Narrative Creation with StoryCubes versus Collective Academic Writing

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Abstract

With StoryCubes, a game constituted by nine dice, illustrated with various pictures, children can playfully create stories together. Through this play, they do what they have to do at school when they have to produce different written work. In the first part of this paper, conforming to French ergonomics methods, we analyse children's activity using the instrumental approach (Rabardel, 1995). This helps understand the means of an activity from a subject's point of view, in this case the child's viewpoint. We focus on what children do and observe variations in their activities between, on one hand, the creation of narrative with StoryCubes game, and on the other, the collective writing of a story from an elementary school classroom. To do that, we capture the entire pedagogical sequence of the collaborative tale by being in the classroom each day, and in addition, fifteen play sessions of StoryCubes, which take place during break time. The second part of this paper demonstrates a co-design process of hybrid tools supporting narratives. It follows a conception in use, and not only for use, because we feed by the children's activity and by what is important to them. Furthermore, this tool has the particularity to be hybrid on two levels: first it includes digital and tangible elements, to allow manipulation and exploration, and then it is positioned between game and pedagogical mechanisms to involve and motivate children, as much as possible.

Keywords: Game, StoryCubes, Narration, Activity, Instrumental approach, Participatory design

In our study, we focus on what children do and observe the variations in children's activity between the creation of narratives with the StoryCubes game, and the collective writing of a story in an elementary school classroom. With StoryCubes, a game constituted by nine dice illustrated with various pictures, children

can playfully create stories together. Through this play, they do what they have to do at school when they have to produce different written work. Decortis (2008) speaks about the development of narrative competence, within this area of interest, we try to answer the following questions: What are the effects of a game, like StoryCubes, on children's narrative activities? How does this game allow a development of creativity, unlike a pedagogical sequence of narrative creation? We will see how these two types of narrative activities affect the cycle of Vygotsky's creative imagination, reused in the 'Narrative Activity Model' (Decortis, 2008). For Vygotsky the imagination is a complex process, the products of the imagination come from a circular re-elaboration of reality, structured in two stages: the accumulation of material by the child, then its re-development through phases of dissociation and association. Finally, the imagination is formalised in external elements.

In the first part of this paper, conforming to French ergonomics methods, we analyse children's activity using the instrumental approach (Rabardel, 2005). This helps understand the means of an activity from a subject's point of view, in this case the child's viewpoint. We focus on what children do and observe variations in their activities between these two forms to create narratives. To do that, we capture the entire pedagogical sequence of the collaborative tale by being in the classroom each day, and in addition, fifteen play sessions of StoryCubes, which take place during break time. Thanks to StoryCubes we see the power of the game to unlock children's expression allowing other less linear forms of narrative. We observe a creative manipulation of content due to the elements on each of the six faces of the dice. In addition, random effects of the dice roll produces surprise and fertility, in the nature of the game.

The second part of this paper demonstrates a co-design process of hybrid tools supporting narratives. It follows a concept of use, and not only for use, since we gather feedback from the children's activities and by what they view as important. Furthermore, this tool has the particularity to be hybrid on two levels: first it includes digital and tangible elements, to allow manipulation and exploration, and then it is positioned between game and pedagogical mechanisms to involve and motivate children, as much as possible.

Two reference cases

The creation of the collective tale in class

In the first case, taking place in a class of CM1, we observe pupils creating a collective story following a class trip to the Massif Central. To initiate the project, children discover the narrative structure through famous tales by identifying the stages: initial situation, disruptive element, events, outcome, and final situation. After a reminder of the class trip by a slide show, students write, in groups, their version of each stage of the story. Each version is then submitted for a class vote. Each session added steps in the story, based on the previous part, as chosen by the class. Students have great freedom for the story content but have to include places visited during their school trip. When the text is completed, the students draw scenes from the story and tell them using the BookCreator tablet app.

