Task complexity and technology-mediated language learning: Issues and possibilities

Andrea Révész

UCL
Institute of Education

What made me interested in this topic?

- Not a “CALL person”
- But intrigued by how technology can optimally be exploited in language teaching and learning
- Recently got involved in a technology-mediated project more directly
- Made me particularly aware of challenges and possibilities in technology-mediated learning

It all started when …

Mingzhu Bi

Alex Barker

Students in the Masters in Entrepreneurship programme at UCL

- **Business idea**: language course for Chinese students planning to study at a university in the UK
- **"Market research"**: Chinese students felt prepared to cope with academic tasks, but found it difficult to complete simple, non-academic activities

My advice was …

…. to design a task-based syllabus.

I offered to help in the process, hoping to get some MA TESOL students on board.

Anna Vasilokonstantaki

Flor Toledo

How does technology come in here?

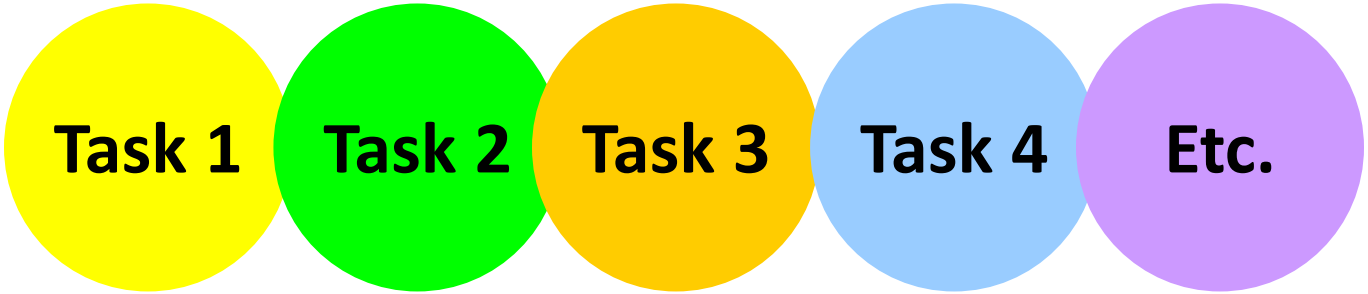
Original course planned for face-to-face teaching …

Part of the course needs to be delivered online due to practical issues

How can we best run this course in a technology-mediated context?

Task-based language teaching (TBLT)

- syllabus is based on **pedagogic tasks**



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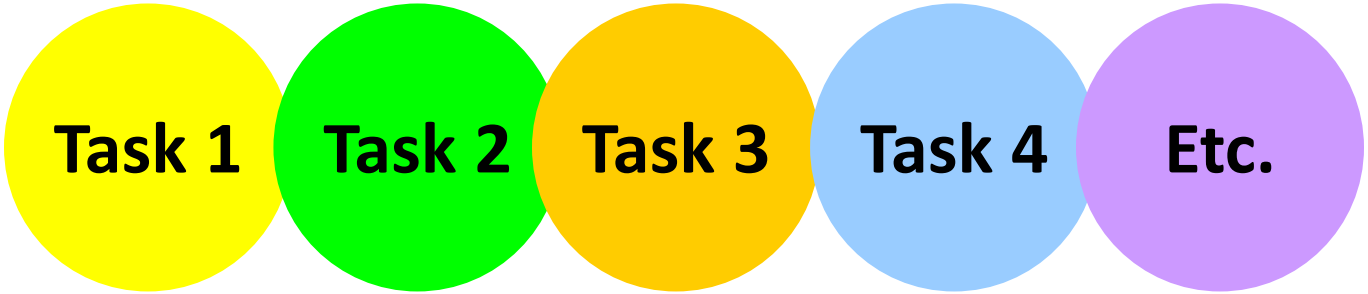


- rather th

Putting together a task-based syllabus requires selecting the tasks that learners will do.

What is a technology-mediated task?

You have decided to rent a flat with a friend while studying in London. After viewing a few flats on *rightmove.co.uk*, you and your friend have narrowed down your choice to two flats in Camden. Now you have scheduled a Skype call to decide which of the two flats to rent, based on the information you found online. Before calling your friend, read the information about the flats and decide what the pros and cons of each are.

