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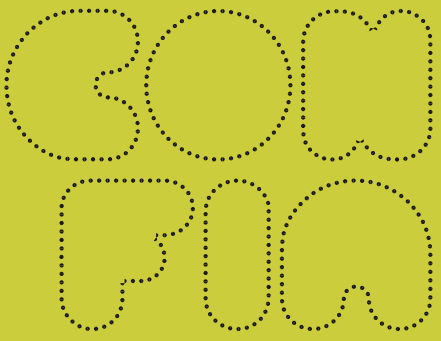

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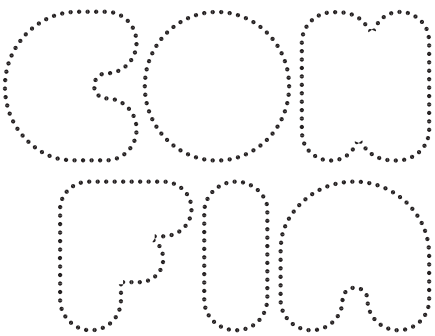

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Definition of the main categories of errors in “functional drawing”

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Abstract
Traditionally, teaching drawing has been mainly centered on an artistic (stylistic) approach. Drawing teachers base their work on methods similar to those used in the fine arts. Notions such as composition, style and expressiveness are primary in the transmission of knowledge to the class. Because of this approach, when learning drawing students sometimes find themselves not quite grasping what they are being taught. This can be doubly true when students have not been trained in the techniques and materials of drawing, or if the main goal of drawing in their education is to provide a tool for other types of artistic creations.

I have conducted research within the classroom for the past years in the context of research for my doctoral thesis, collecting and organizing drawings. These studies took place in an environment in which drawing is meant to serve as a functional tool or language for new media artists and technicians. Most students have little or no previous knowledge of drawing, and often experience severe difficulties when confronted with even the simplest of tasks.

A questionnaire was used to provide information, such as correlations between age and drawing skills, and common mistakes in the representation of simple objects. This data lies at the basis of the attempt to catalogue and analyze main categories of errors in these students’ drawings; and to provide new educational tools for the drawing teacher.

Keywords
Drawing, Drawing errors, inexperienced students, functional drawing, perspective

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1 . Definition of drawing in this context

Recently, authors such as Betty Edwards [1] or John Willats [2] have advocated a new approach to teaching drawing. This approach relies mainly on the creation of a bridge between the evaluation of artistic abilities and of scientific/objective knowledge. The notion of "artistic genius" is rejected in favor of a more encompassing perceptual and observational experience. An intercrossing between the arts and the perceptual sciences encourages a student not only to blindly copy a motif, but also to understand the perceptual mechanisms that underlie his observation and representation of it.

In this context, one must proceed to define drawing in a more specific, and perhaps less "artistic" way. If one extends the definition of a "good" drawing from that of a drawing with aesthetic qualities to a drawing with "functional" value, one can dissect the characteristics of this drawing in a much clearer way. For the purpose of this paper, drawing is characterized as a graphic language, whose message needs to be clearly transmitted from its creator to the person who interprets it. The advantage of drawing when compared to spoken or written languages is that the observer usually does not have to learn an alphabet or grammar, as his/her understanding of a drawing is immediate and usually unequivocal (if the drawing is executed correctly). This allows drawings to convey complex ideas and representations that become accessible to a wide audience, regardless of their linguistic or cultural background. The stricter definition of this type of drawing should include the following parameters [3]:

Drawing seen not as an artistic activity, but as a means to convey, reflect upon, or create the necessary foundation for other activities, be they of artistic nature or not;
Drawing that transcends personal artistic expression, executed in a way in which personal mannerisms and traits are largely absent (the opposite approach an artist would take);

Drawing as a tool used to represent a shape or scene in a correct and rigorous way, keeping a strong similarity between the observed object or scene and its representation;

Drawing as a language, in which the amount of information present in a drawing should be adequate to the function it fulfills;
Drawing that is easily recognized and interpreted, meaning that the mode of representation is clear utilizing the marks best suited in drawing;

Finally, and in order to simplify the scope of this analysis:
Line drawing with no color, or shading.
These definitions permit to narrow the study margin, and the identification of some basic characteristics a drawing should possess in order to be considered a functional tool. This becomes a quantitative analysis, rather than a qualitative one.

