

The Research Diary: Documenting and Publishing Classrooms' Activities

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Abstract

As design researchers using a methodology through design practice, we have been designing and evaluating an artifact for pedagogy through research, for pupils in primary schools. This open-source tool has been made to document and publish pupils' productions during learning activities. In this paper, we present our artifact as well as the context in which we implemented it. Through this research, we intend to question the double act of documenting and publishing and the role it can play to create intentional learning environments. We introduce here our methods, our first results and our research agenda.

1. Introduction

This paper presents an experiment conducted within a classroom in a French primary school with pupils from 7 to 10 years old. This experiment was part of a program – Savanturiers – proposed by a French university that aimed to develop pedagogy through research, mentored by PhD students, for pupils in primary schools. To some extent, this program seeks to apply the principles of some previous studies made in learning sciences to create intentional learning environments [1] [2]. According to Bereiter & Scardamalia and Ann L. Brown, such environments are designed to give students the opportunity – and the responsibility – to take charge of their own learning and to evolve into “communities of learning”: students become active members of such communities of learners and the figure of the teacher becomes the one of a guide, helping them in their discovery process [1] [2]. “In the intentional learning classroom, students are encouraged to engage in self-reflective learning and critical enquiry.

They act as researchers responsible to some extent for defining their own expertise” [3].

As design researchers using a methodology through design practice, we have been designing and testing an artifact to encourage the practice of this research pedagogy. We relied on action-research methodology and conducted a workshop in one classroom for a year, introducing students to Design with a research methodology [4].

During the first few months, we made field observations. Following on from previous theoretical studies and practical works from researchers in psychology such as F. Decortis or E. Ackermann or from interaction designers such as C. Vaucelle, we identified three main issues to this pedagogy that needed to be taken into account in order to create an adequate tool: the development of communities, learning through authentic activities, and a pedagogy based on projects driven by students' questions [1] [2] [3] [5] [6] [7] [8].

Thanks to this analysis, we designed an artifact, both tangible and digital, called The Research Diary and implemented it in our classroom. Using that artifact, students were engaged to document and publish online each step of their learning activities, mainly through pictures.

2. Why documenting and publishing classrooms' activities?

To encourage the empowerment of students in their learning process and to create communities of learning, we designed a tool that has two functions: to document learning activities by collecting data at each work step, which values students' productions and to share this documentation with other learners online through a publication act. We intend to question and evaluate this double process of documenting and publishing for such pedagogy through research. We identified some of the hypotheses about the impact of this documentation/ publication process that underlie our prototype development and implementation:

- It initiates students to research by focusing on processes and methods.
- Plus the switch between collecting data and structuring results, which is how to produce knowledge, is valued because it is made visible.
- Peer-reviews are encouraged through the accessibility and the circulation of each other's works. Peer-review is the way for researchers to create common knowledge and the action of reviewing requires a strong critical thinking.

- The visible evolution of one’s work creates intrinsic motivation. Plus the perceived audience gives credit to what they are doing and publishing becomes a powerful stimulating tool as it plays both on extrinsic and intrinsic motivation [9].
- It helps the emergence of communities of practice, which are groups who share a concern for something they do and learn to do it better together [10].
- Making others’ skills visible fosters mutual help and empathy. One’s work becomes accessible at once and at the same level that his peers which helps identify one’s own expertise and lacks. Each member of the community knows each other’s strength and weakness, which facilitates collaboration.
- The focus made on students’ productions helps the development of new literacies and other media can be valued aside writing. The translation that has to be made between ones work and its trace requires a sense of creativity.
- New pedagogical experiments will be shared and then encouraged by making schools activities visible. Teachers could help each other creating new types of assessments and document them. These new activities and new assessments would have huge consequences on the other hypotheses and would accelerate a pedagogical change towards an intentional learning.

3. Description of the tool

To do so, we designed an artifact, which is both tangible and digital. Based on our field observations, we preferred the photograph sensor to document students’ works because of the nature of our workshop projects and the age of our students which makes difficult the use of keyboard typing. We made strong design choices for each aspect of this double artifact – each choice was motivated by our field and for our users and might be readapted for different purposes (age, learning context, activities).

From a material perspective, the object is made out of wood with two distinctive parts: one parallelepiped (L. 45cm, l. 35cm, h. 12cm) used as the shooting surface (up to A3 size) that opens up to store material and one mobile part, arch-shaped. This design is simple and cheap; easy to make with simple instructions. It is modular, saves space and allows different setups so it can be used for different activities and be easily carried (i.e. as a bag).

We used Velcro all around the arch to configure the station according to each project’s needs. Two mobile LED light sources produce a smooth light on the surface of the parallelepiped and a camera can be

attached any- where on to the arch. Our experiments have been con- ducted with a GoPro, but any phone or tablet could be used and scratched on it, in order to adapt to the school material.