Each session is organized in the following way: reading the next part of the story, individual reflection by taking notes on paper, verbal exchanges within the group, collectively writing the text, group reading, and finally, sharing with the class followed by a vote.
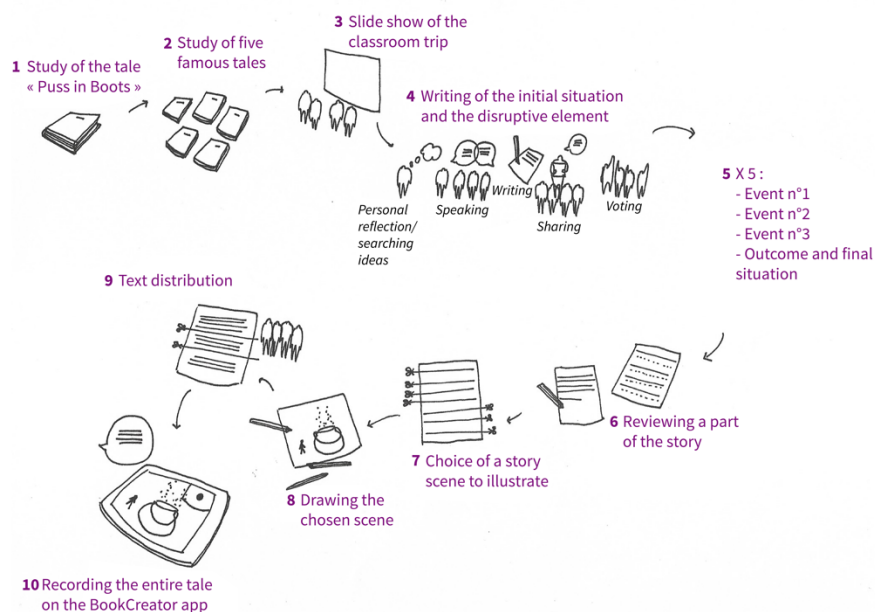

Figure 1. Pedagogical sequence of the collective tale.

The StoryCubes game

With StoryCubes, a game constituted by nine dice, illustrated with various pictures, children can playfully create stories together. We observe fifteen play sessions with the same pupils creating the collective story. For some playtimes, we select four or five children to stay in the classroom, to invent stories with StoryCubes. We systematically mix one or two experienced players with news players, which is how the rules are conveyed. Complementary, we observe siblings, a brother and sister at their home, playing with their StoryCubes game, after listening to stories.

Figure 2. Children playing with StoryCubes's dice.

Evoluting rules of the game

To not influence the activity, a child having the game at home, explained the way he played: "at home we throw the dice, we try to put them in order to make a story".

