



Lesser Known Key Components of Cyberinfrastructure

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Introduction Cyberinfrastructure (CI) is an emerging and complex innovation for processing big data for important insights. This innovation has received continuous federal investments for more than a decade to build a national CI for science and engineering research in the US. In order to better promote the effective adoption and meaningful implementation of CI, the innovation itself needs to be fully defined. This research started with defining CI as multi-dimensional, involving a range of material objects, behavioral practices, and philosophical ideologies. However, the interview data gathered revealed that additional dimensions are at play. In order to determine these additional dimensions, the purpose of this poster is to answer the research question, *“What are key dimensions of cyberinfrastructure (CI) besides the objects, practices, and ideologies that make up the CI innovation?”* Based on an analysis of 20 interviews with CI experts/professionals, additional dimensions will be reported.

Literature Review With the economic and technological climate of the world changing and adapting with each coming day, organizations must adhere to the developing ethos of the modern world. In the realm of cyberinfrastructure, organizations are constantly modifying technology and capacity building methodology in order to maintain relevance. The literature featured in the study reviewed common aspects of organizational capacity, such as leadership, communication, management, culture, and human resources. However, of the various transcripts reviewed, we identified the elements of user interaction, funding via investments, climate sustainability, and technological innovation to be lesser known components essential to the success of organizations facilitating cyberinfrastructure. These strategies proved to be vital in the ever changing sphere of cyberinfrastructure in relation to organizational capacity.

Methodology:

The group implemented their previous knowledge of transcript analysis of these 20 interviews. These interviews were conducted by previous student researchers talking to professionals in the field of Cyberinfrastructure. As accomplished through the 14 transcripts that we were assigned to write analytical summaries prior to this assignment prepared the group to properly read and build this research project, *Lesser Known Key Components of Cyberinfrastructure*.

Findings:

Throughout the transcripts we discovered recurring themes surrounding: User Interactions, Funding via Investments, Climate Sustainability, and Technological Innovations. As cyberinfrastructure is constantly changing, these four factors remain constant. In order for cyberinfrastructure to succeed, the three main components (material objects, behavioral practices, and ideologies) have to be present. We completely agree with this aspect of Cyberinfrastructure and found these highlighted consistently in each transcript. However we believe that these recurring themes that the professionals specifically talked about outside of the three main components should be recognized.

User Interactions

With a higher emphasis placed on user interaction, organizations would be much more inclined enforce CI on both the human and technological level. Regardless of how far technology advances, human interaction is always going to be a key factor of success in any working organization.

- Miron Livny stated that to her, the “cornerstone” of cyber infrastructure is the human factor.
- “The exchange of information within the community is exceedingly important... and the training of users to optimize their usage of the material facilities is also critically important” (Participant 1).



Funding via Investments

In order for an organization to succeed, it is essential to have proper funding. Funding via investments allows for these organizations to progress and move forward all while gaining the attention and support from investors. CI is a consistently growing aspect in today’s world and with the financial support will continue to succeed.

- “You have to have the right investment in the software tools that are needed by the domain scientists to solve their problems” (Participant 14).
- “My group is basically funded by NSF to do things. So again, they’re – finding the funding I guess is a constant struggle.” (Participant 9).



Climate Sustainability

In today’s society technological advancements are taking place at a rapid pace, making an ever changing technological climate. It is important to learn to sustain cyber infrastructure among the rapidly changing technological climate. In order to grow cyber infrastructure people must know how to anticipate and prepare for change.

- “A supercomputer stops being cutting-edge after two or three years. And after five years it’s ready for retirement. And so the cycle of buying big computers or big storage units and then very shortly thereafter trying to find money either from your institution or from the government to buy the next ones is I’d say never-ending” (Participant 11).



Technological Innovations

Technological innovations are constantly evolving, bringing new developments to build capacity. Placing greater emphasis on funding technological innovations would allow organizations to rapidly build a sustainable cyberinfrastructure.

- “Tech extensions can work, not just inside a university, but with all the citizens the university serves. I don’t know why universities aren’t sending agents out to small business, doing tech extensions” (Participant 6).
- “Now, with way too many situations where what is driving is people who have their own technologies and they’re trying to promote them. And they’re being driven by an understanding of what the domain scientists really need” (Participant 3).



Conclusion

Due to the perpetually changing nature of cyberinfrastructure, organizations adapt and build capacity through increased user interaction, securing funding via investments, maintaining climate sustainability, and acclimating to technological innovation. By utilizing these tools, organizations retain relevance in the realm of cyberinfrastructure, and continue contributing to the world at large.

References

Transcripts provided by Dr. Kerk Kee for educational/research purposes