

Paper Presentation

# The Science of Interaction

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# AGENDA



**01** INTRODUCTION

**02** FUTURE CHALLENGES

**03** CONCLUSIONS



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INTRODUCTION

# PERCEPTION OF VISUAL ANALYTICS

Human Interaction aided  
by visual interface –

' The Science of Interaction' –

Humans create knowledge  
through the manipulation of  
an interface

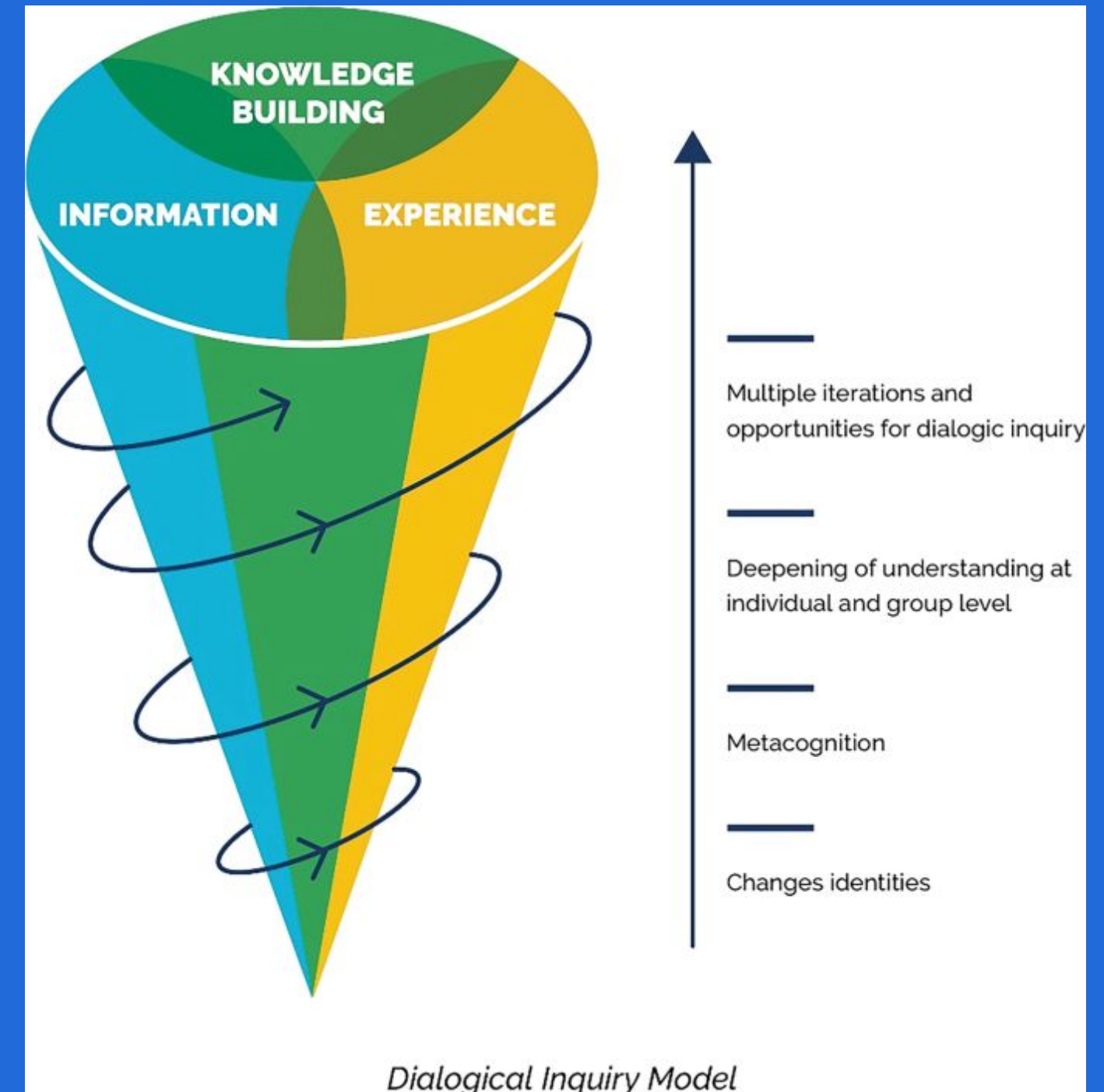
# INTERACTION AS A REASONING AID

## INQUIRY INTERACTION

The inquiry in visual analytics systems is often pragmatic, and the more a user can manipulate data, the more insight they will gain.