The rules of the game are transmitted from child to child, incorporating their own experiences from one session to another. Over the fifteen game sessions, the rules evolve as you can see in Figure 3.
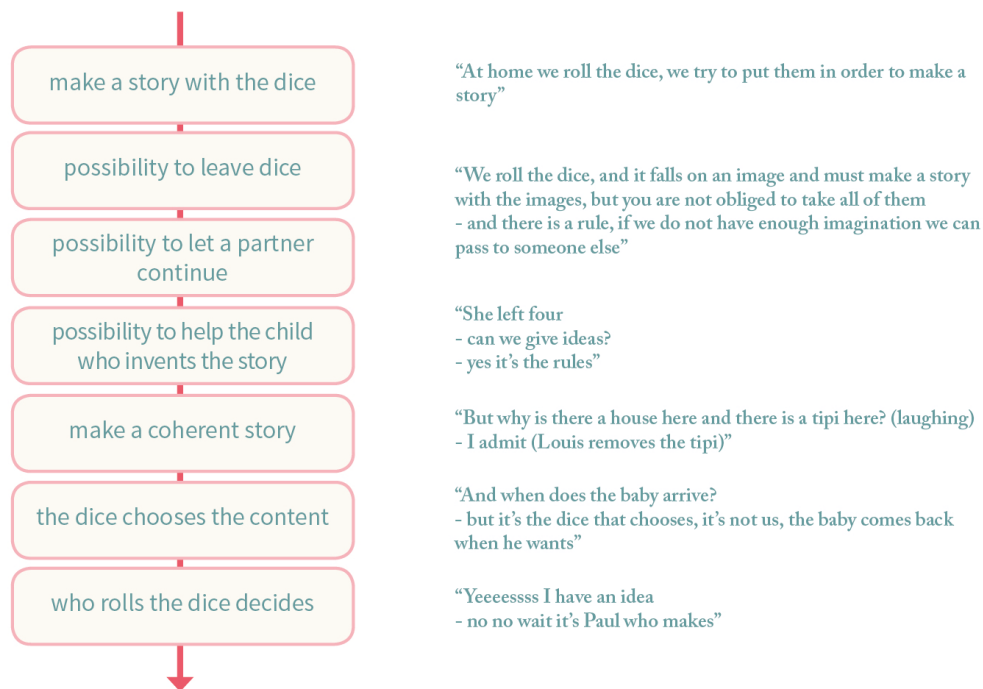
make a story with the dice	"At home we roll the dice, we try to put them in order to make a story"
possibility to leave dice	"We roll the dice, and it falls on an image and must make a story with the images, but you are not obliged to take all of them - and there is a rule, if we do not have enough imagination we can pass to someone else"
possibility to let a partner continue	
possibility to help the child who invents the story	"She left four - can we give ideas? - yes it's the rules"
make a coherent story	"But why is there a house here and there is a tipi here? (laughing) - I admit (Louis removes the tipi)"
the dice chooses the content	"And when does the baby arrive? - but it's the dice that chooses, it's not us, the baby comes back when he wants"
who rolls the dice decides	"Yeeeessss I have an idea - no no wait it's Paul who makes"

Figure 3. Evoluting rules during StoryCubes sessions.

Theoretical background

At the heart of the narrative activity

This research in ergonomics focuses on the notion of activity. By activity we mean what is done, that which is put into play, by the subject to achieve the goal which is fixed in any given situation.

Activity is always oriented towards an objective, which is influenced by a multitude of characteristics of the situation (environmental, social, material, etc.) and subject. Activity is singular, specific to the subject who is instrumented by artefacts (that are potentially instruments). Here we are specifically talking about narrative activity.

Instrument as a mediator

Pupil activity is analysed according to the instrumental approach, which is an anthropocentric technique (Rabardel, 1995). It is based on the concept of instrument, which integrates a character of mixity. It consists of an artefact, and a scheme, which are a structured set of generalised action characteristics which allow

repetition, they are activity organizers of the study subjects. We mobilize it here because it allows analysis of the activities meaning, retaining subject's viewpoint.

Schemes specific to narrative activity

Here we also mobilize the narrative activity model (Decortis, 2008), which is based on Vygotsky's work, and is structured in four phases:

- 'Exploration' represents all the activities that come from experience: what has been seen, heard, and touched. It is a collection phase where the elements are still perceived as an indivisible whole.

- 'Inspiration' is the moment when we made the choice to develop ideas; we give importance to certain elements. It is a reflexive act whereby children dissociate these complex wholes.

- During the 'Production' takes place the association of the previous dissociated elements and their expression. We use the elements chosen during the previous phase; we rework them to produce new content.

- 'Sharing' is the moment when the story is told by a child and shared with others.

Methodology

To analyse the student's activities all sessions were recorded using audio, photo and video, supplemented using individual and group interviews between the teacher and groups of pupils.

Results

The first part of the results covers the analysis of the class story creation using the StoryCubes game.

Application of the model of activity NAM for the activity of the creation of the collective tale

The NAM model is repetitive as the narrative and tablet writing structure repeats.

For the development of the first stage of the story, during exploration the stu-

dents use various resources: their memories of the school trip recalled by viewing of a slide show of the trip, in conjunction with their imagination, and a worksheet with ideas provided by the teacher. The choices are then individually made, constrained within places visited during the school trip. They are immediately written in each student's notebook. This first cycle ends with an oral sharing with the rest of the group.