2 . Study group

The study that was conducted took place in an environment where most students have little or no previous knowledge of drawing, and in the beginning of their degree experience severe difficulties when confronted with even the simplest of tasks. They are first year students of the undergraduate course in Sound and Image, at the Portuguese Catholic University. For them, the discipline of drawing is meant to serve as a provider of a functional language or tool, not for fine artists, but for new media artists and technicians. The Sound and Image course does not have the same entry requirements as a typical fine arts course, as its focus is divided between an artistic and technological approach. This implies that many students applying may never have drawn, or possess little knowledge of drawing techniques.

Altogether, 43 students participated in this study (of a larger group of 65), all of them enrolled in the first year.

3 . Methodology

The methodology used to determine the main types of errors that both inexperienced and more experienced students made, took the form of a questionnaire [4], designed specifically to determine diverse aspects of background information and drawing skills. These errors were not yet organized into categories, but there were some suspicions of which they could be, that the questionnaires were meant to clarify (as many errors confirmed through the use of the questionnaire had been observed in class over the years). This questionnaire had been used a similar format in previous years (usually at the beginning of the first year) to determine the general skill level of the students, and as such it was modified several times over the years. For the purpose of this study, some

new questions and exercises were added, based on previous answers to older questionnaires.

The final questionnaire consisted of two main parts, a written and a drawn one. In the written part, students answered several questions about their level of familiarity with drawing, their educational background, the frequency with which they draw, amongst others.

The drawn part consisted of three types of drawing exercises: from memory, in which students were asked to draw a seated person from a lateral, frontal and top view; copy from photographs, in which the students were asked to draw two slightly different views of a box and one view of a cylinder; and a copy drawing from a complex photograph of a human face, and of a cartoon character.

These questionnaires were handed out on the first day of class of the first year, before students had attended any drawing classes, and again on the last day of the second semester, at the end of the year, after they had attended drawing classes for two semesters. They were to be filled out in pencil, as the drawings were meant to be line drawings only, with as little shading as possible.

F.1 Overview of the questionnaire handed out to the students

It was thought that these different types of questions covered the main problems that students seemed to exhibit during drawing classes, as they ranged from drawing from memory to observational drawing, and drawing both simple and more complex objects.

4. Results

As a result of these questionnaires, (86 in total, 43 in each semester), it was possible to collate a significant number of errors that

repeated themselves in each type of question. [5] The written part of the questionnaire allowed to ascertain that the study group was composed on average of slightly older students than usually apply to the first year of university, that only a quarter of them came from an artistic study area in secondary school, that most (even those coming from artistic areas) of them didn't draw outside of classes, and that most of them didn't understand or apply the rules of perspective [6].

The first part of the drawn part of the questionnaire asked

F.2 A typical response to one of the questions – student drawing from memory a seated person in a lateral, frontal and top view

students to drawn a seated figure from memory from a lateral, front and top view, and in Fig. 2 one can observe a typical answer to this question. [7] It was found that in the lateral view, students mainly opted to represent the seated figure in a profile view, with little or no depth indications (sometimes one leg of the chair the figure was seated on was drawn as being slightly smaller than the one in the foreground). In the frontal view, many drawings showed a wholly frontal position, which led to increased difficulties in the representation of the legs, which should indicate some depth. In Fig. 2, the student opted for a less characteristic solution, twisting both the legs and the chair sideways, in order to solve the perspective problem. The top view also yielded interesting results, as comparatively to the drawing space used in the other views, the students mostly opted for a smaller, more distant looking drawing. This may refer to environmental stereotypes [8], in which a

F3. Example of student drawing (copy from photograph) of two boxes and a cylinder

person observed from above usually is at a greater distance from its observer than a person observed from a side or frontal view.

The second part asked them to copy two boxes in slightly different perspectives from a photograph, and also a cylinder. [9] This question aimed to determine whether students were able to detect and represent subtle differences in perspective. It was found that the first drawing of the box was the one executed more correctly by most students. In the case of the second box, shown in a more unusual angle, a lot mot errors in proportion a perspective were detected. The drawings of the cylinder revealed that many students failed to understand its position, and in many cases drew inverted perspectives of it.