## DIALOGICAL INQUIRY

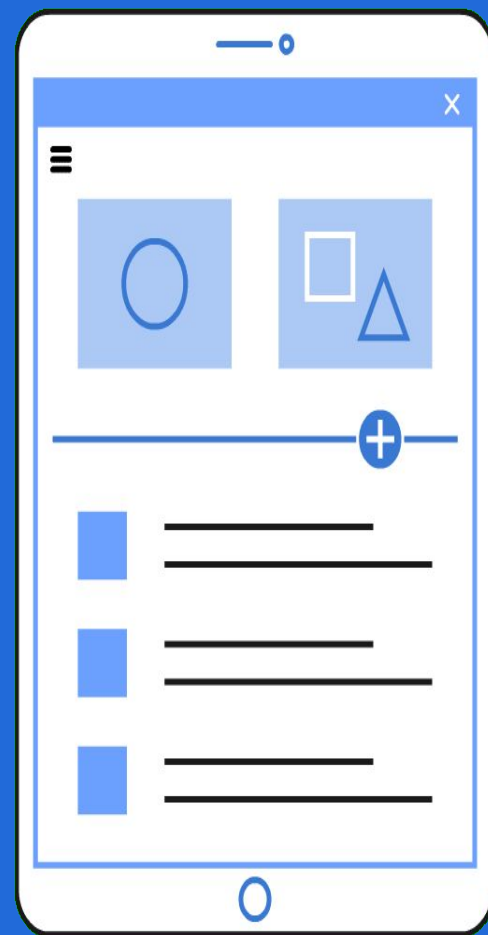
The dialog can occur between people, human and computer, or between an individual and their "future self".





# ELEMENTS OF INTERACTION

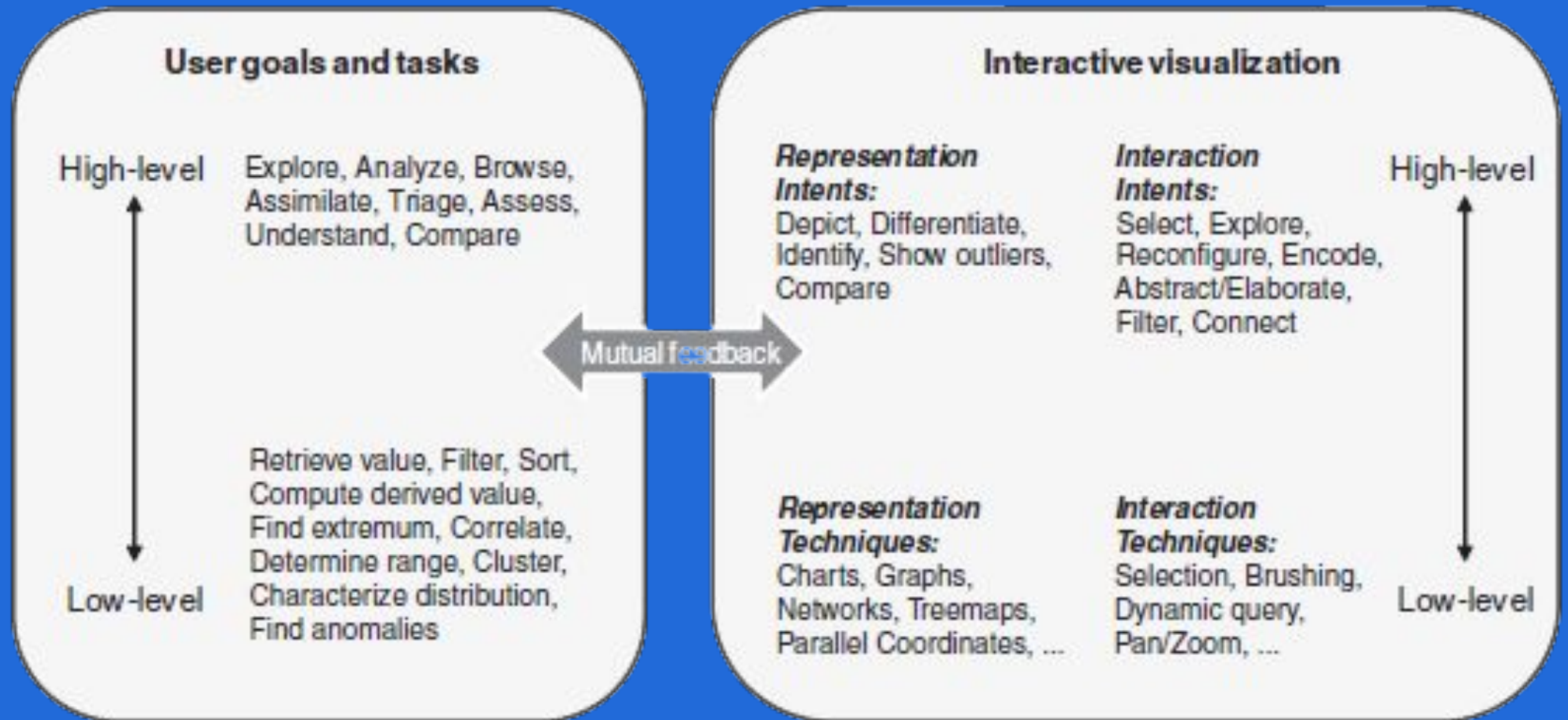
LOW-LEVEL (USER-SOFTWARE)



