
Computation World 2020

# Panel:
# Dealing with Complexity of the Data
*(Main Features, Vision, Sensing, Trustfulness, Stability, ...)*

**Chair**

**Hans-Werner Sehring**, Tallence AG, Germany hans-werner.sehring@tallence.com

**Panellists**

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Technical Co-Sponsors and Logistic Supporters

**Panel 2**
Dealing with Complexity of the Data
(imperfect classifiers, approximate data, volatile data, time-sensitive data, tentative patterns, evolving datasets, etc.)

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## Panellist Position

# Do you know what I mean? – How to transport information over time and context

**Hans-Werner Sehring**, Tallence AG, Germany hans-werner.sehring@tallence.com

- Information is obtained from data by means of (subjective) interpretations.
- Data has been created in some context, and it is processed in different and changing contexts.
- One needs to know processes and data provenance in order to integrate data from different sources.

→ When looking at data, I need to know processes and provenance that led to its current state.

→ When representing information, I need to target it at my audience.

→ Conceptual models behind generation and utilization of data are required for the management of complex data.

**Panel 2**
Dealing with Complexity of the Data
(imperfect classifiers, approximate data, volatile data, time-sensitive data, tentative patterns, evolving datasets, etc.)
**Computation World 2020**

## Panellist Position

# Reliability Displays – Do you even trust yourself and why should I?

**Alexander Mirnig**, Center for Human-Computer Interaction, University of Salzburg, Austria
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- Predictive Systems, process management (e.g., BIM)
- Input based on individual data sets, heuristics
- Fluctuations in data quantity and quality
- Inconsistent reliability of data basis and predictions made on said basis

→ Trust calibration via >>Reliability Displays<<

→ Self-assessment by system and providing information to enable external assessment by system operator

→ Allow adjusting expectations into reliability of system output – both overall and individual

## Panellist Position

# Teaching Materials to Train Deaf or Hard-of-Hearing Curators in Museums

**Miki Namatame**, Tsukuba University of Technology, JPN miki@a.tsukuba-tech.ac.jp

- A museum is an institution open to the public (for education, study, and enjoyment)
- Visitors with hearing impairment need curators with the same language and culture
- Create special content for nurture curator with hearing impairment
- 1: Superimposition of descriptions and speech recognition
- 2: Video with subtitles and multiple captioned
- Equipped on tablet devices

→ 1 can use to correctly indicate exhibition points

→ 2 can solve the time lag between the speaker and the interpreter

→ Effectiveness of the training material should be evaluated

TAVENCE

# DO YOU KNOW WHAT I MEAN? – HOW TO TRANSPORT INFORMATION OVER TIME AND CONTEXT

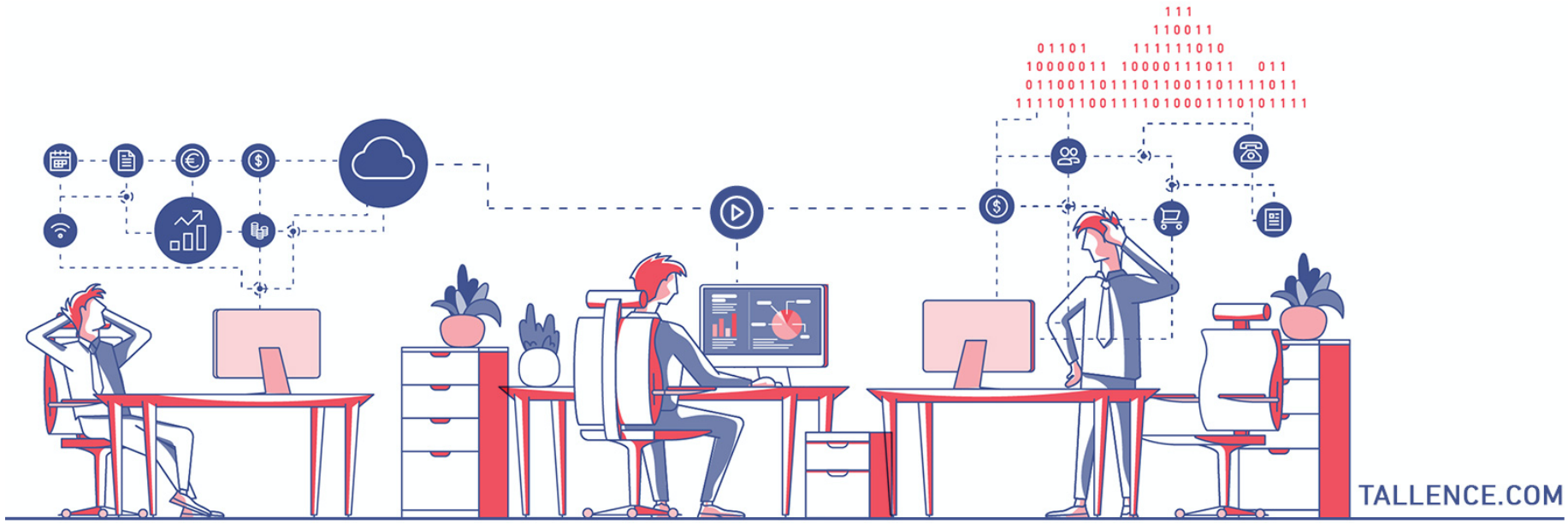
Panel *Dealing with Complexity of the Data*

