Critical Reflections of Visualization Authoring Systems
Arvind Satyanarayan, Bongshin Lee, Donghao Ren, Jeffrey Heer, John Stasko, John R Thompson, Matthew Brehmer, and Zhicheng Liu
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Two Contributions
1. Evaluation of 3 Visualization Authoring Systems
2. Critical Reflections methodology in general

Critical Reflections: A Novel Evaluation Approach for Vis Tools
Evaluation Method
Can evaluate expressiveness?
✓
Can evaluate learnability?
✓
Can compare tool to alternatives?
✘
When can it be applied?
During development

Critical Reflections: A Novel Evaluation Approach for Vis Tools
Evaluation Method
Can evaluate expressiveness?
✘
Can evaluate learnability?
✓
Can compare tool to alternatives?
✓
When can it be applied?
Immediately after release

Critical Reflections: A Novel Evaluation Approach for Vis Tools
Evaluation Method
Can evaluate expressiveness?
✗
Can evaluate learnability?
✗
Can compare tool to alternatives?
✘
When can it be applied?
During development

Critical Reflections methodology in general
- Authors of different tools discuss their work and reflect on their design choices
- Weekly 1-2-hour video conference for 3 months
- Focus on differences in handling marks, data binding, scales, axes, legends and layout

General Idea:
- Authors of different tools discuss their work and reflect on their design choices
- Focus on differences in handling marks, data binding, scales, axes, legends and layout

Visualization Authoring Systems in this Paper
- Lyra: University of Washington, 2014
- Data Illustrator: Adobe Systems/Google Tech, 2018
- Charticulator: Microsoft Research, 2018

Visualization Authoring Systems
Expressivity
Programming
Authoring
Drawing
Learnability
Programming
Authoring
Drawing

Marks
- lyra
- Illustrator
- Charticulator
- outlet: Freely definable marks; G6L: Freely definable marks; Charticulator: Freely definable marks
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Data Binding
- lyra
- Data Illustrator
- Charticulator
- outlet: Freely definable marks; G6L: Freely definable marks; Charticulator: Freely definable marks
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Data Binding

**What?**
1+ data points per glyph; attributes map to visual channels

**How?**
- One glyph for all data, then grouping by attribute; binding via "drop zones"
- One glyph for each point, then grouping by attribute; binding via "drop zones" or menus

**Pros/Cons**
+ Drop zones are very direct
+ Filtering of categorical and quantitative data
- Grouping feature unintuitive
- Long drags/small drop zones

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Scales, Axes and Legends

**What?**
Full customization based on one or more attributes

**How?**
- Scales/axes/legends generated manually or from data bindings and can be freely edited
- Scales/axes/legends generated from data bindings; scales can be reused or merged

**Pros/Cons**
+ Maximum design freedom
+ Simple UI
- Complex, indirect UI and overwhelming set of choices
+ Some flexibility for experts
- Introduces hidden scale dependencies
+ Simplest UI
- Lowest design freedom

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Shared Assumptions of all Tools

- Familiarity with similar design tools (e.g. Adobe Illustrator)
- Concrete, mature design ideas in users' minds
- None of the tools support non-linear design iteration
- Cleaned, pre-processed data set
- Lyra supports some data wrangling, but limited and not easy to learn

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Opinion on the Paper

- Promising new evaluation approach
- Analysis refers to related work on HCI and cognition
- Interesting selection of highly related high-profile tools
- Gathering so many industry people is an achievement in itself
- Non-empirical evaluation
- Actual impact on usability/learnability unclear
- Does not consider time-line of development
- Missed chance to discuss design inspirations and motivations

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Questions?

Lyra: University of Washington, 2014
Data Illustrator: Adobe Systems/Georgia Tech, 2018
Charticulator: Microsoft Research, 2018