HIGH-LEVEL (USER-INFORMATION)



# RELATIONSHIP

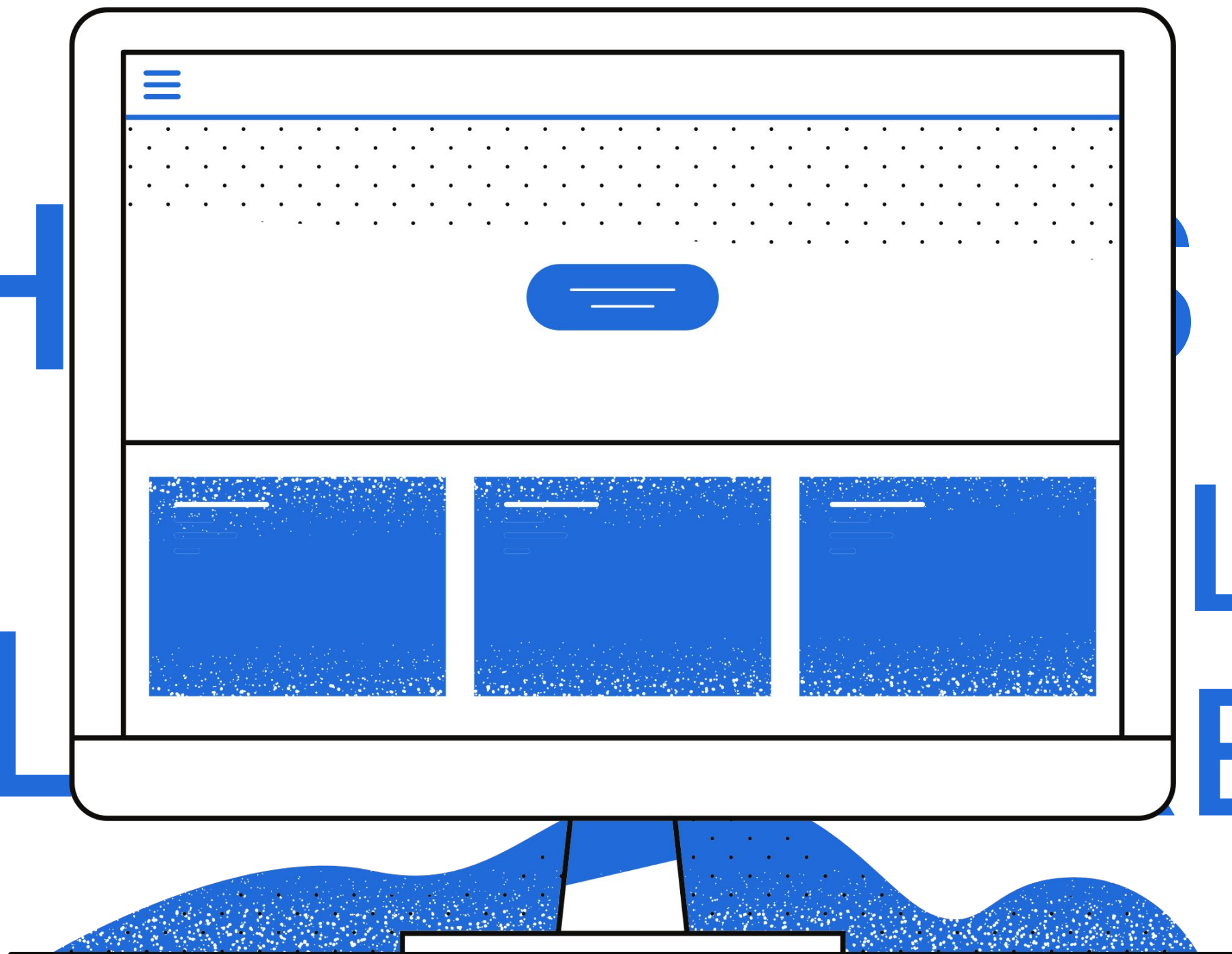
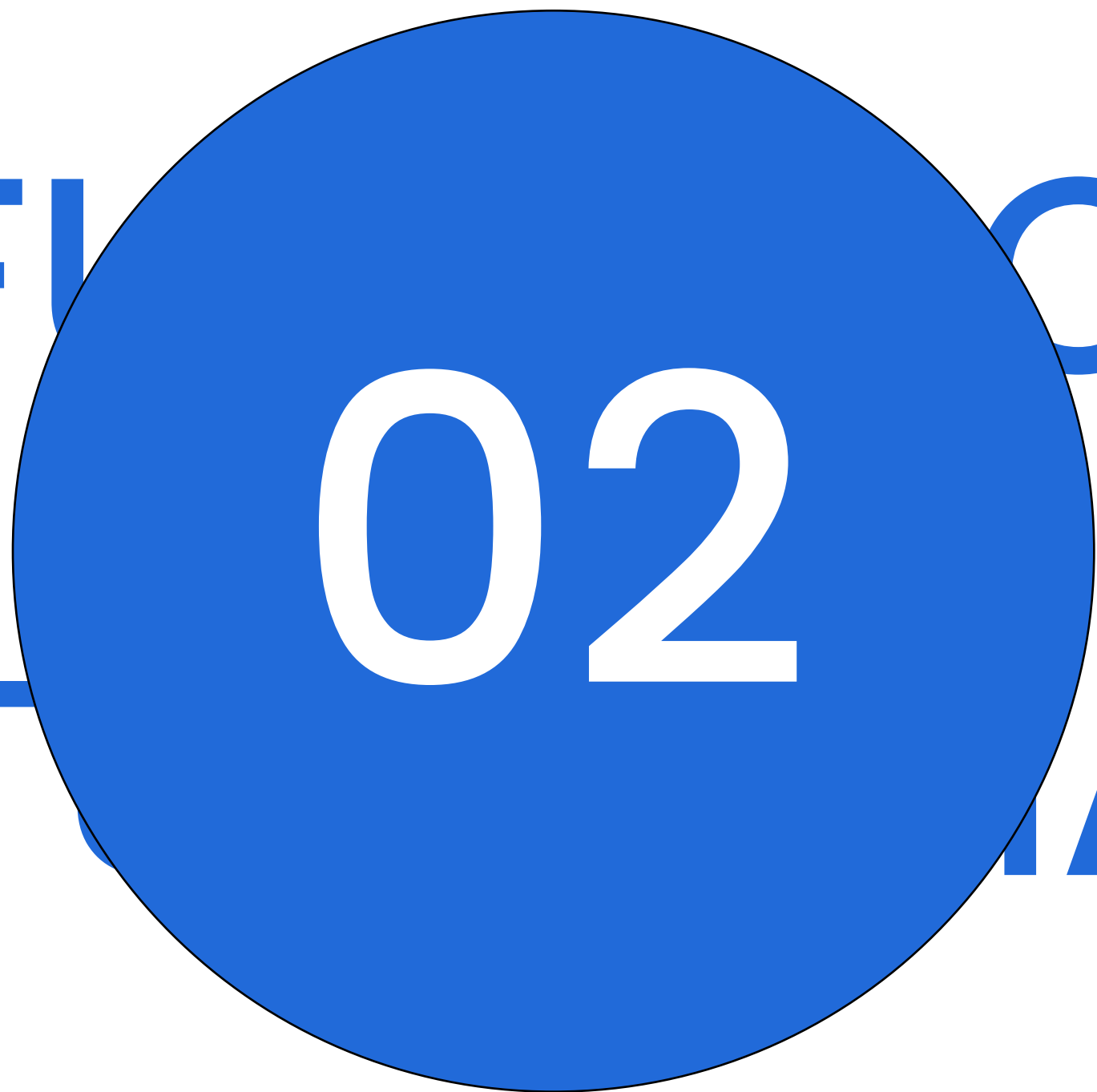