The final part of the questionnaire consisted of a copy of a human face from a photograph, and a copy of a cartoon drawing done only in black and white contour. [10] The drawings of the human face presented more technical challenges, as the copy was made from a heavily shaded photograph, and the face had many wrinkles. The example in Fig. 4 shows a typical example of the errors many students made, in which several elements of the face are left incomplete, as there is neither enough knowledge of human anatomy to complete the parts that are in the shaded areas, nor the drawing skills to represent them. Also, a common drawing error, a discontinuous line is used throughout the drawing. [11] The drawing copying the cartoon had even more disastrous results [12], as the copy of a drawing presupposes even more knowledge of drawing techniques than a drawing made from life or from a photograph.

F.4 Examples of student drawings (copy) of a human face and a cartoon character

5 . Types of errors

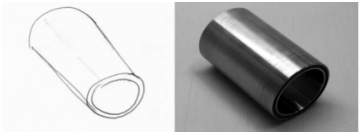
Based on the results obtained from the questionnaires it became clear that drawing errors stemmed from two larger categories of factors: Internal factors, which relate to the understanding and representation of the object, or from the knowledge of the principles and rules of drawing and from External factors, relating to lack of familiarity with drawing materials and the correct way to use them. [13] These factors also relate to what were termed Representational Skills and Drawing Skills. The first relate to the internal thought processes that have to take place during drawing, such as the ability to compare the drawing to the drawn object, or the ability to observe an object with its formal characteristics and proportions in mind. The second relate to the manual skills needed to execute a drawing, both in handling drawing materials and the gestures needed to draw. [14] These observations led to the division of drawing errors into two sizable categories: Internal Representation Errors and Manual or Material Errors.

Internal Representation Errors stem from the incomprehension of the observed object, of the viewpoint from which it is being observed, and of the perspective rules needed to draw it, and they can only be corrected through intensive drawing practice, and by learning and understanding the accepted rules of drawing, such as perspective.[15] Manual or Material Errors stem mainly from a lack of familiarity with drawing materials, and can occur in students with more experience if they are confronted with a drawing material they haven't used before.[16] These errors are usually easier to correct than internal representation errors.

5.1 . Internal representation errors

Internal representation errors can be further subdivided into the following categories: Point of View or Rotation errors, Incomprehension errors, Stereotypes and Relative Placement errors.
Point of View or Rotation errors [17] can be characterized as errors in which one or more of the faces of an object are drawn with an excessive rotation towards the observer. This has the effect of making some of the objects features more visible than they actually are from the observer's viewpoint. This type of error is often more visible when the objects in the drawing are more geometric, but they can occur with any type of object. Also, this category of

F.5 Example of a student drawing presenting an Inverted Perspective error

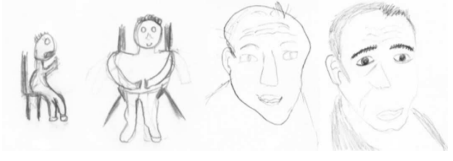


error includes the errors identified as Inverted Perspective errors and Limited Perspective. These include all situations in which an object is represented in a way in which its more distant elements appear to be larger that those closer to the observer.

F.6 Incomprehension of the human face (student drawing)

In the questionnaire, the angles of the geometric objects to be copied from photographs were measured, and compared to those represented in the drawings of the students. In the rectangular objects, most rotation errors occurred in the top part of the object, with an accentuated tendency to show a larger visibility than was there. It was found that from the first to the second questionnaire these errors tended to improve, as students attended drawing classes during a whole year. [18] Incomprehension errors [19] usually relate to more complex objects, such as the human face present in the questionnaire. In the case of these errors, a complex object is usually completed in an "imaginary" way, as those drawing it possess neither the drawing experience, nor sufficient knowledge of the object in order to drawn it correctly.