Flat #1

rightmove Buy Rent Find Agent House Pri

Description | Floorplan | Map & Street View | School Checker

Letting information:

Date available:	Now
Furnishing:	Unfurnished
Letting type:	Long term
Added on Rightmove:	13 February 2017 (6 days ago)

Key features

- Spacious Reception/Dining
- 2 Bedrooms
- Fully Fitted Kitchen & Bathroom
- Storage
- Wooden Floors
- Gas Central Heating
- Double Glazing
- Parking Space

Full description

Bright, spacious and fully refurbished 2 bedroom apartment with wooden floors, pleasantly situated in the quiet and popular Elm Village area of Camden Town.

The property features a Spacious Reception/Dining Room, 2 Bedrooms, Brand new Fully Fitted Kitchen, Brand new Bathroom, Wooden Floors, Storage and Parking Space.

Agar Grove

Enlarge this map

Nearest stations

Camden Road (0.4 mi)
Camden Town (0.5 mi)
Mornington Crescent (0.5 mi)

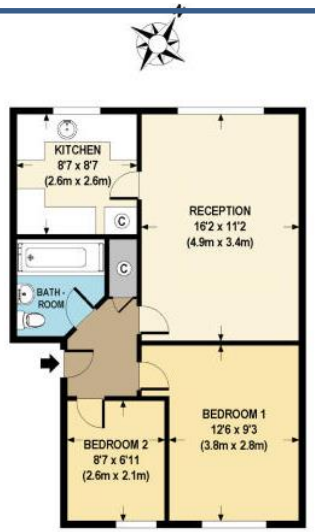
Distances are straight line measurements from centre of postcode

View Tube and Rail map

Nearest schools

Use the school checker ›

Check Broadband Speed



GROSS INTERNAL FLOOR AREA 530 SQ. FT.

Flat #2

rightmove Buy Rent Find Agent House Price

Furnishing:	Furnished
Letting type:	Long term
Added on Rightmove:	16 February 2017 (3 days ago)

Key features

- Large Two Double Bedroom Flat
- Pub Conversion
- Two Bathrooms
- Over Two Floors
- Solid Wood Flooring Throughout
- Bright and Spacious
- Furnished
- Moments from Camden Town's Stables Market

Full description

A large and modern two double bedroom, two bathroom flat set over two floors of a converted public house moments from Camden Town Market.

The property is located in a secure building moments from the Stables Market and has undergone a recent renovation. Benefits from a large open plan reception room with a fully equipped kitchen and dual aspect windows that draw in a great amount of natural light, two large double bedroom with built-in storage and two bathrooms (master with en suite). The property is neutrally decorated throughout whilst attracting a great amount of natural light. Further benefits include good storage space and solid wood flooring.

Enlarge this map

Nearest stations

Camden Road (0.2 mi)
Kentish Town West (0.2 mi)
Camden Town (0.3 mi)

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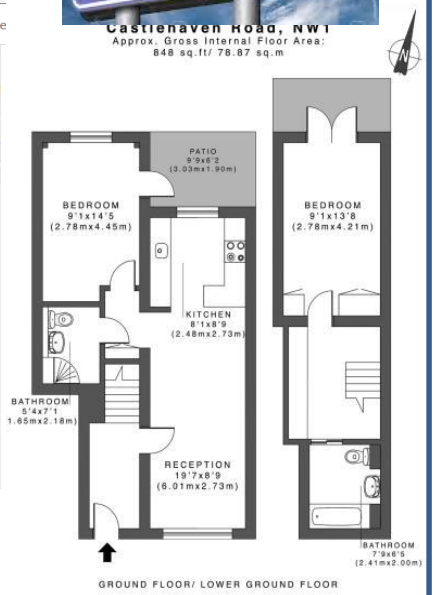

What is a technology-mediated task?

- Primary focus is on meaning
- Goal-oriented
- Learner-centred
- Authentic
- Opportunities for reflective learning

González-Lloret and Ortega (2014)

Rationale for TBLT

- In second language pedagogy, the construct of **communicative language task** has been promoted and increasingly used as **a curricular unit**.