# ABDUCTIVE PROCESS

Becoming familiar  
with a new data  
space



CHALLENGES FUTURE CHALLENGE



FUTURE CHALLENGES FUTURE

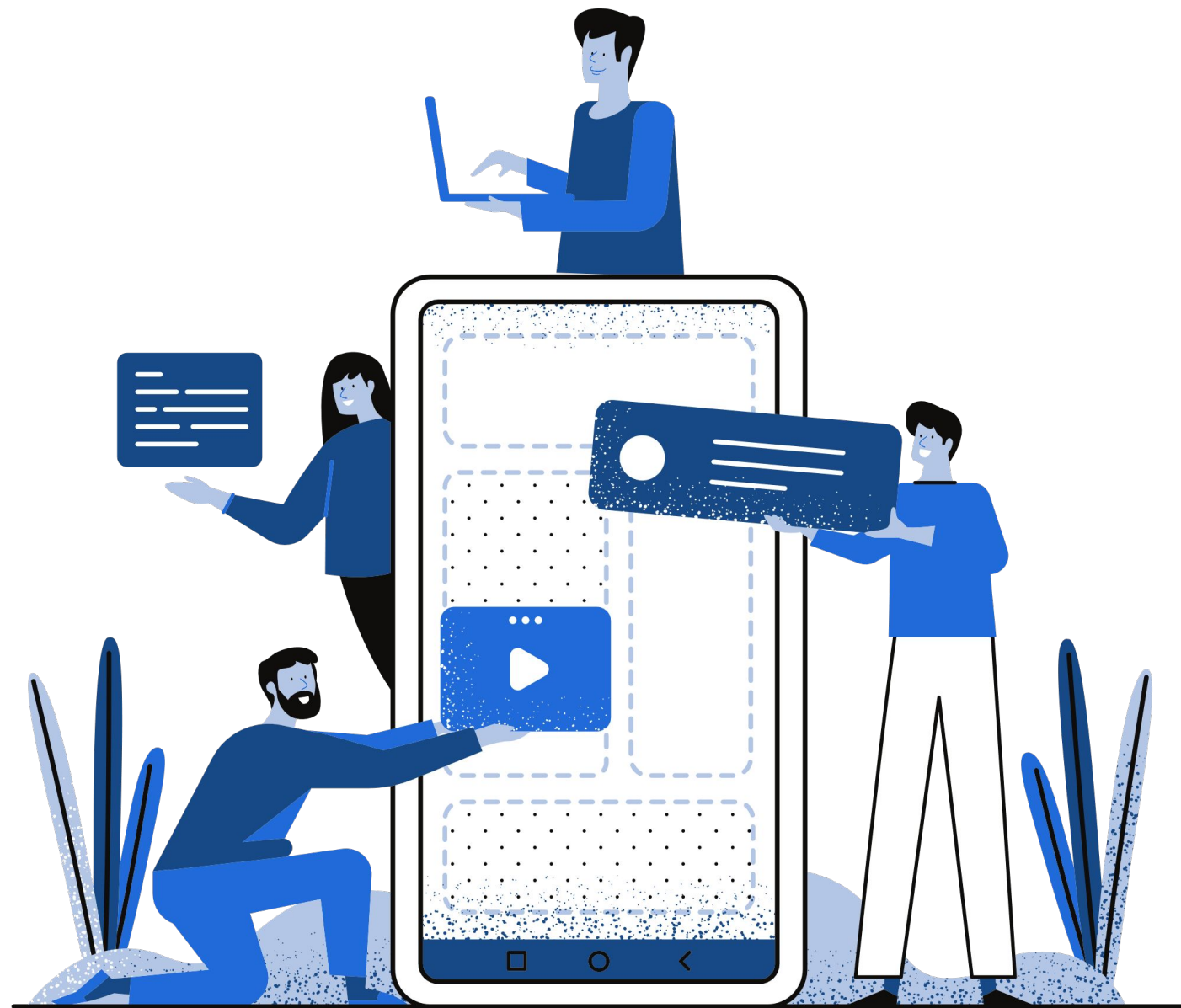
# ● ● ● FUTURE CHALLENGES ● ● ●

## Ubiquitous, embodied interaction

Ubiquitous interaction means that rather than build point solutions, which work for one of each possible user context we need to be concerned with creating core analytic capabilities that can be transformed for each of these contexts but that remain consistent across them.



