating elements, which are usually within the text. For example, «in the middle of the sky am I, yet I'm not a star». Answer: The letter «k» in sky.
- Disorientating elements, which are rhetoric or meaning traps. For example, «what gets wetter the more it dries?» (a towel).

For this author, riddles represent a dialogic game between two people. The one who sets out the enigma knows the answer and demands the receptor to exercise his imagination and sense of interpretation, thus establishing an intellectual game between both.

In Peru's Andean culture, riddles (watuchi in Quechua) follow a very specific ritual (Lara, 2008). The people sit in a circle and a dialogue similar to the following takes place: «What will it be, how much will it be?», someone asks. «It will be what I will answer», says another person, accepting the challenge.

The first person sets out the riddle and if, after reflecting a while, the other person cannot answer, he asks for help: «What is it related to?». The first person answers: «It is related to (something)». If the other person still cannot answer, the first person asks him: «How does a stone fall to the ground?" (or "How does a firework explode?»). «Boom!», answers the other person. «Got you!», says the first person and then asks again: «How many teeth do you have? (or anything related to quantity)».The other person states a quantity and receives similar insults (the punishment for not having guessed). Only then does the first person give the answer to the riddle: «You fool! Didn't you know that the answer was (something)?».

Nowadays, this custom is disappearing due to the popularity of radio and television, which have become the favourite hobby of many rural communities.

### 1.2 Creative thinking and digital technology

Some people believe that the right hemisphere of the brain takes charge of creative thinking, while the left is responsible for logical thinking. The truth is that creative thinking requires both hemispheres: the right one imagines and relates, and the left analyses and evaluates. (Parra, 2003). This discussion about the hemispheres has a certain connection with the opposition that occurs between the text (associated to abstract and lineal thinking) and the image (linked to concrete and holistic thinking). The image is efficient in showing and motivating yet its usefulness is limited when making abstractions and specifying. On the other hand, words are very useful for abstract communication and analysis, yet of limited use for the expression of concrete realities. This is why the best alternative would be multimedia education, which takes advantage of the expressive qualities of both forms of language (Ferrés, 2008). In the case of boys and girls, it is said that they are creative by nature. But their creativity is a fruit of their innocence and not of formal learning. Boys and girls are usually original, yet also inflexible up to the point of refusing to propose new ideas. In their case creativity comes from their spontaneous attitude and not from the deliberate search of a new point of view (De Bono, 1995).

According to Tom Wujec (1996), a way of exercising creative thinking is resolving enigmas, which is different to resolving problems because problems are a synonym of difficulties, perturbations and obstacles. However, resolving enigmas reveals the «Sherlock Holmes» we have inside. Associating ideas or concepts also stimulates creative thinking, as well as the search for metaphors and analogies. «Metaphors –and their relatives similes, analogies,

parallelisms, allegories, symbols, allusions– are much more than rhetoric figures. They are the creators of our conceptual system, they build scaffoldings of ideas» (Wujec, 1996: 28). It is evident that this type of creative exercises has much in common with the game of solving riddles. This is why we believe that encouraging their practice among boys and girls would be an efficient didactic strategy to stimulate creative thinking. Moreover, resolving riddles doesn`t only imply imagination, it also requires logic.

However, there is a problem. The traditional riddles are literary forms that correspond to a pre-digital era. According to Piscitelli (2008), a significant part of children's and youth's resistance to scholar education is due to the technological generation gap between the students (many of which are digital native) and the teachers (who are mainly digital immigrants). This is why the challenge for the teachers is double: they must learn new things and teach old concepts in a modern way. Both of these are challenges that are difficult to overcome, «maybe the hardest part is to teach old concepts with new eyes» (Piscitelli, 2008: 11).

Then, can we achieve a higher acceptation of the traditional riddles among the younger generations? A possible solution would be to use an audio-visual approach and to design them especially for YouTube. Here we must consider the predictions made by Roberto Igarza: «YouTube is probably the Google of the next generation [...] The website based on text is being replaced progressively by an audio-visual website, of which YouTube will be king like Google is in the present era» (Igarza, 2009: 214-215). In relation to the new technologies, we must also be aware that there are also trivial applications, enablers and enhancers. «But the truly valuable, the enhancers, are those that permit acquiring knowledge that is impossible and unthinkable to acquire without digital technology» (Piscitelli, 2005: 94). Moreover, we must remember that learning is a process that involves students and teachers. «It is true that children and young men love machines, yet what they really need in order for them to learn is people» (Piscitelli, 2005: 106).