- Two key reasons:
  - pedagogic tasks prepare learners to carry out **genuine communicative tasks** aligned with their future academic, professional, vocational, and/or personal needs
  - **psycholinguistics research** suggests that syllabi based on pedagogic tasks are more in harmony with language learning processes than traditional syllabi

Task-based syllabus

1. Task-based needs analysis

Identify tasks that students need to do using the L2 in real-life settings

What did we do?

- Researched webpages of London universities providing guidance to new students/international students
- Interviewed newly arrived international students about difficulties experienced
- Interviewed staff at UCL international office, admissions, and housing
- Asked international/local students to keep log of activities during their first two weeks of stay

Triangulated sources

List of target tasks

1. Open a bank account
2. Register at a General Practitioner
3. Call an on-call GP using the National Health Service helpline
4. Register at university
5. Register at a gym
6. Purchase a SIM Card
7. Rent a flat (see letting agent, look at flats, sign contract)
8. Purchase a bike
9. Apply for National Insurance Number
10. Register at police station

List of target tasks

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This task included a number of sub-tasks:

- Searching for accommodation options on the web
- Read the University of London housing guide online to identify steps in renting a flat
- Choose an area to live
- Contact an estate agent (via phone/e-mail/in person)
- Complete online form about personal information and preferences
- If in London already, view a flat
- Choose a flat based on information online or based on viewing

Many of them were technology-mediated

- **Searching for accommodation options on the web**
- **Read the University of London housing guide online to identify steps in renting a flat**
- Choose an area to live
- **Contact an estate agent (via phone/e-mail**/in person)
- **Complete online form about personal information and preferences**
- If in London already, view a flat
- **Choose a flat based on information online** or based on viewing

Task-based syllabus

1. Task-based needs analysis
2. Derive **pedagogic tasks**

Tasks that are included in actual teaching and learning materials

A technology-mediated task

You have decided to rent a flat with a friend while studying in London. After viewing a few flats on *rightmove.co.uk*, you and your friend have narrowed down your choice to two flats in Camden. Now you have scheduled a Skype call to decide which of the two flats to rent, based on the information you found online. Before calling your friend, read the information about the flats and decide what the pros and cons of each are.

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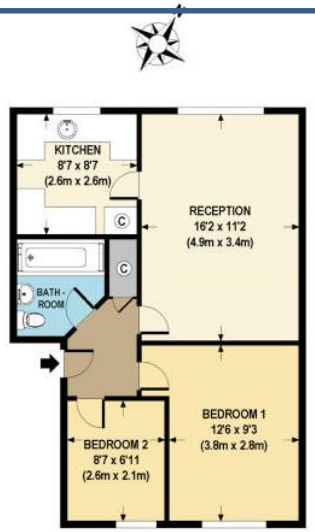

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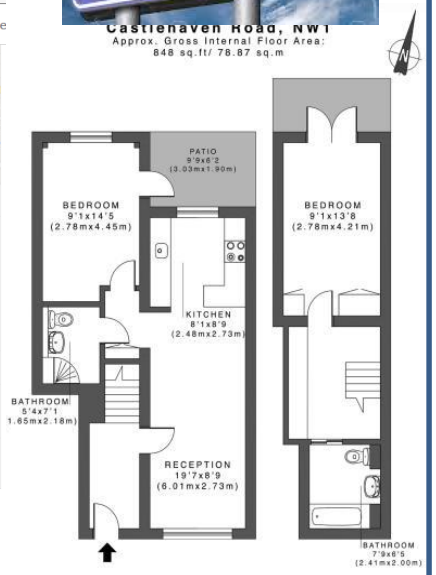


Task-based syllabus

1. Task-based needs analysis
2. Derive pedagogic tasks
3. **Grade** and **sequence pedagogic tasks** to form a syllabus

Task-based language teaching

- syllabus is based on pedagogic tasks

How tasks should be **graded** and **sequenced** in the task-based syllabus in order to create **optimal conditions** for second language learning?

Task-based language teaching

- syllabus is based on pedagogic tasks

On what basis should teachers or course designers decide whether a task should come earlier or later in the syllabus?

Task complexity: A basis for grading and sequencing tasks

Task complexity refers to the inherent cognitive demands of tasks.