There is a gap between the prescribed and the real activity. Du-ring the exploration, the teacher asked students to write down single words, however, the students continued to compose micro-stories. This influenced the following informal sharing as the students read their personal narratives, one by one, and then chose one as the basis from which to work.

This collective cycle is organized around an informal group sha-ring. Choices are subject to negotiations by the group. Production is also collective, a student writes under the dictation of others. Finally, a group spokesperson shares their story fragment with the class, who vote for the best submission.

For the invention of the following stages of the process, the preceding cycle evolves into a time we call 'understanding'. This is when pupils ensure continuity with the previous part of the story. The rest of the cycle is similarly structured.

The textual tale is then transformed into a multimedia story using the Book-Creator application. After a fragmentation of the text, the activity is organized around a tablet on which groups of students take turns. Note that before the tablet activity, important preparatory work is necessary: illustrating scenes from the story, splitting the text in units corresponding to the illustrated scenes, and practice reading the story. There are many opportunities for the pupils to exchange ideas and help one another in the production of the final story. Exploration and inspiration are evacuated because children are exclusively in the realization of all that has been prepared before.
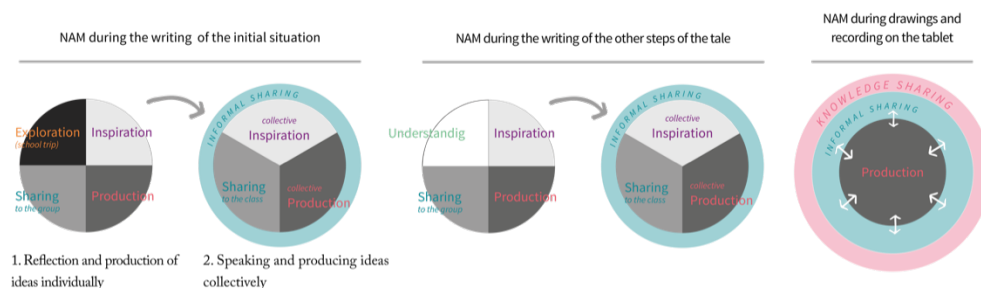

Figure 4. NAM for the activity of the creation of the collective tale.

Application of the model of activity NAM for the activity with StoryCubes

With StoryCubes, if the children create a new story or decided to continue the previous story, the NAM model changes. In both cases, the four phases of NAM are present within a short space of time.

In the first case, the exploration is largely determined by the nine dice, but also by the children's personal and collective group experiences. There are many references to their class trip in the Massif Central, they sometimes refer to elements discussed in class or previously heard stories. For example, a couple of children hear a story mentioning the bridge of Avignon, a few minutes later playing with the StoryCubes they integrate the bridge of Avignon into their own narrative. The inspiration is collectively constructed with suggestions from different children, even if a child, who rolls the dice, is the one in control. The production is done orally, mainly by the child who rolled the dice, while incorporating suggestion from others. In production, children modify elements present on the dice: "I like to add small details that there aren't on the dice, for example a flower on the balcony while we could say that the flower is in the meadows, it's us to decide."

Other students refuse these creative tangents remaining close to the drawing on the dice, for example, a dice featuring a pyramid:

> "Once upon a time a tent...
> - But it's not a tent, it's a pyramid!
> - Maybe it's a pyramid; I say it's a tent"

We notice that the more formal sharing phase – in the creation of the collective story – tends to become an informal sharing session.

Once the story is complete, the children again roll the dice., Two choices are available to them, to continue or start a new story. If the previous story was adjudged to be sufficiently successful, it may be continued. If the next dice roll is consistent with the previous story, as one child explains:

> "It depends if the story is good ... if it is bad we will start it again."
> - But sometimes we don't have the right dice so we try to continue except that we don't find links between the one who started the story before and the one who continued the story."

