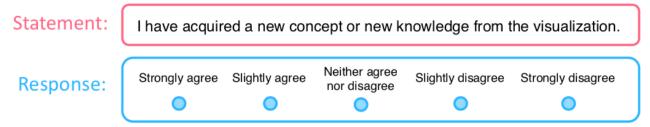## Content Validity: Affective Engagement

An important phase in the development of any instrument is that of content validation. By offering your expertise, you are contributing to the development of an instrument that is content valid. Your assistance in this phase of instrument development is sincerely appreciated. Thanks in advance for your time and help.

Affective Engagement (AE) in this study refers to *a construct dealing with a user's emotional and mental involvement, attraction, fascination, and captivation when he or she interacts with an information visualization*.

We have identified 11 indicators of affective engagement, as can be seen in the table below:

Indicators	Description
Fluidity	The flow of use is continuous, smooth, not disrupted
Enthusiasm	The user is interested, eager, proactively involved, and motivated
Curiosity	The user is inquisitive or investigative
Discovery	The user discovers something new or noticeable
Clarity	The visualization express a clear concept or message; the data is clear or easily interpreted
Storytelling	The visualization tells a compelling story or has a persuasive narrative style
Creativity	The visualization helps users generate or express creative and innovative thoughts or ideas
Entertaining	The user feels the visualization is fun, interesting, or charming
Untroubled	The user feels content and doesn't feel upset or frustrated
Captivation	The user is concentrating, absorbed
Pleasing	The user is impressed by the visualization (e.g., visually, concept-wise)

Below is an example of a question that will be in the final instrument. Respondents will have to select their level of agreement with the statement.

Statement: I have acquired a new concept or new knowledge from the visualization.

Response:

Strongly agree   Slightly agree   Neither agree nor disagree   Slightly disagree   Strongly disagree

○   ○   ○   ○   ○

In the following pages, we have prepared 11 statements, each of which is being considered for inclusion in a new instrument for measuring affective engagement in information visualization.

You will be providing three ratings for each item. The rating tasks are listed below:

- **Clarity:** How clear is this statement (e.g., conciseness, readability, understandability)?
- **Relevance:** How relevant is this statement to the indicator?
- **Comments:** If you selected "unclear" or "irrelevant" in the above questions, elaborate to help us understand why you think so, and what improvements could be made. If you selected "relevant" or "clear", please elaborate on what specifically makes the statement good. Other suggestions are also welcome (e.g., suggest changes in wording or suggest that the item be eliminated).

Demographic information

Your current professional title:

[   ]

Your research area(s):

[   ]

Years of experience in visualization:

[   ]

1. Fluidity

Indicator: Fluidity - The flow of use is continuous, smooth, not disrupted

Statement: My use of this visualization is continuous and smooth.

Clarity: How clear is this statement (e.g., conciseness, readability, understandability)?

Completely Unclear	Somewhat Unclear	Very Clear
○	○	○

Relevance: How relevant is this statement to the indicator "**Fluidity**"?

Completely Irrelevant	Somewhat Relevant	Highly Relevant
○	○	○

Comments

If you selected "unclear" or "irrelevant" in the above questions, please elaborate to help us understand why you think so, and what improvements could be made. If you selected "relevant" or "clear", please elaborate on what specifically makes the statement good. Other suggestions are also welcome (e.g., suggest changes in wording or suggest that the item be eliminated).

2. Enthusiasm

Indicator: Enthusiasm - The user is interested, eager, proactively involved, and motivated

Statement: "I am enthusiastic when using this visualization."

Clarity: How clear is this statement (e.g., conciseness, readability, understandability)?

Completely Unclear	Somewhat Unclear	Very Clear
○	○	○

Relevance: How relevant is this statement to the indicator "**Enthusiasm**"?

Completely Irrelevant	Somewhat Relevant	Highly Relevant
○	○	○

Comments

If you selected "unclear" or "irrelevant" in the above questions, please elaborate to help us understand why you think so, and what improvements could be made. If you selected "relevant" or "clear", please elaborate on what specifically makes the statement good. Other suggestions are also welcome (e.g., suggest changes in wording or suggest that the item be eliminated).

3. Curiosity

Indicator: Curiosity - The user is inquisitive or investigative

Statement: "I enjoy exploring this visualization."

Clarity: How clear is this statement (e.g., conciseness, readability, understandability)?

Completely Unclear	Somewhat Unclear	Very Clear
◯	◯	◯

Relevance: How relevant is this statement to the indicator "**Curiosity**"?

Completely Irrelevant	Somewhat Relevant	Highly Relevant
◯	◯	◯

Comments

If you selected "unclear" or "irrelevant" in the above questions, please elaborate to help us understand why you think so, and what improvements could be made. If you selected "relevant" or "clear", please elaborate on what specifically makes the statement good. Other suggestions are also welcome (e.g., suggest changes in wording or suggest that the item be eliminated).

[   ]

4. Discovery

Indicator: Discovery - The user discovers something new or noticeable

Statement: "The knowledge I gained is a sufficient reward of using this visualization"

Clarity: How clear is this statement (e.g., conciseness, readability, understandability)?

Completely Unclear	Somewhat Unclear	Very Clear
○	○	○

Relevance: How relevant is this statement to the indicator "**Discovery**"?

Completely Irrelevant	Somewhat Relevant	Highly Relevant
○	○	○

Comments

If you selected "unclear" or "irrelevant" in the above questions, please elaborate to help us understand why you think so, and what improvements could be made. If you selected "relevant" or "clear", please elaborate on what specifically makes the statement good. Other suggestions are also welcome (e.g., suggest changes in wording or suggest that the item be eliminated).