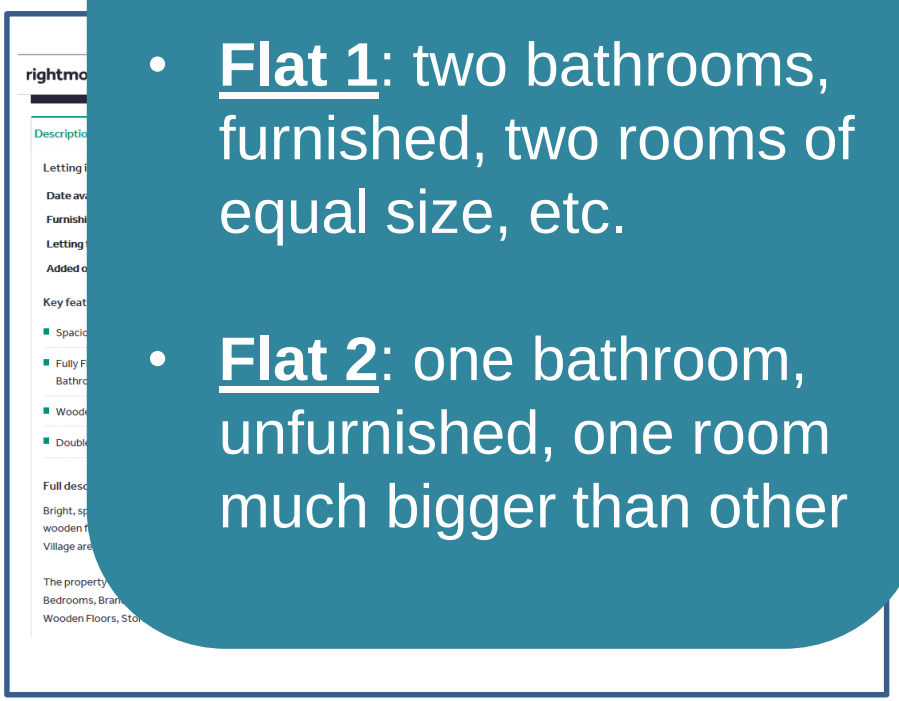
For example,

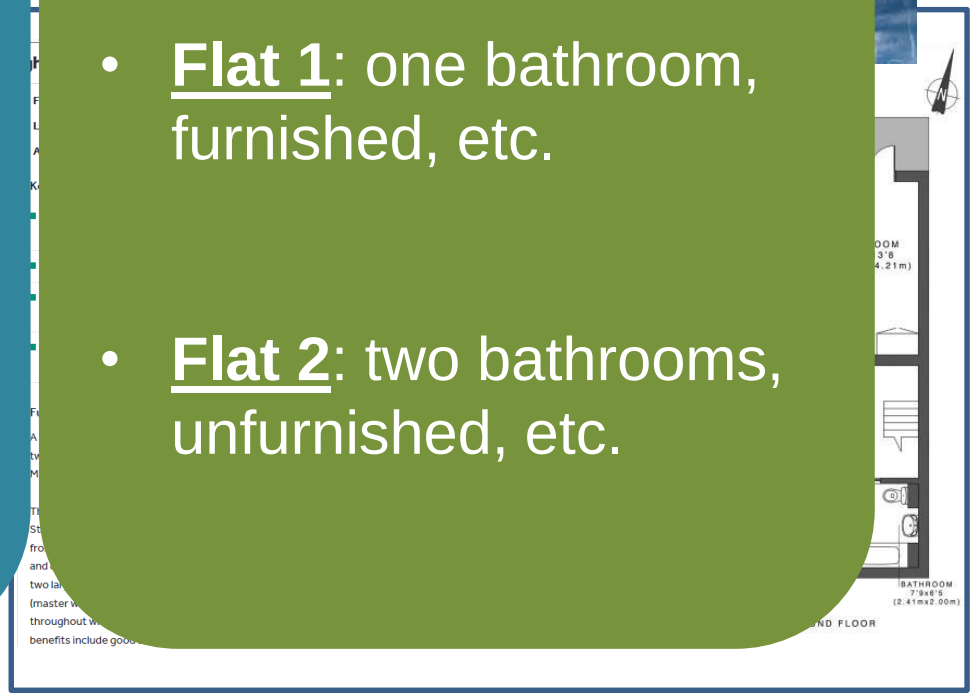
More complex task		Less complex task
more elements more reasoning	>	fewer elements less reasoning

A technology-mediated task

You have decided to rent a flat a friend while studying in Londo ter viewin k, you down you de e. Be t the

Flat





SIMPLE VERSION

One flat much more suitable than the other

- **Flat 1**: two bathrooms, furnished, two rooms of equal size, etc.
- **Flat 2**: one bathroom, unfurnished, one room much bigger than other

COMPLEX VERSION

More difficult to decide between two flats

- **Flat 1**: one bathroom, furnished, etc.
- **Flat 2**: two bathrooms, unfurnished, etc.