In the second case, the exploration is influenced by the story invented from the previous dice roll and they seek to build a coherent sequence – in a phase of understanding. Inspiration is guided by the previous story, the goal is to maintain a coherence between the stories. The production is similar to the previous cycle. Again, the understanding, inspiration and production phases are interspersed with
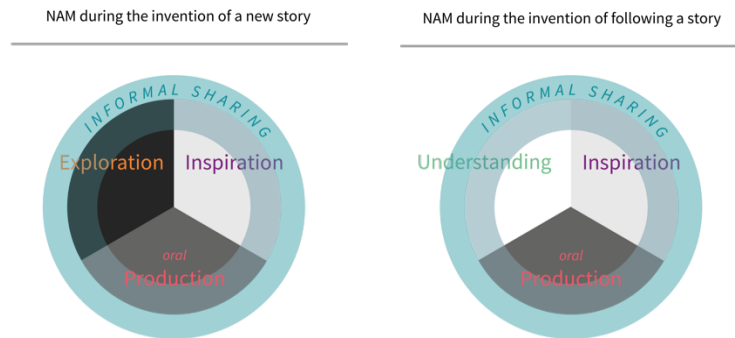
informal sharing between the pupils.

Figure 5. NAM fort the activity with StoryCubes.

Specific scheme to the narrative and creative activity

From observations and interviews, we succeed in identifying various structures occurring in both methods to create stories. These schemes fit into the different imaginative stages of the creative cycle.
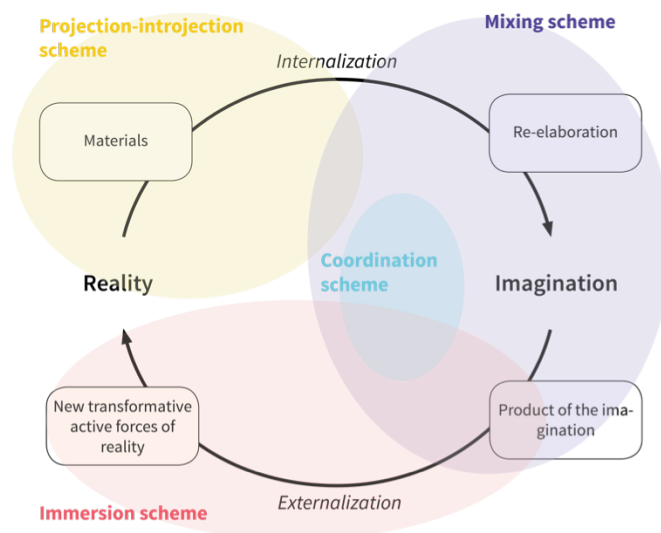

Figure 6. The cycle of the creative activity of imagination with their schemes.

Projection-introjection scheme

Projection-introjection scheme, favoured here by the imposition of the narra-

tive constraint, by the inclusion of the places visited during the school trip, creates links between the lived experience and the story content. In this scheme, children imagine the story, relate the story to their lived experience or take on the characters of the story. Some children identify with the story's heroes:

> "I remember I had an idea but it didn't work out, it was the class of CM1 who was in discovery class, adults they had just gone out to drink a fruit juice or something, there was no adult inside. And there was a blizzard that rage, so we were all alone inside, we had to manage ourselves and to find food, we didn't know when we could go out. The class of CM1 was us ..."

Also in StoryCubes game, they may include themselves as the story's heroes:

> "It was Luca (laughing), who was a baby"
> - Ah it was your little brother?"
> - No it's me!"

Mixing scheme

Mixing scheme is a scheme highly utilised during the inspiration and production phases. These strategies are put in place, by the students, to include their personal ideas into a coherent whole. Acceptation of the idea of others is important: "I'm trying to find compromises, my idea is my idea, I don't want to let go. To be accepted I try to break it a little, but we both have to take a step if we want to agree in the group."

The metaphor of a cooking recipe is used by students who explain mixing elements together. This mixing scheme for the collective story is based on a common goal in which the pupils include personal micro-stories. With the StoryCubes this scheme is more spontaneous.