F.7 Examples of stereotypes present in the questionnaires (student drawings)



Stereotypes [20] consist of modes of representation often acquired during childhood, which persist in adulthood if drawing is not a regularly practiced activity. They often manifest in drawings unconsciously, and are especially persistent when drawing familiar objects. Usually, when drawing stereotypes, most shapes are drawn as separate elements, rather than elements part of a whole (for example, a face will consist of eyes, nose, mouth, eyebrows, etc. placed as individual objects rather than parts of the whole).

Relative Placement errors [21] happen when the transference of the observed object or scene to the sheet of paper causes problems. They are especially visible when drawing a more complex scene, in which multiple objects have to be represented. Somewhat similarly to what happens with stereotypes, a complex scene is perceived as a group of distinct objects, rather than objects with concrete scale and placement relations between them.

5.2 Manual or Material errors

Manual or Material errors consist of Intermittent Line errors, Scale errors and Placement errors.

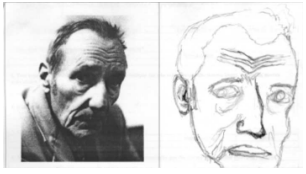
Intermittent Line errors [22] stem from a lack of knowledge of how the drawing implement (pen, pencil, brush etc.) is to be used in the context of drawing. These types of errors may have their origin in the difference between writing and drawing. Whereas in drawing it is beneficial to create a more continuous line, in writing the pen or pencil usually is used in a much different way, constantly lifting and pausing as each letter is created.

F.8 Drawings by the same student in the first and second questionnaires – the use of Intermittent line is somewhat less obvious in the latter example

Scale errors [23] occur when, due to lack of experience, the limits of the sheet of paper are not understood or used correctly to represent a certain object or scene. The drawing is seen as being almost independent from the paper, and can be of inappropriate scale - too large or too small. This error is very well represented when larger objects are to be drawn, and inexperienced students struggle with scale issues.

Placement errors [24] are an extension of Scale errors, as

drawings will be placed at a random location on the sheet of paper. Even during copy works, these errors tend to appear, although they are graver in life drawing.



F.9 Example of a simultaneous Scale and Placement error in a drawing made by a student

6 . Conclusion

Although in this study drawing is classified as a tool, rather than an artistic form of expression, one believes that a more quantitative approach in the analysis of this discipline may benefit both those trying to teach and those trying to learn this vital instrument of creation. The knowledge and classification of these errors can be an extremely valuable resource for the teacher in any classroom, as they allow for a targeted approach to the problems inexperienced students face when learning how to draw. It is believed that for a far too long time more technical questions in the learning of drawing have been ignored, in favor of an artistic and expressive approach. One can argue that both approaches are equally valid, and, if anything, should be used in a complementary way.

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Stop motion: from plastic to plasmatic cinema

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Abstract

When talking about Animation as a graphic or a plastic cinema it is underlying a certain idea of what the medium is and how it is different from live-action films. On the one hand it is about creating the movement and on the other hand it deals with an infinite kind of techniques related to fine arts and graphic arts to produce the images needed, in a word: the forms. Among these techniques, the Stop motion as a privileged medium based on frame-by-frame shows that reality and its matter can be animated too and not only the abstract space of the representation being it a drawing or a 3D modeling. With Stop motion, even if the technique can be "reduced" to animating puppets and a set or clay for example, we will argue that its specificity lies more specifically in the possibility of changing the propriety of a matter and its limit of elasticity to the point of breaking the consistency of things, transmuting the substance into another. In this state of thing, the link between creating form and creating movement can't even be drawn anymore because the form and movement are one same consequence of the substance behavior the artist is giving to matter, whereas in traditional animation you create a form more or less stable and you make it move. This art, now interrogating the global notion of arts of movement, cease to be a graphic or plastic cinema and becomes what we would call a plasmatic cinema. The form never really gets a permanent consistency and integrity to be able to be seen as a moving object or subject but as pure protoplasm constantly transforming and redefining a matter. Indeed, the natural limit of elasticity of matter can be modified with Stop motion to the point anything can become subject to plasticity – not

Keywords

Animation; Plastic/ Graphic cinema; Plasmatic; Protoplasm; Movement forms; Elasticity; Consistency; Virtuality; Transmuting; Substance.

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