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Dynamic Design Documents for supporting applied visualization

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Applied Visualization requires close collaboration between visualization researcher and domain expert — especially so where new techniques are introduced that disrupt existing workflow. For fostering such close collaboration, we developed dynamic design documents (DDDs): highly interactive, data rich web-based reports detailing our re-designs, where analysts can explore, learn, test and evaluate design configurations for themselves — in their own time and within an analysis context that is real and familiar. DDDs published at: https://rooch84.github.io/spc/

Fostering critique of existing process
Our DDDs encouraged the small team of crime analysts with which we collaborated to problematise existing design and workflow.

Statistical Process Control chart monitoring (SPC) is an established technique used by crime analysts. Analysts were first presented with a single SPC chart and encouraged to identify signals and processes that might be inferred. As a consequence, analysts reflected on the uncertainty and variability associated with SPC signatures (signals and processes). They also began to identify follow-up questions — most often whether observed patterns are consistent across crime type and location.

Introducing new layouts and visual grammar
By exploring our re-designs independently using DDDs, crime analysts learned the new data mappings, formed a view on them and developed a sensitivity to the trade-offs involved in designing for greater data density.

Design process as ordered narrative
Our DDDs present design iterations that follow a very deliberate order: starting with highly abstract views displaying only the most important information, we gradually introduce detail and eventually discuss data-rich, visually complex, graphic composites. Ordering documents in this way draws attention to design trade-offs and persuades analysts to engage with different design candidates.

Testing designs within their intended context of use
As is typically the case in applied visualization, we develop a set of re-designs that are data dense through careful manipulation and combination of visual variables. Through our DDDs analysts were able to inspect these layered graphics for themselves — from their own machines, in their own time.

Effect on applied visualization
Our DDDs help collectively identify a rationale for re-design, introduce analysts to the various trade-offs associated with re-design, in their words “demonstrating the thinking process” (Operational Analyst), and help persuade them of a new visual grammar that might initially “tend to overwhelm” (Strategic Analyst). By physically distancing visualization researcher and domain expert, they engender a level of critical engagement qualitatively distinct from earlier studies in which we have engaged. Reflecting on our recent experience, we speculate that DDDs might help partially overcome more intractable problems to evaluation in applied visualization: most obviously that of social-desirability bias, where collaborators give responses to key questions that they think we would want to hear.