Coordination scheme

A coordination scheme is deployed in parallel with the mixing scheme, like a condition of realization. This scheme is not acquired by all pupils and raises many difficulties as the teacher notes:

> "Now this is the hardest part, you have to be okay together. It isn't everyone gives an idea and then we make a micmac of all that, the idea isn't we take the ideas of Gertrude because it is all right and we won't break the head. The idea is that we really want to build a real adventure together".

It is a scheme in which the children must choose which ideas harmonise and minimize the feeling of misappropriation.

Within the coordination scheme, we can observe characteristics which are both common and different during the observed scenarios. We note cases of successful coordination - with StoryCubes, the child who incorporates suggestions made by his comrades a few seconds earlier. These propositions are not integrated in the same way but undergo modifications by the child-narrator:

> Child 1: she had a black cat.
> Child narrator: No, she's not a witch, and she had a magic fountain.
> Child 2: Who was throwing emotions?
> Child 1: Who makes her sleep ... or I do not know.
> Child narrator: She could make emotions, so one day a guy passed, he was very happy, he wanted to look at the fountain closer but ...
> Child 2: There was a tree blocking him, so he walks.
> Child 1: He snuck up like a black cat.
> Child narrator: So he managed to pass and turned into an unhappy black cat, who left cat prints.

During the creation of the collective story, we note that the group of students, currently writing their part of the story, complement one another. A child initiates a part of the sentence which is then continued by his comrade. These moments of successful co-activity between children are more evident when children play with StoryCubes.

We find numerous occasions involving obstructed coordination. With StoryCubes a child who invents the story absolutely refuses ideas submitted by his comrades. The child then invents the story in a more solitary way. During the creation of the story, multiple obstructed coordination events may occur, as the groups systematically try to agree on each element of their text. To do this, they often submit their ideas to a group vote when they fail to reach agreement. The obstructed coordination generates long negotiations between all group members, questioning choices and try to reach a compromise: "a group of children, because you want a little girl and I want a class."

Instead with StoryCubes, the dialogue is minimised by the placing of aligned dice on the table. The child, who narrates, receives many suggestions which he refuses or accepts in silence, since the validation (or refusal) is done by the dice.

Special attention is paid to the meaning of the created story. There is a spontaneity at work during the game with the StoryCubes. The children care about the meaning of the narrative through various choices throughout the creative process. There are exchanges between two dice rolls, with pupils asking questions about the meaning and the elements to be worked out during the story. In creating the collective story, work on the coherence and meaning of the story is coordinated by

the teacher, who induces narrative elements to work in the story.

There is also an immersion scheme that we do not detail here.

Participatory design with children

The second part of this paper demonstrates a co-design process of hybrid tools supporting storytelling. This method consists of four stages: Discover - Invent - Mix - Iterate (DIMI). We initiated a co-design process with children from the same school, over a period of several weeks. We will now look at the phases; each took the form of a 45-minute workshop with two mixed groups of four children each. The workshops were held around a large communal table, in a specific room within the school.
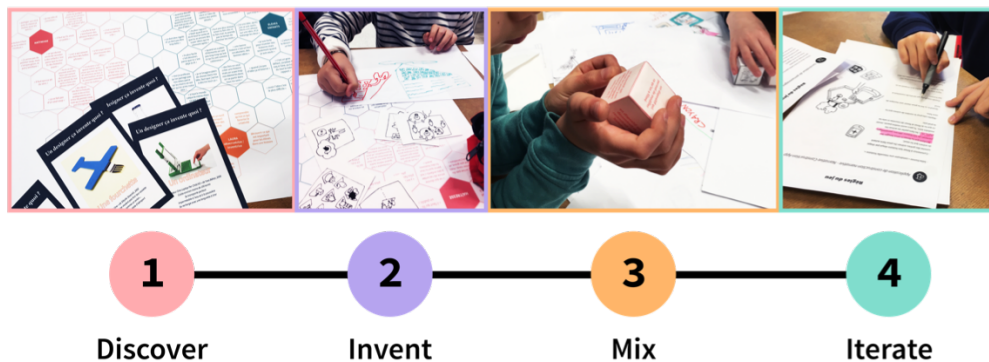

Figure 7. DIMI method

Discover

This phase introduces examples of design to children and shares their perception of their previous storytelling experiences.

