

## How to Visualise the Qualities of Installations?

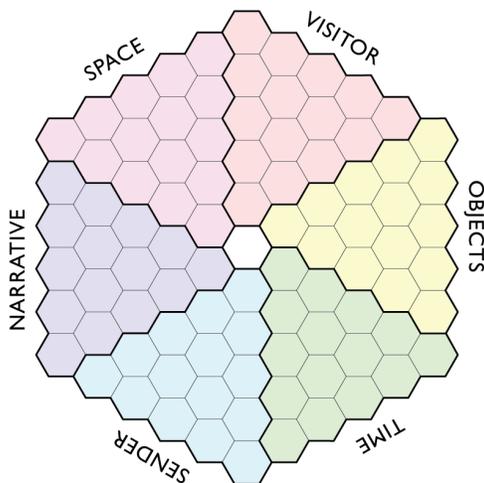
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Museums and science centres are places where visitors learn and gain knowledge through encountering and engaging with installations. The design of these installations is important for the engagement and experience outcome for visitors. We present two visual methods, the Expogon and the Visitor Engagement Index (VEI) profile. These can assess the design of installations and give hints for the designers on how to improve the experience.

A systematic approach is needed to evaluate whether installations in a science centre work as intended, and what could possibly be changed to improve the mediation effect. Tools are available to structure this evaluation process.

### The Expogon

The Expogon by Dan Spiegel (see [expogon.org](http://expogon.org)) breaks down the exhibition medium into six elements: *narrative*, *space*, *visitor*, *objects*, *time*, and *sender*. Each element consists of fifteen hexagons representing categories, ten pre-filled and five empty for additional categories. The researcher wanders through an exhibition and notes observations on the Expogon. Thus, it is a qualitative tool that allows brainstorming when evaluating an exhibition.



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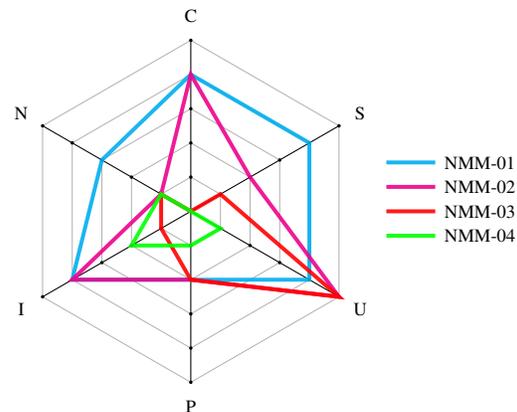
The Expogon gives hints to an evaluator on what to improve in an exhibition. However, it does not reflect to what degree the six elements are fulfilled. To rectify that, we developed a different approach.

### The Visitor Engagement Index Profile

The Visitor Engagement Index (VEI) profile is a quantitative measure to evaluate single installations.

It classifies installations in their dimensions of competition (C), narrative (N), interaction (I), physical (P), visitor or user control (U), and social (S). Each of these dimensions can have a value from 0 to 5; the higher the value, the more a dimension is present in an installation. The table on the following page presents the description of the values for each dimension.

The values from this assessment are drawn in a spider-diagram for each installation that is evaluated. We show an example in the following diagram where four selected installations at the Norwegian Maritime Museum (NMM) are characterised and assessed using the VEI-profile. Drawing the assessment of several installations into one diagram, one can evaluate the characteristics of an exhibition.



The VEI profile for selected installations in a science centre.

The selection of the dimensions in the VEI-profile is from an installation-centric perspective, aimed at complementary dimensions to the Expogon. The selection of these dimensions has been performed together with representatives from science centres where we, in an iterative process, listed possible characteristics of installations and grouped these avoiding large overlaps. Afterwards, we defined the different levels as shown in the table. Practice will show whether these dimensions need to be adjusted or dimensions need to be added.

Being assessed along these six dimensions, the installations at the NMM have distinct characteristics, from a simple presentation with a start button (NMM-04) to a complex simulation and game with four consoles (NMM-01).

Assuming that these installations form one ensemble, we can visualise this ensemble’s characteristics as a whole. In the above example, we recognise that the physical (P) dimension has rather low values for these installations. An exhibition designer could consider to increase the P-value by making changes to the installation for the sake of giving visitors a better experience or to decrease values, e.g., the U-dimension in the above example. In other cases, a good mix of characteristics could be the objective of an exhibition.

### How to Assess Engagement?

When an installation designer decides to make changes on the basis of the VEI-profile, both the original and the modified installation need to be assessed with regard to how engaging these installations are. In the field of visitor studies several approaches are possible, such as observations, questionnaires, or assessment using diverse sensors. In

the ideal case, the assessment is minimally intrusive, does not bother the visitor, and can be performed in a short time.

Observations by museum personnel usually focus more on the visitor instead of the installation. Questionnaires might be intrusive for the visitor, and the answers are given in retrospect, i.e., not *in situ*. Our approach is to use observations from sensors to retrieve data about a visitor’s engagement. Electronic questionnaires will be tailored so that only relevant questions will appear. Thus, the visitor will not be bothered more than absolutely necessary.

### References

Wolfgang Leister, Ingvar Tjøstheim, Göran Joryd, Trenton Schulz: *Towards Assessing Visitor Engagement in Science Centres and Museums*. In: PESARO 2015, The Fifth International Conference on Performance, Safety and Robustness in Complex Systems and Applications. pp 21-27. 2015.

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	0	1	2	3	4	5	
<b>C</b>	visitor observes only; no competition element.	inst. has several components; result must be achieved to proceed or succeed.	visitor receives a score; competition with the installation (machine).	competition with other visitors asynchronously.	competition with other visitors in real-time.	challenge in team; influence on other players’ result.	<b>C</b>
<b>N</b>	no narrative; object can only be observed.	installation is used in a specific sequence; chronological succession of events.	installation is built up in sequences; conditions must be met to proceed to next phase.	installation designed for multiple visitors; visitors may cooperate; multiple parallel narratives.	multi-player game or simulation; visitors cooperate to achieve a final result.	visitor develops narrative.	<b>N</b>
<b>I</b>	no interaction with object; observe only.	primarily no interaction; visitor can do something with the installation.	some interaction, such as “continue”, “stop”, “yes/no”; installation reacts.	moderate degree of interaction; choices influence outcome.	high degree of interaction; choices have consequences; content is stored.	visitor creates some of the content.	<b>I</b>
<b>P</b>	no physical activity; observation only.	push buttons; touch screen; hold or touch object.	visitor moves betw. parts of installation; enter installation; guided tour.	some activity, e.g., operating pumps; throwing balls.	full body-motion; longer physical activity.	full body motion over time; performing physical task in real setting.	<b>P</b>
<b>U</b>	controlled; visitor is observer; linear structure.	controlled with some degrees of freedom; mostly linear structure.	combination of controlled and free flow; choices can be made.	visitor can make choices; receives feedback on right or best choices.	visitor controls flow, but installation limits choices.	visitor has high degree of control; creative process.	<b>U</b>
<b>S</b>	single visitor.	single visitor, others observe.	several installations used independently from each other.	single visitor while others observe and engage and cheer.	installation intended for several simultaneous visitors.	multi-visitor installation; visitors must cooperate.	<b>S</b>
	0	1	2	3	4	5	