Task complexity: A basis for grading and sequencing pedagogic tasks

Using task complexity as a basis, two models have been put forward to guide task grading and sequencing decisions

Trade-off Hypothesis

Cognition Hypothesis

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Trade-off Hypothesis

Cognition Hypothesis

Skehan's scheme for task analysis (1998)

Code complexity	Cognitive complexity	Communicative stress
➢ Linguistic complexity and variety ➢ Vocabulary load and variety ➢ Redundancy and density	Cognitive familiarity ➢ Familiarity of topic ➢ Familiarity of genre ➢ Familiarity of task Cognitive processing ➢ Structure ➢ Explicitness ➢ Clarity ➢ Amount of 'computation'	➢ Time pressure ➢ Number of participants ➢ Text length ➢ Opportunities to control interaction

Task complexity: A basis for grading and sequencing pedagogic tasks

Using task complexity as a basis, two models have been put forward to guide task grading and sequencing decisions

Trade-off Hypothesis

Cognition Hypothesis

Robinson's notion of task complexity (2001)

Task complexity refers to the inherent **cognitive** demands of tasks.

Similar to Skehan's cognitive complexity

Robinson’s notion of task complexity (2001)

Resource-directing (conceptual demands)	Resource-dispersing (procedural demands)
+/- here-and-now	+/- planning time
+/- few elements	+/- prior knowledge
+/- spatial reasoning	+/- single task
+/- causal reasoning	+/- task structure
+/- intentional reasoning	+/- few steps

Cognitive-interactionist models of TBLT

Independent variable → **Causal processes** → **Dependent variables**

Trade-off Hypothesis

Cognition Hypothesis

Task demands/ complexity

Attention

Conceptualisation

Formulation

Monitoring

Complexity
Accuracy
Fluency

Complexity, accuracy, and fluency (CAF)

- **Complexity (C)**: How advanced and elaborate the language is
- **Accuracy (A)**: The extent to which error is avoided
- **Fluency (F)**: How fast, smooth, uninterrupted performance is

