



## Art Studies as Tools for Understanding Observations in Science

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### Abstract

*Observations are fundamental in science as they have to include cognitive activities based on the perceived sensations. These activities have to be transformed to written or spoken language. In order to practice and visualize these processes we present a method based on Roland Barthes concepts *studium* and *punctum*. About 60 students aiming at becoming primary school teachers (years 4–6) were followed during a period of the first two years of their education. The results on all course examinations during these years (n=17) were compared to the quality of two reflective texts. One from the end of the first year on the impression of art works by David Hockney or Bill Viola, another of experiences from field sites used at the beginning of their studies. They wrote reflections on their experiences including observations and their personal and professional development during their teacher training. The texts were analysed by using the 4 R's of Doll's. Results of VARK tests assessing the learning style of the students from the beginning of their education were used. The choice of science courses can be shown to be correlated to different factors depending on the selection of these but there was no general pattern behind the choice of science. Training of observation in different contexts and reflections on these in relation to personal development seem to promote better professional understanding.*

### 1. Introduction

Observations are fundamental in empirical science, from the experimental researcher in the laboratory to the field inventor who has to select the important impressions to record among all possible ones on the field site. In order to be scientifically useful in a theoretical framework the observations have to include cognitive activities based on the perceived sensations transformed once more to written or spoken language.

### 2. To train to observe

The ability to observe in this broad sense often responds to the observer's curiosity and may thus promote interest for further scientific investigations. This capacity also matures the understanding personal and professional development [1]. In order to practice and visualize these processes from perception to increased understanding we here present a method based on Roland Barthes concepts *studium* and *punctum* used in pre-service teacher training.

### 3. Methods

The study is primarily based on different texts produced by about 60 students aiming at becoming primary school teachers (years 4–6) during the first two years of their education with focus on two reflective texts. One was from the end of the first year on the students' impression of an art work by David Hockney or Bill Viola. The students were primarily asked to select a painting of Hockney from his web site [2] or to look at *The Martyrs* of Viola [3] and write short reflections based on the selected art work. As instructions they had also got a short informative text on Roland Barthes concepts *studium* and *punctum* [4] based on Wikipedia [5]. The students were told to use these concepts in their texts. When the texts were assessed the concepts of Barthes were used (Table 1).

Punctum	1	Refers to a touching detail establishing a direct personal relationship.
Studium	4	Refers to personal experiences not shown in the related art work.
Studium	3	Refers to strong emotions related to the art work
Studium	2	Explains the personal choice of art work (recognition)
Studium	1	Description of the art work

Table 1. Rubric for the assessment of art work reflections.

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The other text we used was reflections by the students based on their experiences when they at the end of their second year returned to field sites used at the beginning of their studies. They were instructed to include not only reflections about observations but also their personal and professional development. The texts were analysed by using the 4 R's of Doll's, *recursion*, *relations*, *richness* and *rigor* [6]. For rubric used for this assessment see [7].

In addition the results of VARK (*Visual*, *Aural*, *Read/write* and *Kinaesthetic*) tests [8], from the beginning of the education, assessing the learning styles, were used in the analyses.

These factors reflecting different skills of the students were analysed in comparison with the results on all course marks (n=17) during these years. Here associations between these indicators of quality and the marks were analysed with clustering and ordination techniques using the R statistical program [9].

## 4. Results

Although we had many background factors in our analyses we could rarely show that the choice of science courses was positively correlated to any of these. For example, an analysis based on all factors but with the total marks in each subject (Swedish, English, Mathematics, etc.) showed after single term deletions a positive correlation between Recursion according to Doll [6], and the combined marks on the placement courses and the choice of science courses (Figure 1).

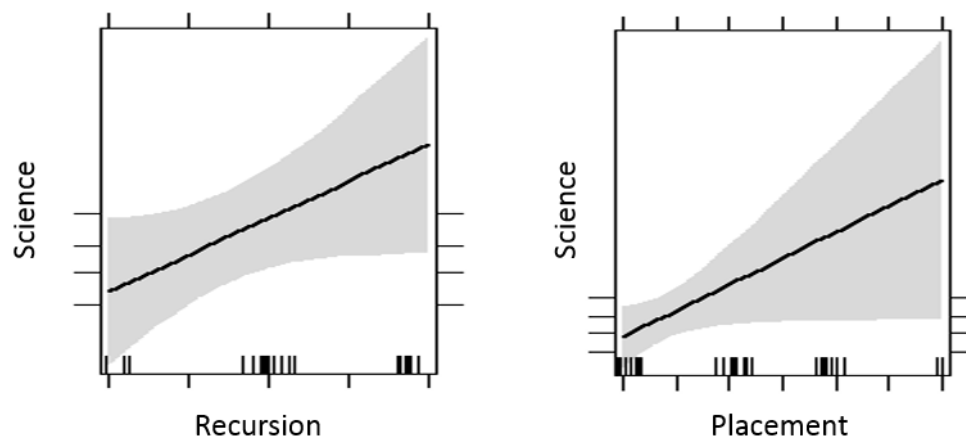


Figure 1. The relation between the choice of science courses and *Recursion* in the field reflections ( $p=0.0207816$  \*) and marks on placement courses ( $p=0.0053959$  \*\*).