## 2. Materials and method

In this phase of the investigation we decided to create prototypes of audio-visual riddles and validate their acceptance and interpretation qualitatively among boys and girls from third to sixth grade of primary education. We made a series of five audio-visual riddles, uploaded them to YouTube and annexed them to a blog named «Don't be hard-headed» (http://noseascabezadura.blogspot.com). The riddles (see annex) are identified with the titles: «leaves», «cotton», «vowels», «sum» and «girl».



In order to rescue the dialogic nature of traditional riddles, which we think is important, we created a character in 3D animation similar to a «stone head» (stone sculpture of the pre-Inca culture Chavin). As an introduction, this character sings a text in an Afro-Peruvian rhythm were it states the degree of difficulty of the selected riddle. We established three levels of difficulty to reinforce the recreational-challenging function of the riddles and evaluate comparatively the degree of ease/difficulty that boys and girls experiment in each case.

After the introduction formula the riddles are presented, all of them designed with still images, written texts and background music. We didn't use a video to avoid the excessive weight of the files making it difficult to view. The five riddles use different creative resources. «Leaves» (fig.1) uses images that substitute words and applies the antithesis. «Cotton» (fig. 2) uses two consecutive metaphors. «Vowels»

(fig. 3) uses a comparative description and an incomplete word as help. «Sum» (fig. 4) associates different images and substitutes one object with an allusive one. «Girl» (fig. 5) includes the hidden answer in the names of the images that are presented.

At the end of each riddle, the character reappears with a common concluding formula. It offers the user two «clues» (see end of fig. 1) or help that can be selected in an interactive part of the screen (resource offered by YouTube). But only one of the clues has a relevant relation with the riddle, the other works as a disorientating element, which, all the same, forces the boys and girls to think. We decided to use this concluding formula in order to maintain the dialogic tone of the riddle and establish a procedure or fixed ritual in the same way as watuchi or Quechua riddles that we commented on previously.

In the presentation of the blog we included a text that invites the users to write their answers in the comments of each riddle, specifying that in some cases there could be more than one possible answer. We also included an online survey with the question «what do you think of this riddle?» and four possible answers: «they teach how to think», «they are too hard», «they are entertaining», «they are boring».

We validated the material in three state schools of Lima, with 34 girls and boys who were between 8 and 12 years old. The majority were familiar with


Image 1: Leaves

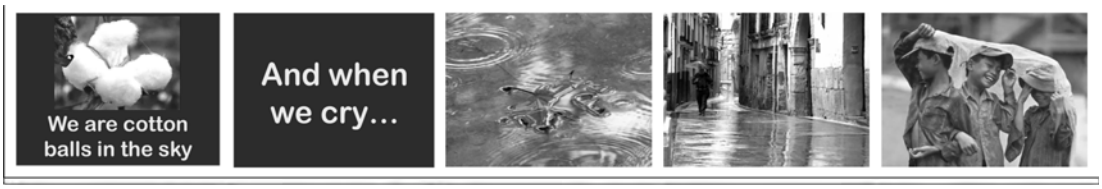


Image 2: Cotton


Image 3: Vowels

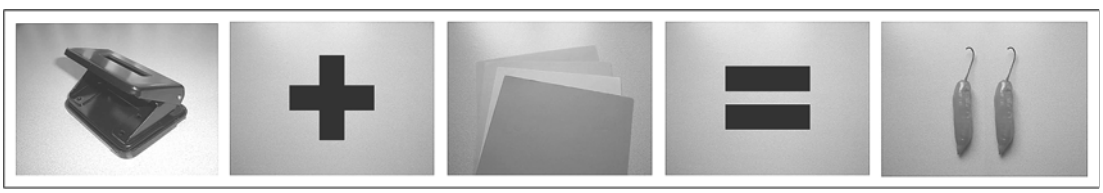

Image 4: Sum


Image 5: Girl.

YouTube, yet very few knew how a blog worked. The procedure consisted of showing them how to access the first riddle and then letting them continue on their own whilst we answered their doubts. We tried to intervene the least possible to be able to observe and analyse their behaviours and spontaneous reactions. Originally we expected each student to work individually on a computer, but the chosen schools didn't have enough terminals with internet access. So we decided to work in small groups of two, three or four students on each computer.

This allowed us to observe the dynamic that takes place when girls and boys try to solve a riddle in groups. Considering that we would only work with a limited number of students, we designed an information sheet for the rest of the students explaining them how to access the blog.

## 3. Results

Next we will present the most relevant results from the validation in relation to each riddle.

