Content Analysis in Systems Engineering Acquisition Activities

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Overview

- What is Content Analysis?

- Sample of Systems Engineering Technical Process Activities for Content Analysis

- Factors that can impact the use of content analysis

- Future Research on the use of content analysis

What is Content Analysis?

➡ Krippendorff (2004) and Patton (2015)

1. Decide what data sources to use for the analysis. These best fit the research questions (unitizing).

2. Identify a representative data subset to analyze (sampling).

3. Transform raw data; Evaluate and interpret characteristics within and between data elements (recording/coding).

4. Evaluate and interpret the categorized data (reducing data).

5. Infer the meaning of the categories. Test and validate the inferences with respect to the research questions (inferring).

6. Summarize and communicate the analysis findings (narrating).

Sample of Systems Engineering technical process activities for content analysis (INCOSE, 2005)

Process	Activity
System Requirements Definition	Ensuring the system requirements adequately reflect the stakeholder requirements

Negotiating modifications to the requirements to resolve any issues identified |
| Architecture Definition Process | Analyzing "relevant market, industry, stakeholder, organizational, business, operations, mission, legal, and other information" to guide architecture development |
| Systems Analysis | Comparing results from several types of models |

Sample of Systems Engineering technical process activities for content analysis (INCOSE, 2005)

Process / Activity	Implementation	Integration, Verification &Validation	Operations	Maintenance
Analyzing and resolving anomalies	X	X	X	X
Eliciting or identifying constraints and/or trends	X		X	X

Factors that can impact the use of content analysis

- Time required and resource availability to spend on the analysis

- Familiarity/Expertise with content analysis methods

- Familiarity/Expertise with the technical subject matter and data content

- Data access, particularly when data are spread across multiple print and electronic sources

- Data quality/quantity

- Individual personality - having the ability and patience to search for and identify patterns in datasets of various sizes

Future Research on the use of content analysis

- Investigate:
  - The degree to which the previous factors actually impact content analyses use
  - The actual use of content analysis in the technical processes previously discussed, and what software tools are used and can be used to facilitate the process
  - The impact of content analysis on the system engineer's workload
  - The development of
    - appropriate contexts and levels of depth for content analysis efforts within different acquisition phases
    - generalizable categorizes for system attributes
  - The implications of content analysis on training and skill development for systems engineers in the acquisition workforce

Questions?