As the methods of analysing reflections is new we here present the texts of two students and show how these were analysed.

### 4.1 Student 1

#### 4.1.1 Art work

The painting is of David Hockney's (the artist) mother sitting in an arm chair. The portrait is called "mum" and is painted 1990 [10]. You see an old woman with white curly hair and distinct blue eyes, as blue as the background. She has a faint indication of sad eyes and her hands which are deformed are clearly visible in the painting as she has the hands joined in front of her. She is sitting somewhat slumped (due to age) in a yellow blouse, green jacket with a skirt in the same colour and violet tights. The armchair she is sitting in is brown and you can't see if it has a back. The background appears powerfully in its blue colour. The aim is probably a homage of the painter to his mother but may also appear sad [*Stadium* 3].

I was caught by this painting as it strongly reminds me of my wife's grandmother. They could have been twins. The picture makes me both sad and happy, sad because she is no longer among us and happy for the memories of her which makes me warm inside. I also strongly reacted on her way of looking at me, I've got a feeling she is the observer looking directly into my soul. The painting is a strong portrait and affects me every time I see it [*Punctum* 1].

#### 4.1.2 Field studies

The observations I had from the first time was air temperature at the height of my head and ankles, the number of parked black cars and the number of persons carrying a rucksack. These values didn't really differ between the two observations except for the air temperature, as it was much warmer [...]. I



am not the same person today. Would I select the same observations if this was the first visit? Probably not [*Recursion 3*].

In my group we discussed which type of teaching was possible to do on the site and in which school subject. We had several suggestions and our own development since the first field study was obvious. [...] [*Relations 2*].

I presented to the group my ideas about how to use the site for teaching in different school subjects, e.g., the right of public access (civics), properties of lakes (biology, chemistry, physical geography) and their importance (human geography, civics, history) and our common responsibility for nature and our environment [*Richness 3, Rigor 1*]. [...]

## 4.2 Student 2

### 4.2.1 Art work

I selected David Hockney's painting "Nude" from 1975 because it was the first painting that made me feel something at the first glance [11].

The primary feeling that came over me when I saw the picture was something unpleasant. Simultaneously it gives me a feeling of resignation and fear. As someone has decided to give in. This also make me depressed, depressed because someone decided to give in and stopped fighting for or against whatever it could be that bothers. But that feeling also arises questions in me. Why has the person on the picture chosen to give in? What has happened? What adversities could it be? [*Punctum 1*]

It is hard to know how the artist planned how we should reason when we look at his work but I think he does some conscious choices in order to create these questions and feelings. One choice could be the choice of colours, because this is one of the reasons why I have a feeling of rawness in the picture. The same raw effect would probably not be achieved if the picture was painted in happy colours. But also Hockney's choice of posture may also be a conscious choice as this posture gives a strong feeling of grief [*Stadium 4*].

### 4.2.2 Field studies

Much have happened since we made the first field study. One of the most striking impressions when I return to the site is the many possibilities I now see compared to the first time [*Recursion 2*]. Earlier I may have had problems to see behind the site but today I can see different types of possibilities to include in teaching and then it becomes quite obvious that the training has widened my perspectives on education. My opinion about the profession of teachers and teaching in the beginning of my training and also about the first field study have changed. This became visible when I returned to the site. [...] I have become more daring today, especially in believing in my own ideas about teaching. In the beginning of my first year, especially during my first placement, it was hard for me to believe in my own thoughts and ideas about how to design teaching but as time went by and with more flesh on the bones about what teaching may be I venture to believe in my own competence [*Richness 2*].

Looking back at my previous reflections, especially during placement periods, it is possible to see a fairly clear development, where I successively got more and more conscious about the real meaning of this profession and the role of the teacher. I'm aware about what I need to use more time and focus but also which things and problems I have solved which also is important to be aware of to continue my development.[...]. But due to these recurrent reflections I know my strengths and what I need to further develop [*Recursion 3*]. [...]

## 5. Discussion

Here we can see how contextual observations may be. Open investigations of specific objects creates understanding on different levels. When comparing the texts of the students' it is clear that the instructions to use studium/punctum when describing the art works promoted deeper reflections. Also the instruction to relate the reflections on the field work to professional and personal development increased the quality, although the 4 R's as quality markers were unknown to the students. What became clear during the analyses was that there is no typical profile of a teacher student selecting science as a main subject.

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