[   ]

5. Expressiveness

Indicator: Clarity - The visualization express a clear concept or message; the story is clear or can be easily interpreted

Statement: "I think the visualization clearly delivers a point of view."

Clarity: How clear is this statement (e.g., conciseness, readability, understandability)?

Completely Unclear   Somewhat Unclear   Very Clear
○   ○   ○

Relevance: How relevant is this statement to the indicator "Clarity"?

Completely Irrelevant   Somewhat Relevant   Highly Relevant
○   ○   ○

Comments
If you selected "unclear" or "irrelevant" in the above questions, please elaborate to help us understand why you think so, and what improvements could be made. If you selected "relevant" or "clear", please elaborate on what specifically makes the statement good. Other suggestions are also welcome (e.g., suggest changes in wording or suggest that the item be eliminated).

6. Storytelling

Indicator: Storytelling - The visualization tells a compelling story or has a persuasive narrative style

Statement: "I think this visualization is easy to comprehend"

Clarity: How clear is this statement (e.g., conciseness, readability, understandability)?

Completely Unclear	Somewhat Unclear	Very Clear
○	○	○

Relevance: How relevant is this statement to the indicator "**Storytelling**"?

Completely Irrelevant	Somewhat Relevant	Highly Relevant
○	○	○

Comments

If you selected "unclear" or "irrelevant" in the above questions, please elaborate to help us understand why you think so, and what improvements could be made. If you selected "relevant" or "clear", please elaborate on what specifically makes the statement good. Other suggestions are also welcome (e.g., suggest changes in wording or suggest that the item be eliminated).

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7. Creativity

Indicator: Creativity - The visualization helps users generate or express creative and innovative thoughts or ideas

Statement: "I think this visualization sparks my imagination."

Clarity: How clear is this statement (e.g., conciseness, readability, understandability)?

Completely Unclear	Somewhat Unclear	Very Clear
○	○	○

Relevance: How relevant is this statement to the indicator "**Creativity**"?

Completely Irrelevant	Somewhat Relevant	Highly Relevant
○	○	○

Comments

If you selected "unclear" or "irrelevant" in the above questions, please elaborate to help us understand why you think so, and what improvements could be made. If you selected "relevant" or "clear", please elaborate on what specifically makes the statement good. Other suggestions are also welcome (e.g., suggest changes in wording or suggest that the item be eliminated).

8. Entertaining

Indicator: Entertaining - The user feels the visualization is fun, interesting, or charming

Statement: "Using this visualization is enjoyable."

Clarity: How clear is this statement (e.g., conciseness, readability, understandability)?

Completely Unclear	Somewhat Unclear	Very Clear
○	○	○

Relevance: How relevant is this statement to the indicator "**Entertaining**"?

Completely Irrelevant	Somewhat Relevant	Highly Relevant
○	○	○

Comments

If you selected "unclear" or "irrelevant" in the above questions, please elaborate to help us understand why you think so, and what improvements could be made. If you selected "relevant" or "clear", please elaborate on what specifically makes the statement good. Other suggestions are also welcome (e.g., suggest changes in wording or suggest that the item be eliminated).

9. Control

Indicator: Untroubled - The user feels in control and doesn't feel upset

Statement: "(reverse coded) I feel frustrated when using this visualization."

Clarity: How clear is this statement (e.g., conciseness, readability, understandability)?

Completely Unclear	Somewhat Unclear	Very Clear
○	○	○

Relevance: How relevant is this statement to the indicator "**Untroubled**"?

Completely Irrelevant	Somewhat Relevant	Highly Relevant
○	○	○

Comments

If you selected "unclear" or "irrelevant" in the above questions, please elaborate to help us understand why you think so, and what improvements could be made. If you selected "relevant" or "clear", please elaborate on what specifically makes the statement good. Other suggestions are also welcome (e.g., suggest changes in wording or suggest that the item be eliminated).

10. Captivation

Indicator: Captivation - The user is concentrating, immersed, and forgets about surroundings

Statement: "I feel absorbed by this visualization while using it."

Clarity: How clear is this statement (e.g., conciseness, readability, understandability)?

Completely Unclear	Somewhat Unclear	Very Clear
○	○	○

Relevance: How relevant is this statement to the indicator "**Captivation**"?

Completely Irrelevant	Somewhat Relevant	Highly Relevant
○	○	○

Comments
If you selected "unclear" or "irrelevant" in the above questions, please elaborate to help us understand why you think so, and what improvements could be made. If you selected "relevant" or "clear", please elaborate on what specifically makes the statement good. Other suggestions are also welcome (e.g., suggest changes in wording or suggest that the item be eliminated).

11. Pleasing

Indicator: Pleasing - The user is impressed by the visualization (e.g., visually, concept-wise)

Statement: "The look and feel of the visualization is pleasing to me."

Clarity: How clear is this statement (e.g., conciseness, readability, understandability)?

Completely Unclear	Somewhat Unclear	Very Clear
○	○	○

Relevance: How relevant is this statement to the indicator "**Pleasing**"?

Completely Irrelevant	Somewhat Relevant	Highly Relevant
○	○	○

Comments

If you selected "unclear" or "irrelevant" in the above questions, please elaborate to help us understand why you think so, and what improvements could be made. If you selected "relevant" or "clear", please elaborate on what specifically makes the statement good. Other suggestions are also welcome (e.g., suggest changes in wording or suggest that the item be eliminated).