### 3.1. Leafs

This riddle turned out to be much more difficult than we expected. We classified it as basic difficulty level, but most of the boys and girls needed to see the clues to be able to solve it. Even though they understood the double meaning of the word «leaves», they got confused with the other words. Their lack of vocabulary didn't help them understand the meaning of the words «index», «back» and «cover» applied to the book. Apparently, including many descriptive terms of the object in question instead of facilitating the riddle, made it more complicated.

There was a girl who gave answers such as: «A donkey!», «Aloe!». In other words, she tried to guess the type of animal or plant that she saw in the images. Another boy had to explain to her: «No, you are saying what the pictures are, that is not what it is» It seemed that the girl didn`t read (or didn't understand) the written text and was just influenced by the images. It is important to mention that in the commentaries, besides «book» they also wrote other acceptable answers: «notebook», «encyclopaedia», «album».

### 3.2. Cotton

In this case there was a correspondence between the level of difficulty assigned by us (basic) and the degree of difficulty perceived by boys and girls, as many could easily solve it without having to see the clues (although it seemed that some of them new a similar riddle). Those who had some difficulty to solve it thought that «rain» was the answer. Having included a second metaphor (« and when we cry... ») confused some children, making them believe that they had to guess the meaning of the images (maybe too many of them) that were after the suspension points. On the other hand, the correct clue had a text, which was a little hard to read and understand.

### 3.3. Vowels

This riddle turned out to be too easy to resolve. We classified it as a level two in difficulty, yet most of the children solved it without looking at the clues. Including the name with the missing vowels facilitated excessively the answer (the first part of the proposal would have been enough). Moreover, one boy commented that the example of an animal whose name included the five vowels was in his school book. Some students knew the answer but didn`t remember the exact name of the animal («it is like a vampire»), which reflected a vocabulary problem. On the other hand, the resource of substituting a word for an image, in this case worked better –without misinterpretations– than in the riddle «leaves». Maybe because in the previous case all the message (text and image) was presented in the same screen, yet here two screens linked by an effect were used. Furthermore, the text is shorter. It should also be mentioned that the false clue (a small wooden truck) was considered funny, even though the image itself is not funny at all. The reason may be that considering that most of them knew the answer (bat) the clue resulted totally absurd and senseless.

### 3.4. Sum

This riddle was the hardest of them all. Some children commented «it is really hard (difficult)», «it is for smarter people». We classified it as very difficult (third level) but we didn`t imagine that almost nobody would solve it even after looking at the correct clue. To help them, we had to improvise additional clues at that moment. Only one out of the 34 children found the answer without help. Some confused the image of the hole puncher (it is a stapler) or didn`t know its name (it is the thing you use to make holes). Others, at the beginning saw the «plus» sign as a «cross» and thought that the coloured sheets were folders. Moreover, after seeing the result of the sum (two chillies) they were even more confused: «it is not the correct sum, chilli is not the answer», said one of the boys. Seeing the correct clue didn`t help them much either, even though it shows a bag of «confetti (pica pica in Spanish)» (pieces of paper), which is the answer to the

riddle. With respect to the questions of the correct clue (what effect does chilli have? And two chillies?), some didn't understand the term «effect» and others answered «two chillies are hotter (pican más)». This is why we had to improvise other orientating questions, even though we didn't always receive the answers we expected. We asked: What comes out when we perforate a coloured sheet of paper? They answered: «holes» What does it feel like when you eat chilli? «Our tongue burns». What is the name of what is in the bag? «It is what they throw at parties». Finally, after a big effort we made them associate the image of the two chillies with the word «hot-hot (pica pica which means confetti)» and everyone exclaimed «That's right!»

We believe that the great difficulty that this riddle generated is understandable because it is more symbolic and abstract than the others. But also because its approach has no equivalent in traditional riddles, in other words, there is no previous knowledge of how to interpret it. It looks more like a graphic hieroglyphic than a riddle. This is why the correct clue should have been more direct. For example, writing the word 'pica' (hot) replacing the letter 'i' with the image of a vertical chilli.