The first part of the workshop takes the form of a discussion centred on the definition of the designer's job based on design examples. It is also the moment to expose their mission: to conceptualise a new writing tool – may include technology. The second part of the workshop is dedicated to the discovery of actors' mapping and a discussion based on their lived experience of the verbatim that challenges the children.

This workshop is based on:

- A mapping of the actors involved in the project, which includes old verbatim from the teacher and students (collected during previous interviews). This mapping also includes a researcher pole to discuss the reasons for the researcher's presence and his objectives.

- Examples of design presented in the form of cards with images of the invented object and its description.

The work with mapping engages children in an active exploration of their narrative practices. Different elements emerge: inventing in groups, difficulties in generating ideas, and facility to invent in their playground. They consider the scenarios in which they invent stories (alone, with others, with or without a theme). Children verbalize enriching one another.

Invent

The 'Invent' phase opens a space for generating ideas through drawing and speech. Ideation takes place throughout the workshop. This phase of ideation begins with a time of silent and individual reflection. The children are then asked to tell their idea to the researcher. The session alternates between drawing, sharing and explanation and the students are allowed to copy and improve their colleagues' ideas. Concept maps are gradually spread over the table to help generate new ideas.

The material of this workshop is based on a set of 37 concept cards – composed with text on the back and more abstract diagrams on the front. They represent digital possibilities which the children don't necessarily know (examples of concept cards: use a sound recorded in the environment; zoom in details of the story; appear in history; have access to a multitude of stories, etc.). It is a modular material because the cards can be introduced at different times, gradually, and selected depending on the children's previous work – to invite them to go to unexplored areas.

This workshop allows idea generation to be formalised through drawing or verbal explanation (53 ideas) – proposals involve sound, video and drawing where children create the contents of their stories. There is a desire to produce stories rather than writing, sometimes behind hyper-technological ideas. There are also proposals to overcome the lack of ideas. The generation of ideas is fluid and spontaneous; the concept cards are only introduced only during the middle session of the workshop.

Mix

The "Mix" phase takes the form of a combination of ideas using dice. Following a period of discovery of the dice, where the children read the content of the faces, the pupils threw four dice and linked the contents of the faces together. Each student individually rolled the dice, but the dice mix was done collectively. The children could remove a dice if no association was made, or switch with a used dice.

The material provided consisted of nine dice: three red dice containing the results from the students' previous workshop and five black dice containing concept cards, in order to naturally encourage the children to produce concepts in accordance with our design criteria. The content of the dice was earlier reformulated by the researcher so as to begin with "a device" in order to detach from certain imagery (robots, computers ...).

Offering dice allowed the children to physically manipulate and organize their ideas, while promoting collaboration. In a similar manner of the StoryCubes game, the children created associations between several dice, and reworked their ideas in more concrete and detailed ways. The children were deliberately trying to land on all sides of the dice. The exchanges between children were harmonious; occasionally the same dice roll generated two different ideas.

Iterate

This phase includes a replay time and improvement of the devices being finalized. After distribution of summary documents, a period of individual and silent reading time was proposed, during which the children were encouraged to highlight and annotate elements they liked or did not understand. After reading, a group discussion was initiated by the researcher.

The productions of children were synthesized in different devices presented in the form of rules of the game.

During the group discussion, the children gave their opinions and preferences on the devices. They also suggested improvements to the devices, like one boy, Henry, who shared his family story, or Anita, who liked creating background music. A time of discussion was reserved for the elaboration of the content of certain elements of the device, for example, sets of characters.

Hybrid narrative tools

Later, the hybrid tools conceived during the workshops were produced, proto-typed, and tested with groups of children. They include digital and tangible elements to allow manipulation and exploration. Three devices were designed with the children.