Computation World 2020

25 October 2020, Hans-Werner Sehring

# // Communication and information systems

In the digital sense: Transporting information over space, time, and context




**Sender**

*represent* (information, semantics$_1$) = data

**Receiver**

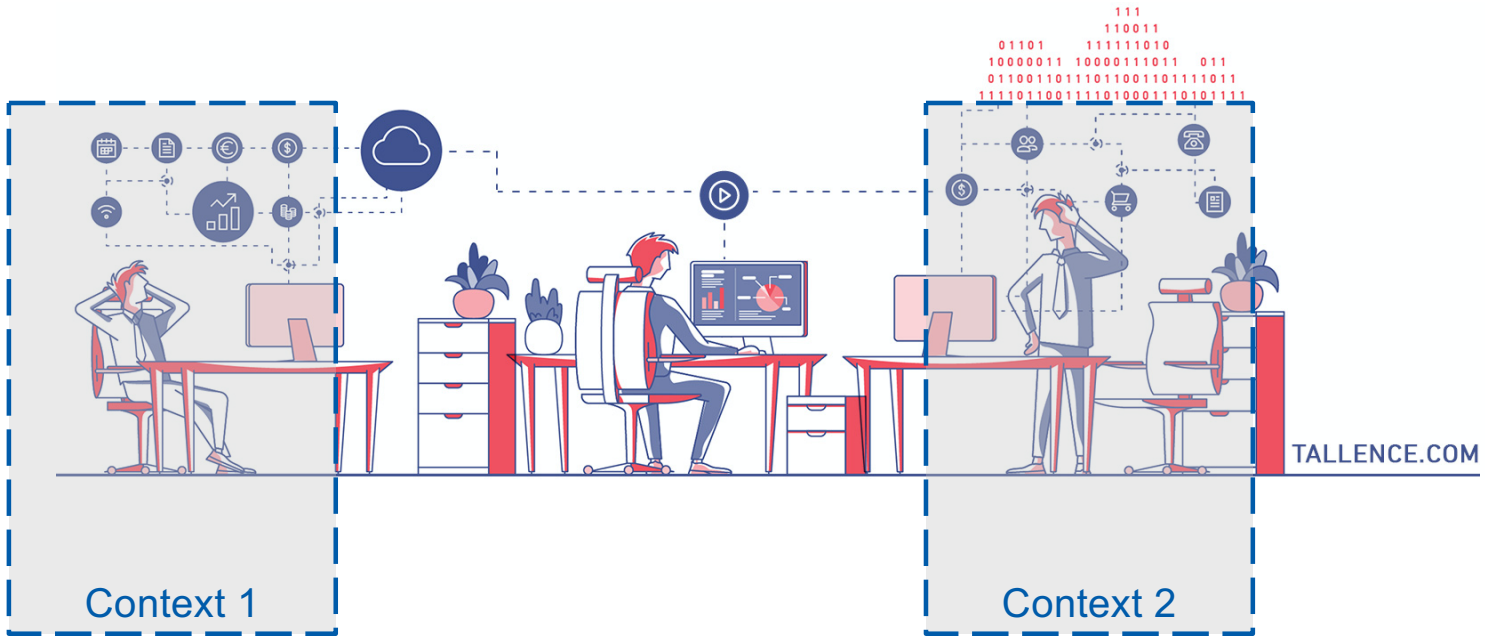
information = *interpret* (data, semantics$_2$)

# // Dealing with communication

Many disciplines looked at this

- Linguistics:
  - Sender and receiver both have a semantic model
  - Syntax of representation
  - Pragmatics of communication
- Semiotics: sender and receiver exchange a sign for some content
- Computer science perspective:
  - Information is represented as data using a representation function of the sender
  - The data has some “neutral” form that is used for transmission (Marshalling)
  - An interpretation function transforms the data into the internal representation of the receiver
- Etc.