# CAPTURING USER INTENTIONALITY



We need to recognize what the user is trying to achieve through the interaction. While some techniques can be used to represent the ‘how’ of an analysis process, typically ‘why’ in this process is lost..

# KNOWLEDGE-BASED INTERFACES

The ability of visual  
analysis tools to represent  
and reason with human  
knowledge is  
underdeveloped





# COLLABORATION

1. Collaboration is common in visual analytics and rarely is the entire analysis process done by one person.

2. Collaborative systems need to be developed to help map between user models and across synchronous and asynchronous collaboration modes.

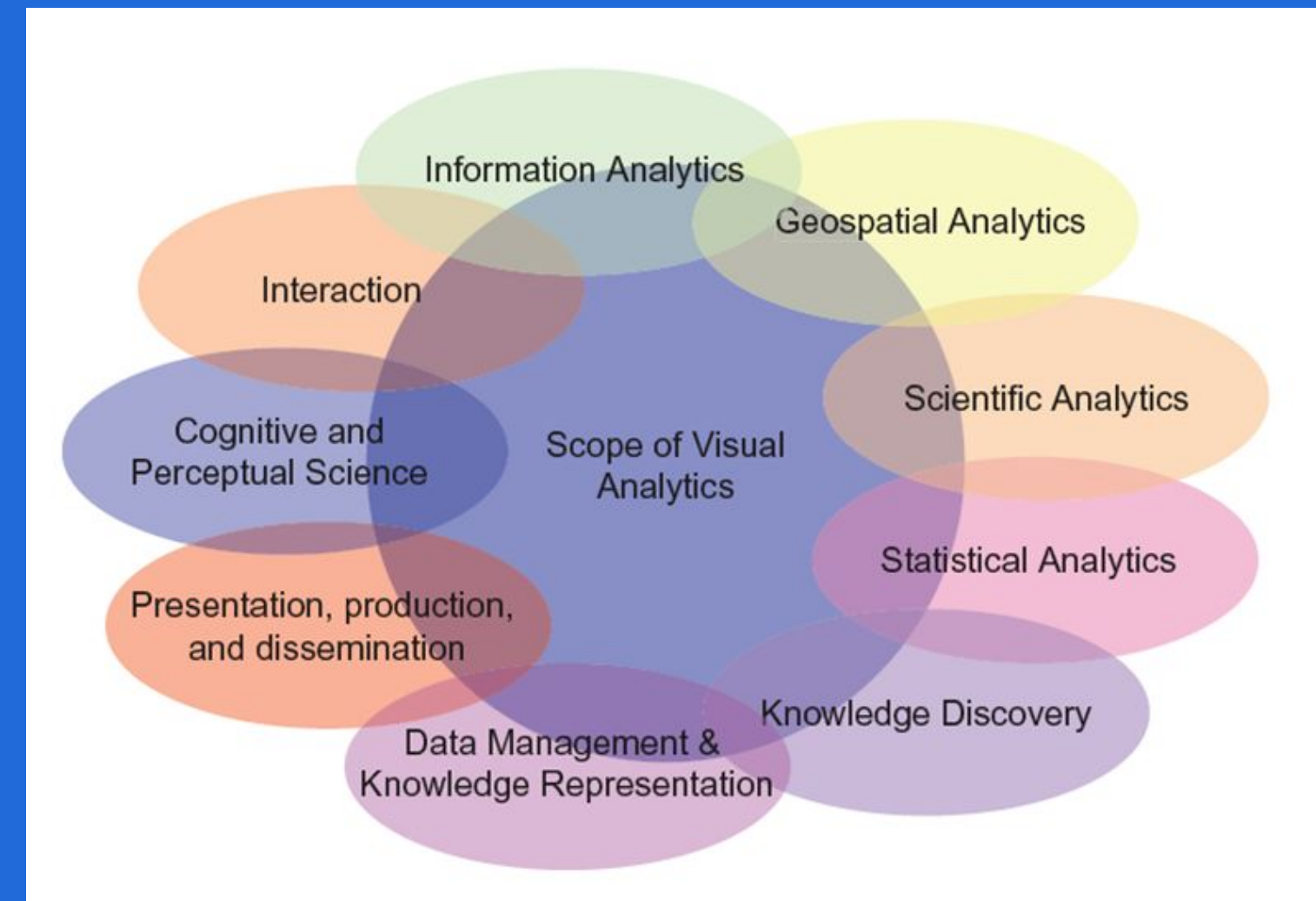
3. Brennan et al proposed a framework for multi-analyst work and used the concept of "private perspectives" to describe user models.