Cognitive-interactionist models of TBLT

Independent variable → **Causal processes** → **Dependent variables**

Trade-off Hypothesis

Cognition Hypothesis

Task demands/ complexity

Attention

Conceptualisation

Formulation

Monitoring

Complexity
Accuracy
Fluency

Interaction-driven language learning opportunities

Interaction-driven language learning opportunities

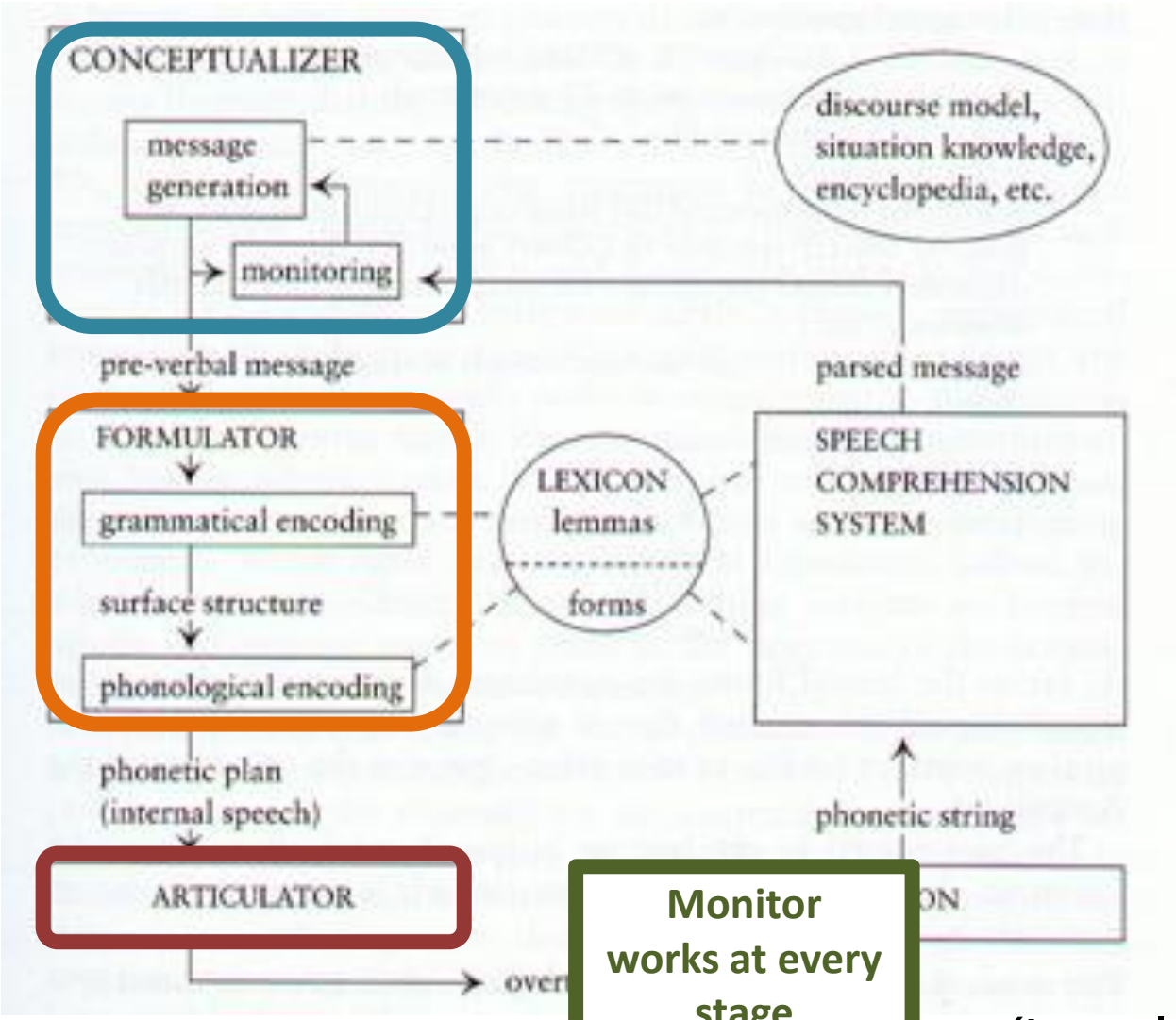
- Language-related episodes (LREs)
- Negotiation of meaning
- Provision and processing of feedback