We find an **"Idea generator"** which allows children to combine audio content to start their story. This device compensates for the lack of written ideas as many children emphasize their preference for collective creation since they have more ideas or imagination on which to draw. The generator consists of a recorder and a tray; pupils create their own ingredients and constraints, thereafter listen to what this combination of elements may produce. They have at their disposal a set of rewritable modules (equipped with RFID chips), they can test different narrative combinations to choose the one that most inspires them. Children can record audio elements (up to 15 seconds) using the recording base (not shown in the photos), which is simple to use: the child places the module he wants record on the base, presses a button and speaks to record its ideas, can listen again, and if satisfied presses another button to save the recording in the module. The children collect a set of ideas.

Figure 8. The idea generator device

The second device takes the form of a story box in the manner of a mini theatre, composed of sound modules and supports, tiles, supporting drawings vertically.

The sound modules allow the children to capture up to 15 seconds of sound. To record a noise, they just have to press a first button and speak, sing, make a sound. A second button lets them listen to the sound produced. Twelve modules are offered to the children, when a child records a new sound the previous sound is erased. The audio elements are associated with the tiles, which take the form of a wooden hexagon with two grooves to place the drawings. Twenty-six tiles are offered to children, so they can create their story. The hexagonal shapes offer a vast range of permutations; the tiles can be used independently or grouped together. The children can draw their own elements or include personal artefacts, decorations, characters or objects. These elements were listed by the children themselves and fit directly into their own culture.
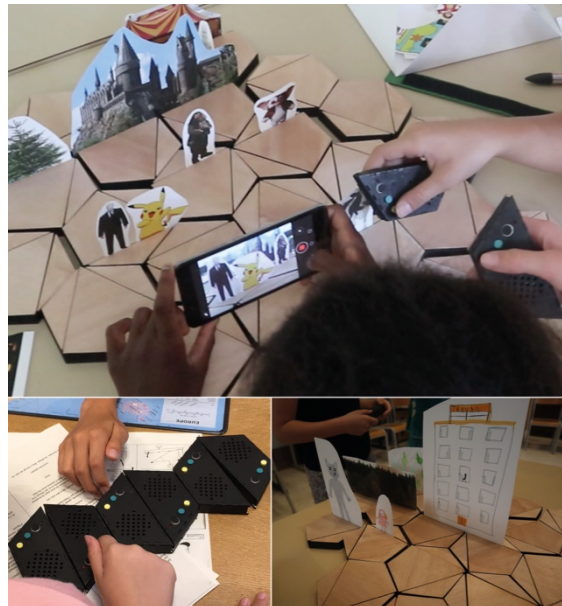

Figure 9. The story box device

The last device offers the possibility to film and mix the narrative elements using an application combining two complementary interfaces. Video capture is done with a smartphone and the video mixing using a tablet, all managed in accordance with a work plan – which the children described metaphorically like a cooking recipe. Each video scene appears on the work plan as a new ingredient (apple, flour, eggs, milk, etc.). The work plan allows all the narrative elements of the story to be organised and the selection is done by putting in a pot. The child may decide to not include a scene by leaving it on the worktop. They have the ability to view the filmed scenes immediately after shooting on the smartphone or send to the

tablet to watch later, directly on the tablet. The child composes their recipe for cooking with their own narrative ingredients, deciding on components and order since the child can decide to place one ingredient before another. These co-designed devices try to leave some freedom for children, allowing them to manipulate and test different narrative elements thanks to the modular structure and the panel of modes of expression (voice-drawing-video).

Conclusion

The whole analysis of the activity, presented in the first part, is essential because it offers a real understanding of what children do when they create stories. The point of view of children is taken into account to analyse their own activity but also to design tools based on their own ideas and their own needs. For example, the metaphor of the kitchen and its cooking recipe is rooted in participatory design but also in schemes structuring the activity, as a child explains:

> "I take an idea that I like and I remix it with some elements that I like, small things to me, it's like a kind of cooking. Each ingredient counts and needs all the ingredients to make a perfect recipe. I had a starting dough as a recipe, I had several ingredients that is the ideas of others, I choose a few, I put everything in a bowl and I mix and here's an idea."

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