# PRINCIPLES OF DESIGN AND PERCEPTION

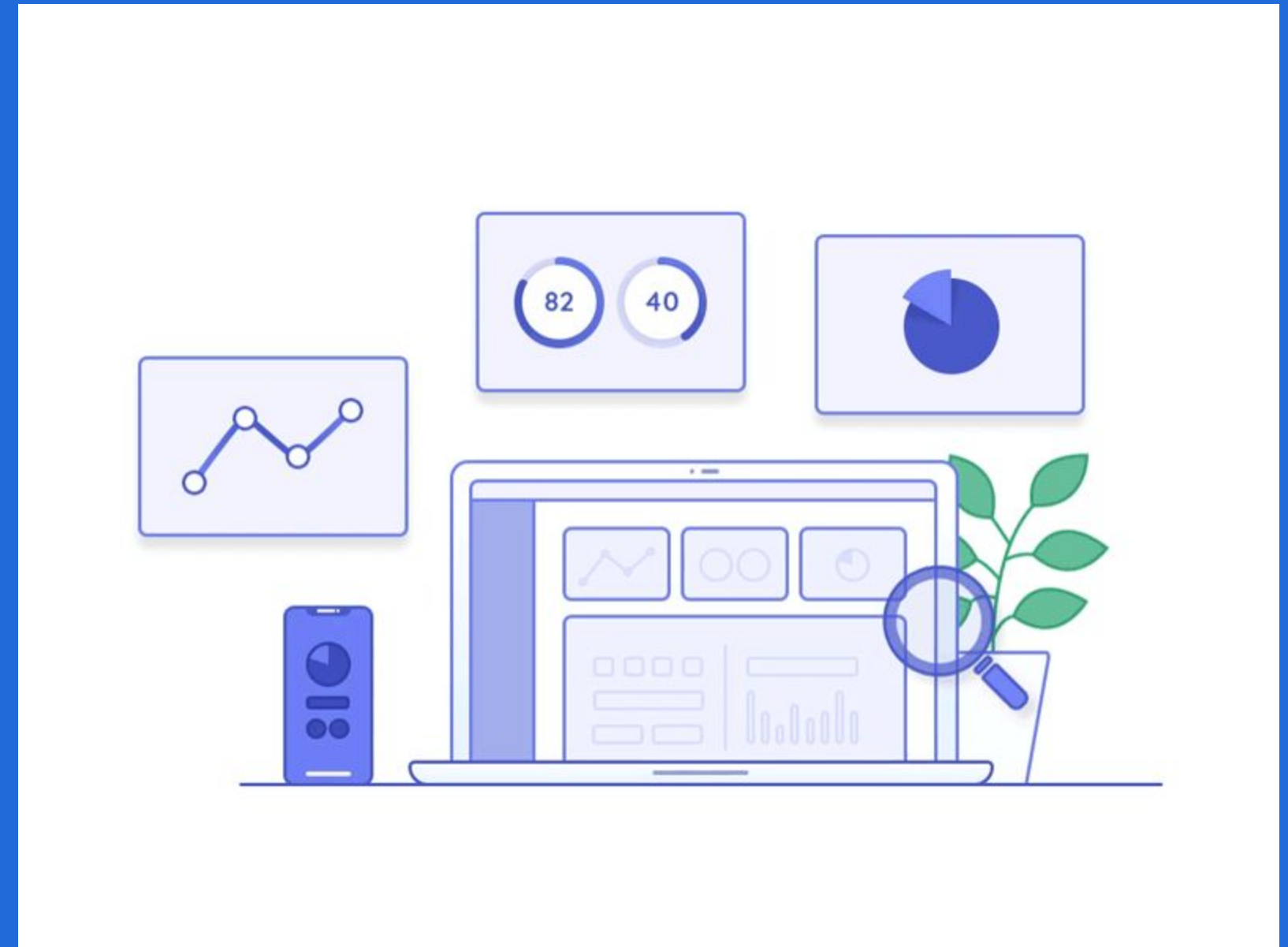
The visual analytics community needs greater interdisciplinary participation to make more significant progress in addressing the challenges of analytic interaction.



# INTEROPERABILITY FOR INTEGRATED INTERACTION

The intersection of cognition and the dynamic nature of information during the analysis process is crucial for visual analytics, yet there has been limited involvement from the cognitive science and perception communities.