Skehan draws on Levelt's model of speech production

Planning what to say

Grammatical, lexical, and phonological encoding of message

Production of speech sounds



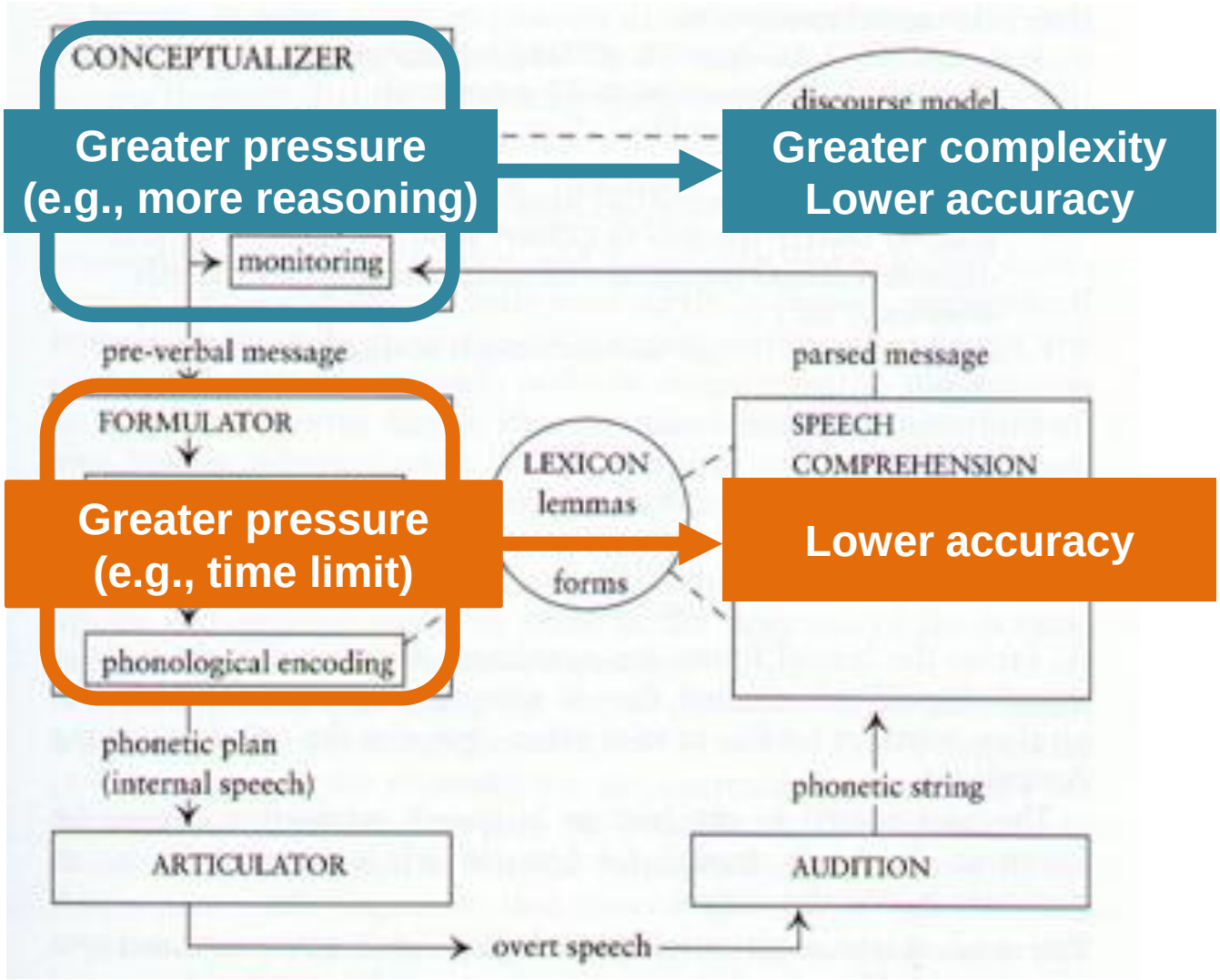
Monitor works at every stage

(Levelt, 1989)

Skehan (2009)

Planning what to say

Grammatical, lexical, and phonological encoding of message



(Levelt, 1989)

Robinson's Cognition Hypothesis (2001)

Resource-directing (conceptual demands)	Resource-dispersing (procedural demands)
+/ ore-an y	+/ nning tim
+/ w ele	+/ or knowle
+/ patial ning	+/ gle task
+/ ausal ning	+/ k struc
+/ tentio asoni	+/ v steps

Task complexity

Complexity
Accuracy

Fluency

Task complexity

Complexity
Accuracy
Fluency

Robinson’s Cognition Hypothesis (2001)

Resource-directing (conceptual demands)	Resource-dispersing (procedural demands)
+/- here-and-no	+/- nning tim
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+/- ausal rea	+/- k struct
+/- tentional ng	+/- v steps