# // Subjectivity of information



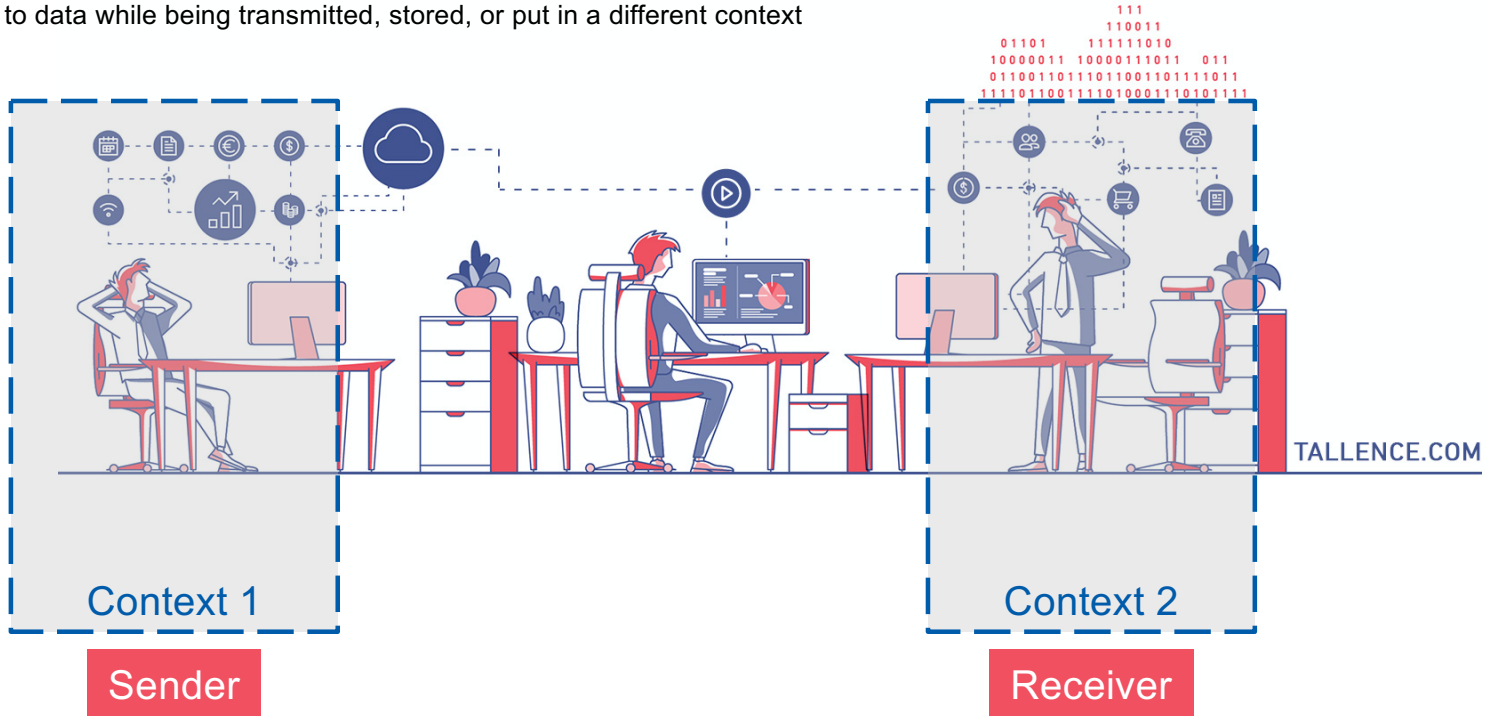

Example:

*represent* (“expensive”, student) = “$100”

*interpret* (“$100”, billionaire) = “cheap”

# // Evolution of data

Things happen to data while being transmitted, stored, or put in a different context




Example:

