The PAT annotation model for Multimodal Instructions

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We present the development, implementation and application of the PAT annotation model, which describes instructional documents that consist of pictures and text (PAT). In document design research (Schriver, 1997) the combination of pictures and text has been noted but not so much investigated in terms of function and content. Although useful starting points have been provided (Bateman, 2014), we are unaware of a standard methodology to describe and evaluate picture-text relations. This leaves document designers without specific guidelines, while readers and users may experience difficulties in effectively processing multimodal content due to mismatches with their expectations and cognitive capacities.

Development
As the possibilities to describe multimodal documents are infinite, we advocate conducting corpus studies and reader/user studies in tandem to determine the relevance of annotation categories and their values. Based on preliminary analyses of a corpus with first-aid instructions (currently 297), we conducted multiple reader and user studies to investigate the effectiveness of particular design features. With the results of these studies we developed and fine-tuned the specification of 51 types of functional and content relations between textual elements and between text and pictures.

Implementation
Our corpus annotation is supported by the PAT Workbench, a custom-made online tool that provides a flexible environment to systematically investigate multimodal designs by facilitating storage, annotation, retrieval and evaluation of documents (See, Figures 1, 2 and 3 and https://cosmo.service.rug.nl/patworkbench/login/). The workbench includes 'smart' OCR for uploaded documents, user-defined specification of annotation categories, and a tool for creating gold standard annotations based on multiple annotations.

Application
As a worked example, we will present the results of a comparative study that involved the application of the PAT annotation model to a subcorpus of 46 first-aid instructions from two editions of Het Oranje Kruis Boekje 2011 and 2016. Het Oranje Kruis is a Dutch organisation that provides learning materials for first-aid certification trainings. A comparison of multimodal instructions (117 pictures and 9416 words in total) for 23 tasks in both editions of Het Oranje Kruis Boekje allows us to conclude that the two editions are similar in terms of the visualised actions, but differ in terms of: text content (preambles, alternative actions, control information); the type of shot used in the pictures (close-up/medium shot versus long shot); and text-picture relations in terms of layout (alignment versus proximity).

Future work
The PAT project (http://www.rug.nl/let/pat) will deliver theoretical results in terms of empirically validated models for effective multimodal presentations and authoring guidelines for multimodal documents. Future work will include more comprehensive textual analysis and finer-grained analysis of the pictorial materials, coverage of a greater number and a wider variety of instructions, (semi-)automatic annotation, more empirical evaluation, and (semi-)automatic generation of potentially effective text-picture combinations for multimodal instructions.

Bibliography

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Schriver, K. (1997). Dynamics in document design: Creating text for readers. Wiley, New York.

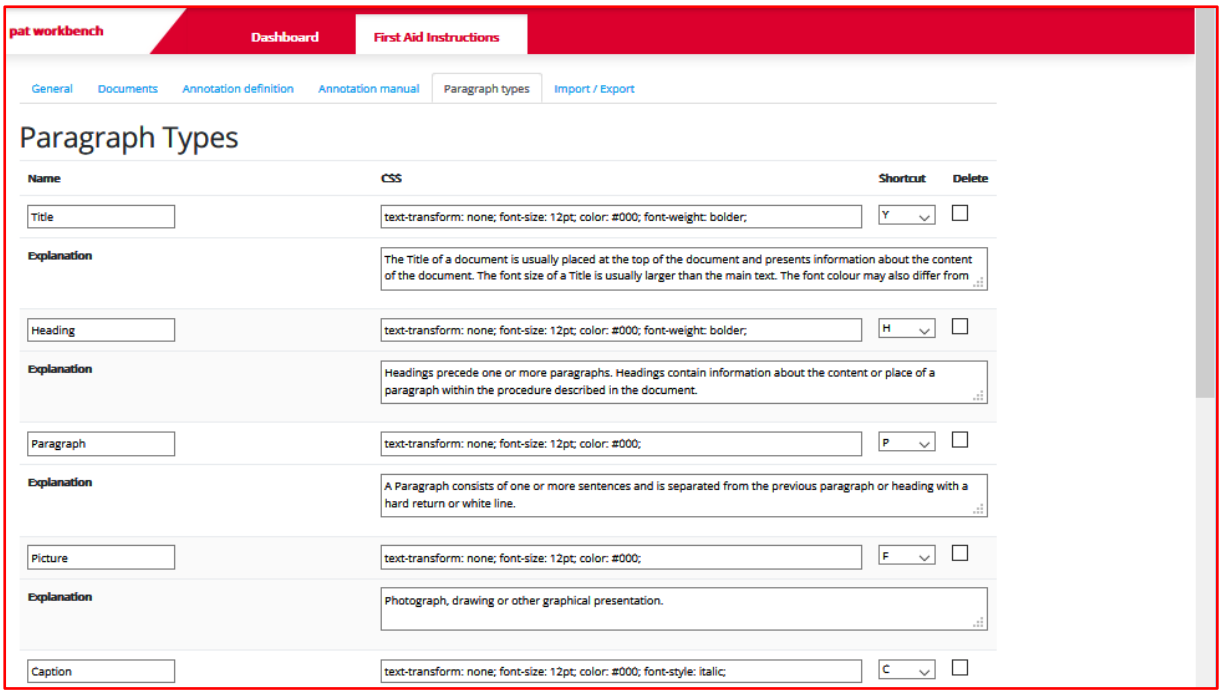

Figure 1: Screenshot of description of Paragraph Types in the PAT workbench.