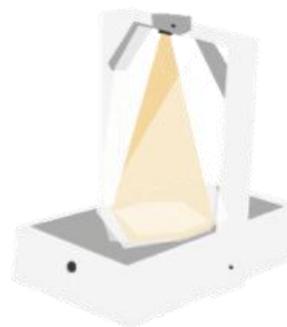


Figure 1. Preliminary sketch of the design



Figure 2. Setting of the station in the classroom



Figure 3. Production of the wood-object



Figure 4. Two pupils uploading their picture on their profile page

3.1. The web-based platform

This object interacts with a web-based platform, displayed on a computer – or a tablet – next to it. This platform enables children to upload their pictures into a personal space and publish them for other children of the class to see. Pupils create profile pages with editable names and descriptions and add their pictures to their own gallery. The others can make comments and feedbacks. The platform is made of a single screen with all the data dynamically loaded and stored with ajax to a local json file. Each picture, taken with a GoPro camera, is loaded via Wifi and displayed live in the platform.

Different designs of the platform have already been tested with the pupils. We used a two-fold process to iterate our interface. First, we conducted interviews during the class, discussing how to improve the interface and collecting feedbacks directly from the pupils. We also captured the way they used it – using the computer in-built camera and streaming the screen – which allowed us to see precisely their difficulties to use it, through their faces expressions, their oral comments and their mouse moves. First we created a one-page interface, based on the class-photo analogy, but we realized that pupils liked to have their profile independent from the others. We then redesigned our interface with pop-up profile pages, which was used much more intuitively by our pupils. Then we add textual features, such as description and comments but our class has not used them properly yet.

We have been working with another students group on ameliorations that could be implemented to this platform and we discovered that all pupils would preferred the interface to be more like a social network and allow more interactions between peers. The entry through projects that we found relevant was questioned and they considered an entry through people.

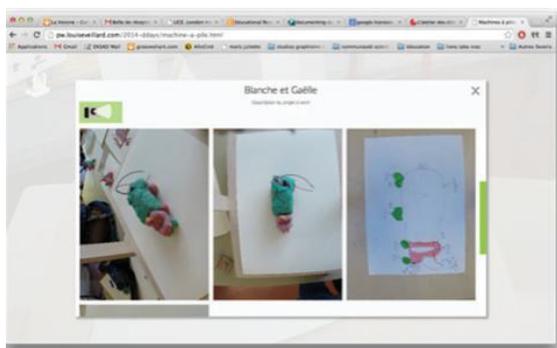


Figure 5. Screen-capture of the web interface

4. Several results elements

After three months implementing our artifact in our workshop, working on three different projects, we are not able to conclude on all research hypotheses but we do have some results elements.

4.1. A new space in the classroom

We found that this physical station in the classroom constituted an important pole and fostered interactions between pupils during the workshop. It plays the role of a meeting point where pupils see what the others have been doing after each workstep: they discuss their answers to the brief and give each other oral peer-reviews and feedbacks. It helps stimulate the next work phase. The physical area concretizes in the common space of the class the research process and its documentation.

4.2. A quick ritualization

Pupils quickly ritualized this documentation process and after two sessions, they set the device themselves: they became autonomous with all aspects of the artifact (both the tangible one and the interface). Through our screen casts, we can measure a rapid progress in key-board typing and in the control of the interface.

Another interesting thing to note is their understanding of how to make pictures and their comments on their pictures: they were sensible to the fact that their pictures represents their work and were quite imaginative in their documentation process (use of different setups, take several pictures in a row to induce a story).

4.3. Development of mutual help

Using that artifact for several sessions, we observed several signs of mutual help. The most obvious manifestation happens within teams: they collaborate to document their work. When writing, pupils adopt different roles (typer or speller or checker) depending on their abilities. For each picture, there are also definite roles that work synchronously: the one who sets the scene and takes the pictures and the one who uploads it on the interface.

Moreover, some pupils who felt very comfortable using the interface stayed in front of the device to help the ones who had some troubles using it. It was rewarding for them to be recognized as expert and useful for the others who needed their help. In that case, the learning happens offline between peers through gestures and

talks.

But they also use the online traces (the pictures) and browse others' profile pages. It allows them to acknowledge others abilities and progress – even though we have noticed that they do not browse naturally other's pages but rather show their own page to the others when they stand in front of the device. They can be inspired by others work, observe different practices for a same brief and ask questions to their classmates when needed.

4.4. Learning process made visible

The evolution of each pupil's work – or group of pupils – is visible on the platform as a history of pictures shows the production process, on each profile page. The teacher can decide whether this platform is public or private, for class use. As the learning process is made visible, each pupil gets a picture of its personal progress and of the general progress of the class. From our observations, we noticed that this visible evolution of one's work provokes a renewed motivation and stimulates the next working step. This focus on the process offers a lot of new ways of assessing students and renews the ideas of self-evaluation and peer-evaluation.

Plus, the perceived audience due to the online publication adds to this motivation. Pupils can proudly share what they have been doing and making with their family and peers. The publication phase, ultimate step of the researcher work, stimulates and engages pupils to be creative in order to contribute to the pool of submitted work and gain recognition from their peers and even from a greater community.

5. Conclusion

This tool helped us in setting a learning process through a research pedagogy in classrooms by integrating these important phases of documentation and publication into the class workflow. New evaluation methods and new interactions between pupils, between classes and even between schools could then be evaluated, giving students a new meaning to their work and productions. By describing our research hypotheses, we described our research agenda, but the first results are encouraging. After being participants in our research, we now would like to observe how teachers will use that tool.

6. Acknowledgements

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7. References

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