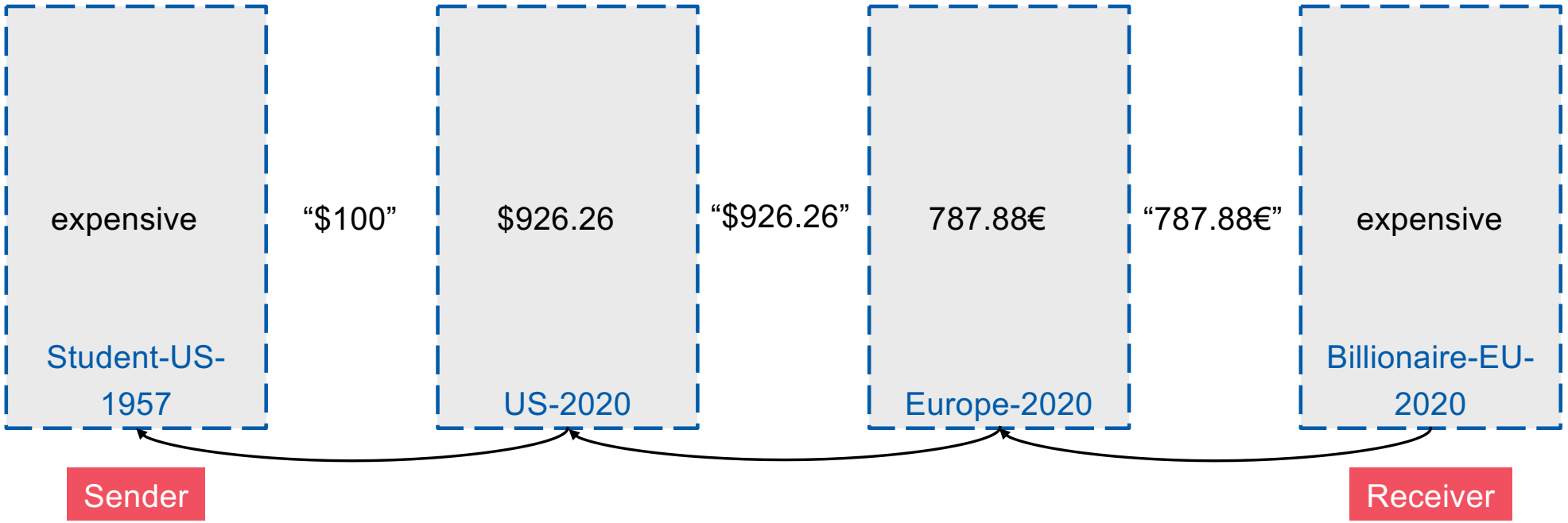
*represent* (“expensive”, student) = “$100” → “$926.26” → “787.88€” → *interpret* (“787.88 €”, billionaire) = “some European price tag”

Inflation

Europe

# // Recording the history of data

The process of data evolution carries information in itself



# // Communicating the history of data

Didn’t we just leverage the problem to another level

- Sender and receiver do not only need to have Pragmatics of communication, they need a mutual understanding for all the contexts in which data was processed.
- We did some research under the topic of Concept-oriented Content Management.
  But more researched is needed for today’s forms of data utilization.
- Basically, either:
  - Sender and receiver have a common understanding of the presentation of processing history, and the complete history of data is known.
    This is how software configuration management, e.g., Git, works.
  - The receiver starts to uncover the history of data when interpreting it. Chance to learn from other disciplines.
    - Learn from History about processes.
    - Understand subjectivity of interpretations from the Humanities.

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# THANKS.


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# Reliability Displays: Do you even trust yourself and why should I?

Position slides, Alexander Mirnig, Center for HCI, University of Salzburg, Austria

With contributions from:

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# On Trust and Trustworthiness

**Trust:**

- A relation between two agents, in which one (trustor) depends on the achievement of the other agent's (trustee) goals.
- Characterized by uncertainty, vulnerability = risk

**Trustworthiness:**

- A characteristic expressing how likely (or unlikely) the trustor should expect the trustee

