Designing by sketching and writing: case study of preservice teachers preparing a competitive recruitment exam

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Résumé

Preservice teachers in applied Arts use to design educational engineering during a five-hour competitive recruitment exam called "applied disciplinary test". They have to analyse some pictures and texts in order to develop an adapted educational engineering for high school students. This creative activity focus on prior design skills that both teachers and designers have to manage such as analysing, conceptualising, synthesising, sketching, creative thinking, reporting and communicating. In other words, preservice teachers in applied Arts have to know and to understand designing and the essential steps to achieve a design process they replicate in a pedagogical engineering. They must answer the test prescription with acuity and efficiency, using traditional tools for writing and sketching (pens, pencils, coloured markers, A4 or A3 layout sheets, etc.). They cannot access to digital tools or web documentation. They are sitting alone in front of a table with their traditional drawing material. Moreover, they move while they keep sitting, they cope with sheets and tools, and they make some accurate or disarrayed gestures. Nevertheless, the prescription leads them to a kind of diagrams or operative texts and images. Observation and analysis of the design activity of some candidates during a test may provide insight into the use of tools and papers in diagram design. Does an observation of the movements of sheets, tracing instruments and hands inform us about certain aspects of the design activity and, if so, about what do they inform us?
In order to answer this question, we set up an experimental design that allow us to detect and track different elements of each preservice teachers during the exam taking care not them disturb them. All participants were sited in a quiet placed of the " Plateau Experimental Jacques Giniestié " in Marseille, Fr and filmed with cameras located on the ceiling, at distance of 200cm.

Data treatment was made in Python with the OpenCV's functions while analysis was made in R with RStudio.

From the raw recordings, we first get the coordinates of the corners of their table and then

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we applied a perspective transformation algorithm in order to wrap and crop the images. From the new video file, we exported one image each minute on the entire recording. Objects and body part were tracked with contraste detection while the crowding was measured by space taken by their sheets.

Concerning the crowding we measured, we observed various patterns across participants: however, we clearly saw that different phases were present, alternating from low crowding (when the sheets are packed) to high crowding (when they were spread out over the table). We linked low crowding phase to subject reading and draft construction and high crowding to re-organisation and answers redaction.
Next steps consist of carrying analysis with hand / body as well as objects tracking (like pens, markers, or pencils) in order to see if there are correlations between the space taken by the body / hand and the sheet crowding? The aim is to understand a forgotten part of creative design process.

Mots-Clés: design activity, desk crowding, exam, video, base analysis