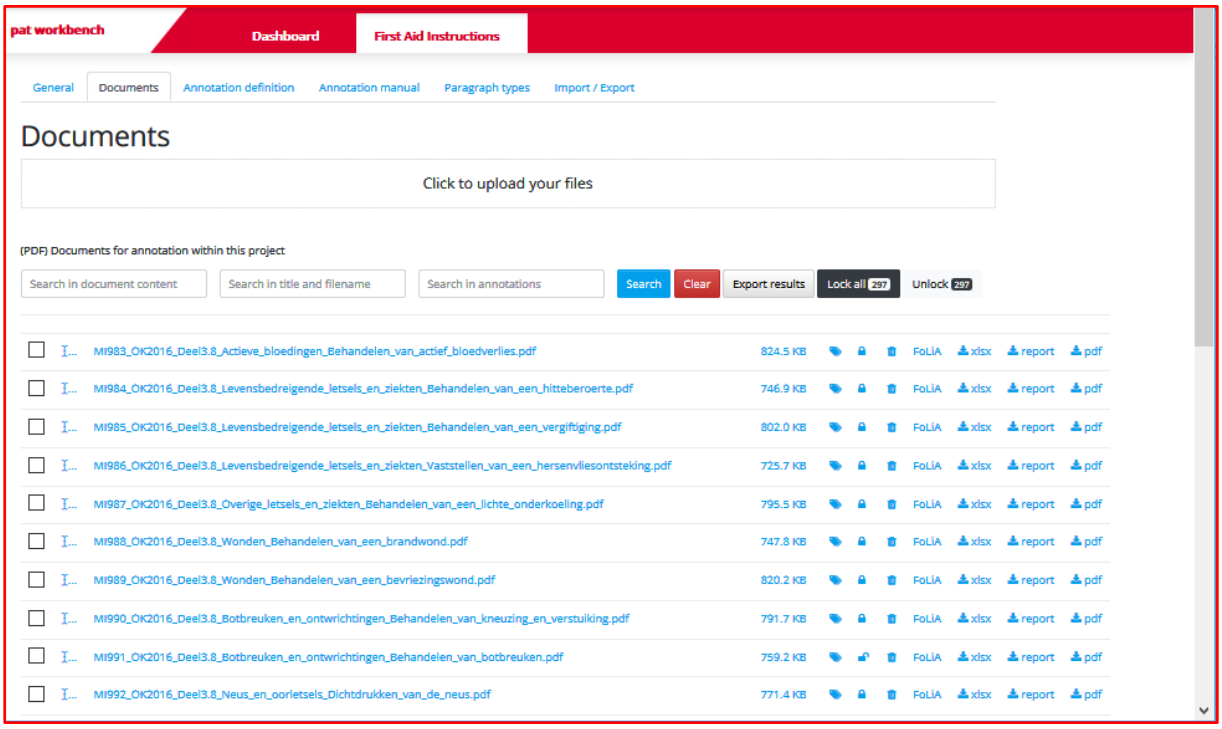

Figure 2: Screenshot of corpus documents in the PAT workbench.

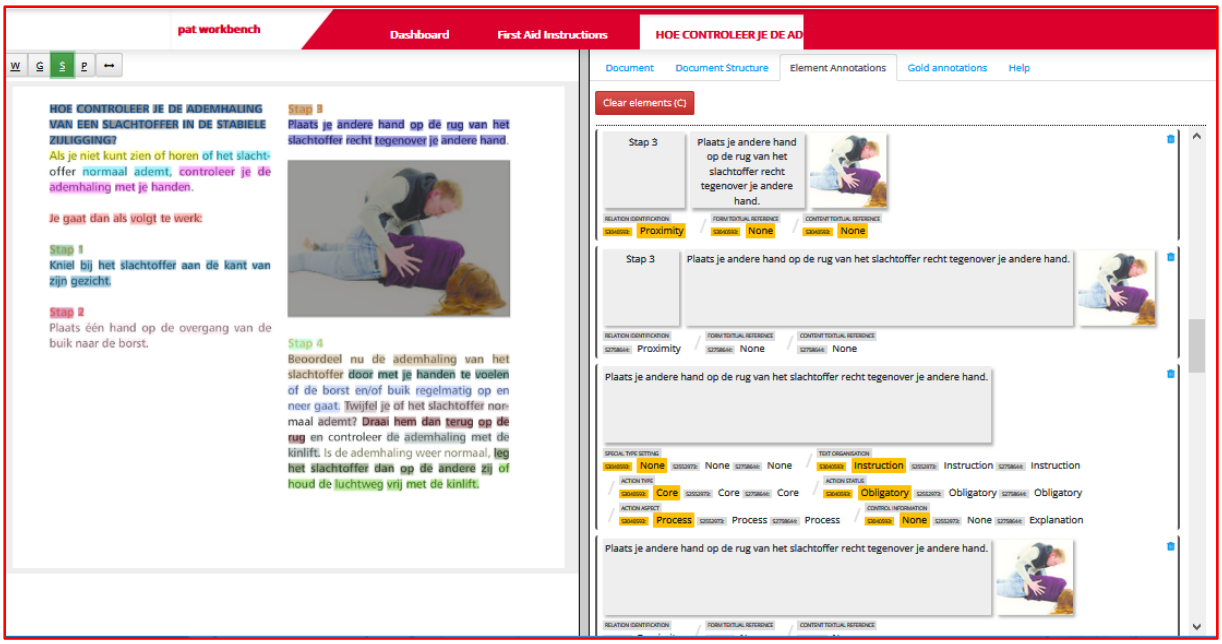

Figure 3:Screenshot of document annotation in the PAT workbench.