# Trustworthiness Indicators

**Trustworthiness:**

Top-down communication

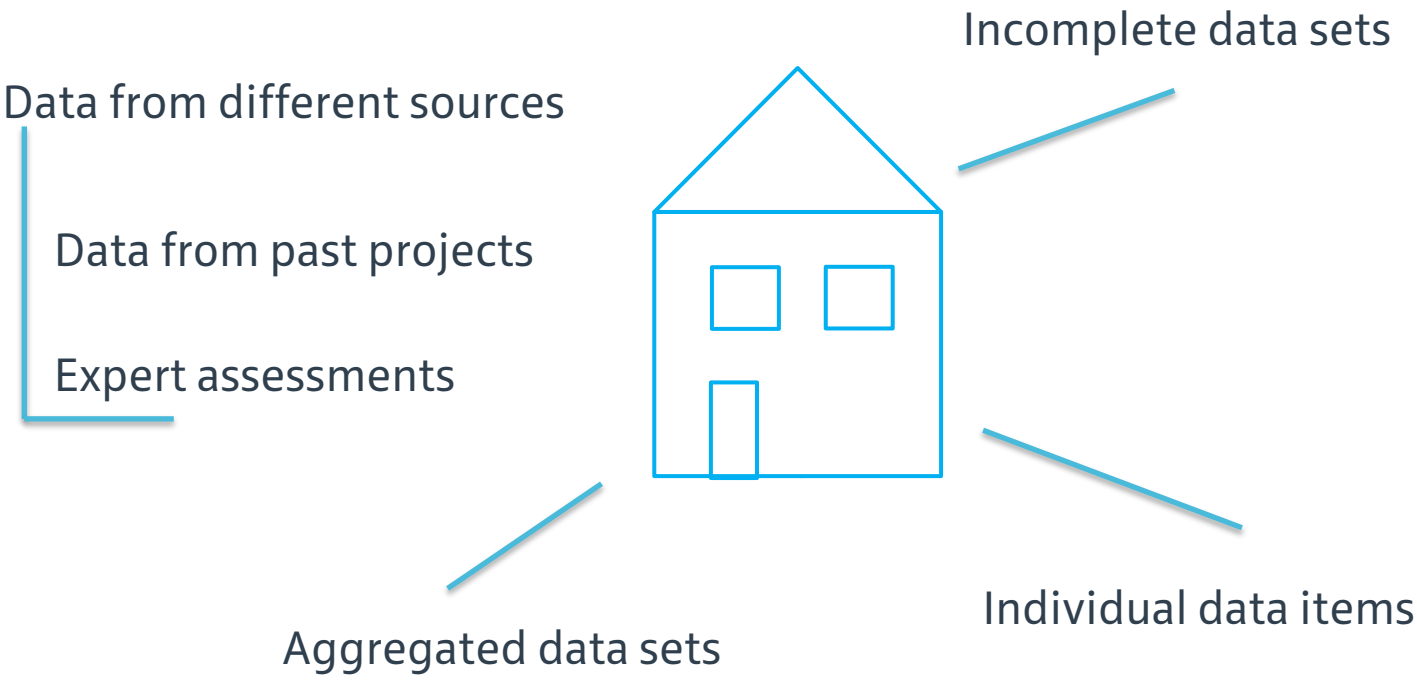
- First, I make you trust me
- Then I'll try and make sure to work well enough to actually satisfy the trust you have put into me

But is that how it should work?

**No!**

# Context: BiM

## Business Information Modeling



# The (Pro-)Position

- Different users, temporal distance between instances (both for data items themselves and times they are entered), heterogenous pool of data feeding the system
- Data quantity and quality expected to be inconsistent
- Inconsistent reliability of data basis and predictions made on said basis as a result

# The (Pro-)Position

**Allow the user to make the call on whether (and how much) to trust the system's output**

- In addition to the data and predicted values, calculate **reliability score** for each output
- Communicate this to the user via **reliability** displays
- Enable informed use of system with degree of caution on user's side adjusted appropriately

→ "Co-Worker Metaphor"

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# Video Teaching Materials to Train Deaf or Hard-of-Hearing Curators in Museums

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# Purpose and Solution

- Improving the information accessibility of museums
- Facilitating Science communication
- Focusing on visitors who used sign language