WHAT ARE THE CHALLENGES THAT THE VISUAL ANALYTICS RESEARCH COMMUNITY MUST WORK TOWARDS IN THE NEXT 5 YEARS TO INTEGRATE INDIVIDUAL SOLUTIONS INTO INTEGRATED SUITES TO SUPPORT THE END-TO-END PROCESS OF ANALYSIS?



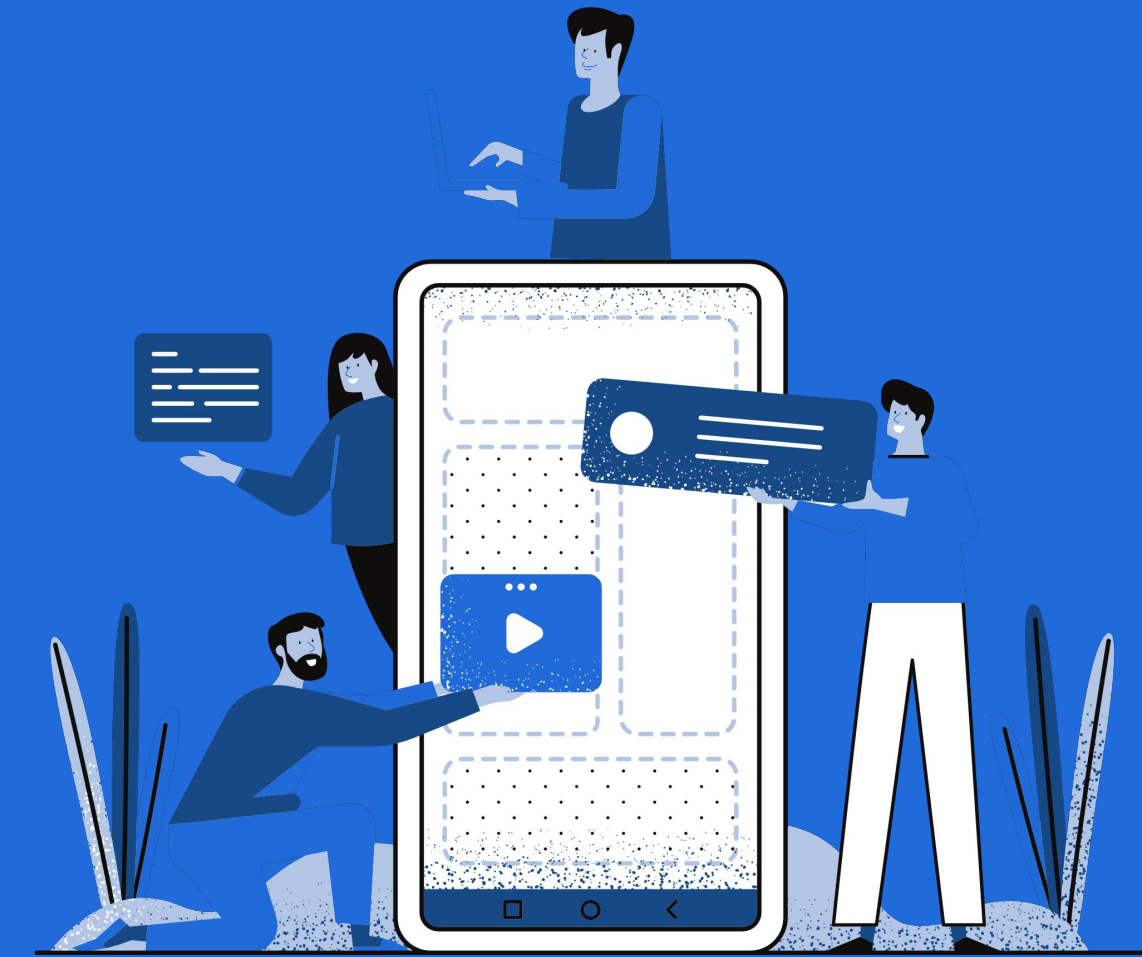
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# CONCLUSION

THE MAIN QUESTION:  
WHAT IS THE GOAL OF ADVANCING THE SCIENCE  
OF INTERACTION IN VISUAL ANALYTICS?



The field of visual analytics places importance on interaction with visual environments for knowledge construction, recognizing interaction as the inquiry.

The science of interaction can be developed through research in seven areas: ubiquitous and embodied interaction, capturing user intentionality, knowledge-based interfaces, principles of design and perception, collaboration, interoperability, and interaction evaluation.



THANK YOU!