### 3.5. Girl

We classified this riddle with a medium level of difficulty (level two), yet it should have been level three because the majority of boys and girls couldn't find the answer without looking at the clues. When they saw the image of the floor polisher, some didn't remember its name: «It is the thing used for cleaning the floor. What is its name?». Others didn't recognise the artefact (it isn't used very much in some working-class sectors). In the case of the refrigerator, many said fridge, which made it more difficult to discover the answer. They also tried to construct a name with the initials of the artefacts («Refila?, Alina?»). The initial text turned out to be long and confusing for the children who could not read fluently. Seeing the correct clue, most were able to identify the solution, but there were those who did not recognize the character (maybe because it is mostly seen on cable TV, and few have access to it). Only when they read its name on the logo on the screen could they solve the riddle. However, there were some kids who not even seeing the correct clue with the name could answer the riddle because they weren't able to decipher that the word «Dora» was hidden in the names of the electrical appliances. In this case we had to give them additional help: we asked them to repeat out loud the names of the artefacts so that they could find the connection. Translator's Note: In Spanish the appliances are called: «refrigeradora, lustradora, licuadora y lavadora» – and Dora is the name of a girl.

### 3.6. Other notable results

• We didn't find a correlation between the age of the pupils and their capacity to resolve riddles. Younger kids resolved riddles that the older ones couldn't resolve. There was a kid, apparently not too bright, that discovered the answers more quickly than his group members who in the end told him jokingly: «Today you are not as dumb as usual». This makes us wonder if there is a relation between intelligence and the ability to solve riddles (maybe a theme for a complementary investigation).

• Having established three levels of difficulty increased the sense of challenge of the riddles and allowed us to associate them with the dynamic of videogames. One child asked: «How many levels are there? What happens if I complete them all?». This concern reflected his expectation of obtaining some kind of recognition, maybe that his name appeared in a virtual ranking. Other kids had the idea that they were going to be evaluated: «Are you giving us a grade?», they asked.

• Deciphering the riddles in small groups generated an internal competition: «You haven't solved anything, I've resolved three». There also was some collaboration and exchange of ideas, yet not in a formal or premeditated way. It was interesting to observe that in one of the schools the first group, to whom we explained the procedure, wanted to explain it to the next group and this group to the next. When we finished working with one group of students, the new group entering the class usually asked those who were leaving: «Did you guess?». And the other answered «Yes!» with satisfaction.

• Having included two clues, one correct and the other one incorrect, turned out to be disconcerting at the beginning, but after they had understood the mechanism it was stimulating. A couple of kids, for example, left it to rock-paper-scissors to decide who would choose the first clue. Other children believed that the clue the stone head was looking at was the correct one. Some viewed the clues as quick as possible (they opened them as soon as they appeared) and others, on the contrary, «froze» the video to think for a while. In some cases, we suggested to watch the riddle again before seeing the clues. Those who solved the riddles without looking at the clues wanted to see them anyway in order to confirm their answer.

• The possibility of writing their answers in the commentaries of the blog was highly appreciated by boys and girls. But what they enjoyed the most was being able to write their names and see them published. However, within those who entered the blog on their own (guided by the information sheet we gave them) there were some kids who entered anonymously in order to make jokes or make fun of a classmate.

• The survey of the blog only had 14 participants and the answers were: they are entertaining (7), they teach how to think (5), they are very hard (2), and they are boring (0). Apparently, resolving this kind of surveys is not very appealing to a child. One of them expected something to appear on the screen after submitting his answer.

• During the validation we collected opinions about the expression «hard-headed» and the 3D character. The phrase was associated with «someone who doesn't think» and the character was identified correctly as «stone head»; one kid even mentioned «Chavin». With respect to the music, many kids ended humming the song, especially the part where it says: «Don't be hard-headed».

• In general, the interest raised by the material was very positive. One kid asked us: «Can we continue watching it at break time». Here we must mention that in one of the schools the internet connection failed and we had to show the videos without the children being able to neither interact with the clues nor write their answers in the blog. This mishap allowed us to observe that in comparison the enthusiasm was less than in the groups with internet access.

## 4. Discussion

### 4.1. Brilliance of the author or satisfaction of the guesser?

In a traditional riddle, the author is the one who controls communication: he sets the challenge and knows the answer. His expectation is that nobody solves his riddle, this way he can show off revealing the solution. This communication scheme is reinforced more in certain forms of traditional riddles: ironies, questions with a set formula and the double meaning. These formats are very similar to popular jokes. When someone asks: «What's the worst thing about being Armando Guerra?» he expects that nobody knows, otherwise he would fail as a joke teller (or riddle proposer). But in the case of the audio-visual riddles, our expectation is that boys and girls discover the answer. This is why the design of the riddle and especially of the clues is fundamental. The user's intellectual and emotional satisfaction of solving the riddle depends on the correct formulation of the riddle and clues. If we transfer this reflection to the formal education field, we can verify that some teachers frequently want to show off their knowledge more than facilitate the intellectual enjoyment of their students, which should be the objective of all educational communication.