- Training a curator to offer explanations via sign language

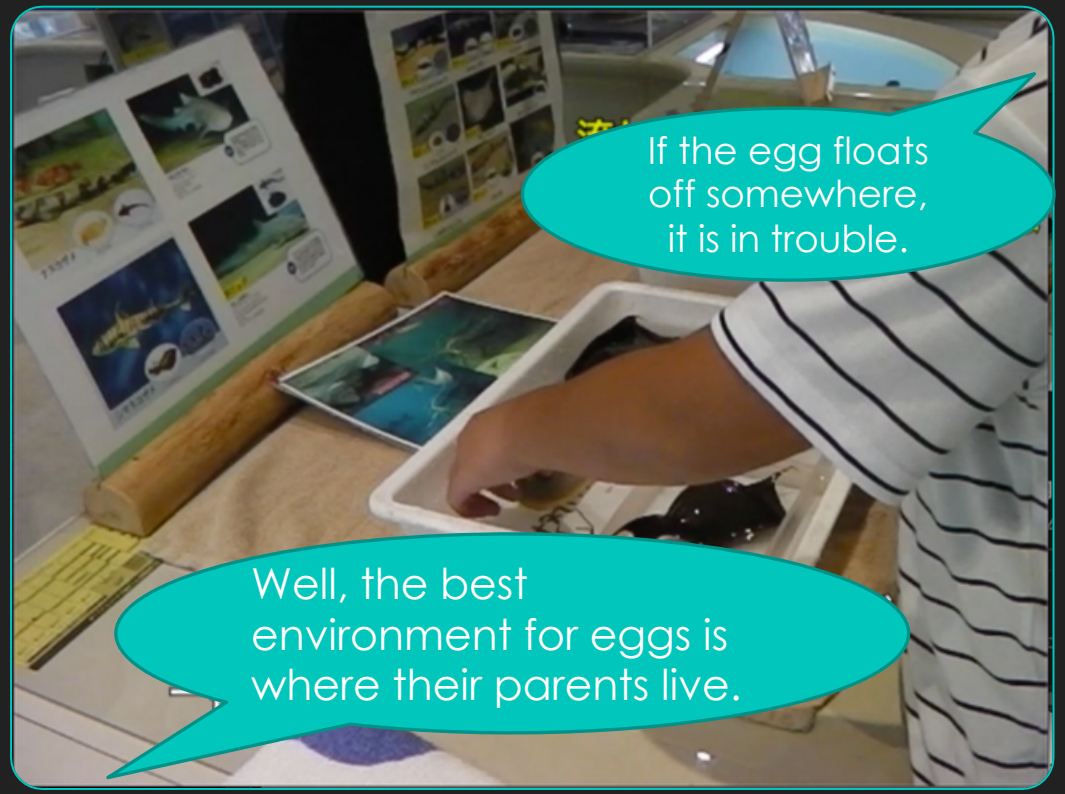
# Obstacle of training

- Deaf or HOH trainees are unable to see the sign language interpreter, instructor's movements, and materials at the same time.

- Recording the lesson and creating a video with captions for review
- The materials can be operated on a tablet device

# Why is training difficult?

- The voice conversation between the customer and the curator was fast and simultaneous.
- The voice conversation was conducted with the face turned down as the user touched several materials, one after the other.
- The trainee was unable to lip-read because the speakers' faces were turned down.
- The time lag between the conversation and the interpreter's actions had disastrous consequences.



# Training materials design

- Technical approach : automatic speech recognition
- Photographed the materials to be touched on the spot with the transcribed text that was then superimposed on the images.
- Composite images were saved on tablet devices.

# Why is training difficult?

- The scenario involved several technical terms.
- The trainee did not know why the instructor was making such remarks because he was unable to hear the unspecified number of students' voices.
- The trainee was unable to comprehend the instructor's conversation for encouraging students' awareness, in real-time.
- The time lag between the conversation and the interpreter's actions had disastrous consequences.

# Training Materials Design

- Technical approach : authoring
- Video materials for the lecture, which were divided in the unit according to the scenarios.
- Contents consisted of multiple captioned videos.
- The trainee selected the necessary units from the menu and could study freely.

# Features of training materials

- Technologies for superimposition of descriptions and speech recognition were suited to real-time communication about exhibits because they can indicate exhibition points correctly.
- Video teaching materials were suited to self-learning because they can also reproduce subtitles to solve the time lag between the speaker and the interpreter and help Deaf or HOH individuals to understand conversations.

# Conclusion and Future works

- Training materials using media technology were essential for training curators with hearing impairment.
- Such types of content are adaptable and flexible for use in other types of scenarios or different educational contexts.

- Evaluate the effectiveness of such training materials for Deaf or HOH trainees
- Add sign language descriptions for the video training material

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