### 4.2. Seems like the same riddle, but it is different

We have already mentioned that the most valuable use of digital technology is when it maximizes knowledge which is impossible to gain without it. Do traditional riddles (oral or written) encourage creativity in the same way and degree as our blog of audio-visual riddles? If it were so, our project would only work for making the traditional riddles look more attractive for the new generations. But we believe there are two additional advantages.

In traditional riddles, as we pointed out before, the transmitter usually reveals the answer. And when people listen to it, they associate the statement of the riddle with the solution and understand the creative clue: «Oh, so that was the answer» In other words, the creative thinking is exercised not so much in the process of discovering the answer but in the subsequent comprehension of the concepts and ideas that have being creatively linked to the riddle. It is like learning how to paint, mainly analyzing paintings and not painting. In our project the emphasis is on the user (who is not a passive receptor) discovering the solution. This directly exercises creative thinking. Moreover, as authors of the blog we chose not to publish the answer. We prefer users to read the comments and deduce the correct answer (which could eventually be more than one).

The other advantage has to do with language. Reading a riddle in a book or listening to it from someone is a cognitive and sensorial experience very different from appreciating the same riddle in a multimedia interactive language. In this case, children usually confront the riddle in a different way: they look at the image, read the text, interpret the message, give ideas, doubt, read the text again, advance the video, pause the video… in other words, «think» and «feel» in a different way.

Here we must remember what Gramigna and Gonzales Faraco (2009:164) point out with respect to videogames: «The thing that really counts in a recreational, cognitive and relational adventure is to know how to capture in each process a movement of the mind and the emotions that encourage it».

### 4.3. The mediator is the one who facilitates individualized clues

Nowadays it is expected that a teacher must act as a mediator in the education process. He must facilitate the access to knowledge for students without giving it to them directly. In other words, work as a «bridge» that links, brings closer, orientates and allows encounters. But how to perform this role now that digital technology can also work as a mediator between users and knowledge? From our experience in the blog validation, we believe that there are two different types of mediator. When technology works as a mediator it tends to homogenize the users assuming all of them have a similar profile and will react within certain established parameters. But what happens when a child «breaks the mould»? Previously we commented the case of a girl who gave absurd answers and another boy of her group helped her understand the real sense of the riddle. It would be difficult that this type of individualized «tutoring» is assumed efficiently by a machine. This is why we believe, now more than ever, that the mediator role of the teacher (and also of older or more capable students) is fundamental to complement the usage in class of new technologies. Maybe it is paradoxical but teachers should thank the digital media for making their role acquire more relevance.

### 4.4. Collaborate or compete?

In the business world competition is promoted as one of the main pillars of economic progress. It's what allows the development of innovations and the maintenance of comparative advantages between products and businesses. Furthermore, on a country level, we talk about the competitive advantages of nations. On the other hand, the collaborative spirit is a factor for success in the development of many social and technological projects; it's a way of bringing individual efforts together to accomplish common aims that will benefit everyone. How do we combine both factors in the educational field? In the case of our project, one way of accomplishing this would be that each group of students works internally in a collaborative way and externally in a competitive way. In this scenario the mediator role of the teacher would consist in organizing the groups, trying to be fair, helping everyone without any favouritism, acting as an impartial referee during the intergroup competition and rewarding the best without diminishing the rest. What if we had to choose between competition and collaboration? In this case, we would choose collaborative learning. Even though there is not much accumulated experience, it seems as a more advanced form of education, closely linked to the collective intelligence nowadays associated with the web 2.0 and social networks.

### 4.5. Create riddles: pending assignment

According to the «Bloom Taxonomy for the digital era» (Churches, 2009), the highest level of ability of superior thinking corresponds to «create» rather than «evaluate», «analyze», «apply», «comprehend», «remember». On the other hand, according to «The social technographics ladder», the upper ladder of technology users correspond to the group of creators, followed by critics, collectors, joiners, spectators, inactives (Forrester, 2008). These two approaches demonstrate the importance in the digital world of the creation of communication products by users. This is why we must accept as –self-criticism– that an important deficiency of our project is not having included a mechanism that facilitates the creation by boys and girls of their own audio-visual riddles. With the purpose of making up for this deficiency we intend to include in our blog an invitation for children to send ideas or dialogues of audio-visual riddles that they have done in class with their teachers. We will produce a video of them to publish it with the name of their authors. The participation of teachers will be, once more, indispensable.


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