Task complexity

Interaction
Feedback
Development

Task complexity

Interaction
Feedback
Development

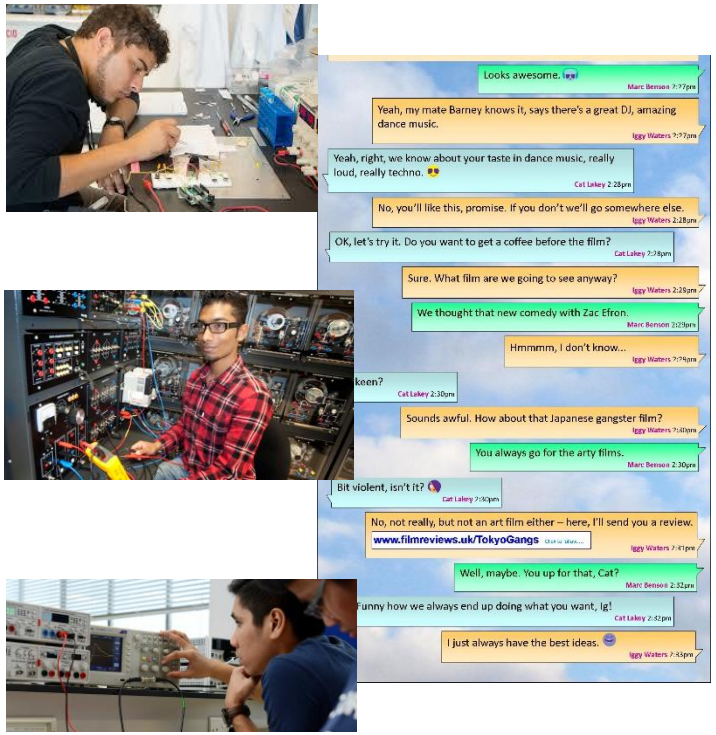
Empirical research on task complexity in technology-mediated contexts

- Only a small number of studies
- Typically conceptualised in terms of the Trade-Off Hypothesis and Cognition Hypothesis

Nik, Adams & Newton (2012)

Participants:

- Engineering students at a technical university in Malaysia



Task:

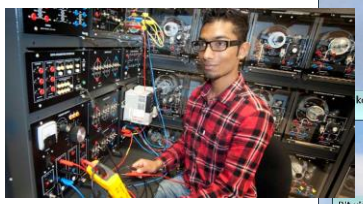
- 45 min interactive problem-solving task
- Participants played the role of engineers in multinational company
- Had to decide what type of electrical engineering software to adopt
- Instructed to compare and contrast software and reach a decision

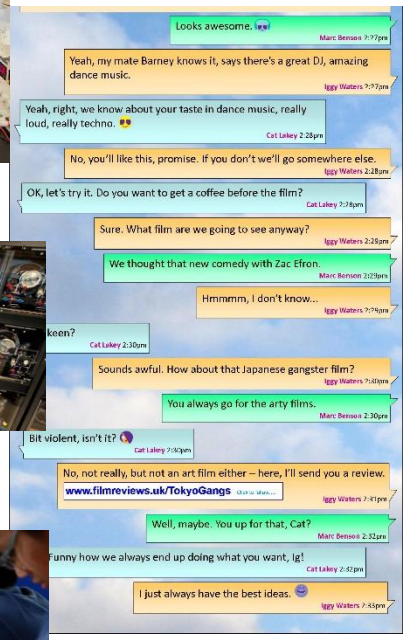
Nik, Adams & Newton (2012)



Task complexity operationalised as

- Low versus high **task structure**
- Presence versus absence of language support



Low structure:

- No guidance how to complete task

High structure:

- Guidance how to complete task (students given a comparison table)

Robinson's Cognition Hypothesis (2001)

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+/- few elements	+/- prior knowledge
+/- spatial reasoning	+/- single task
+/- causal reasoning	**+/- task structure**
+/- intentional reasoning	+/- few steps

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+/- causal reasoning	**+ sk stru**
+/- intentional reasoning	+ w steps

Task complexity

Language-related episodes

Language-related episodes

Any part of the discourse “where students talk about language they are producing, question their language use, or other- or self-correct their language production”

(Swain & Lapkin, 2001, p. 104)

Learner	Chat exchange
Yasmin	madi. . . hani will explains first ok
Hani	kk thanks
Yasmin	b quick hani
Madi	wiat! after will, we canot put s
Hani	what madi?
Jack	*yasmin- she will explain-
Madi	will explain - don’t pout s
Yasmin	oh ok ok. quick!

From Nik, Adams & Newton (2012)

Robinson's Cognition Hypothesis (2001)

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Task complexity

Language-related episodes

Contrary to Cognition Hypothesis

Adams, Nik & Newton (2015)

Resource-directing (conceptual demands)	Resource-dispersing (procedural demands)
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How will task complexity affect linguistic complexity and accuracy?

Following the Cognition Hypothesis,

Resource-directing (conceptual demands)	Resource-dispersing (procedural demands)
+/- here-and-now	+/- nning tim
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+/- intentional reasoning	+/- v steps

Task complexity

Complexity
Accuracy

Adams, Nik & Newton (2015)

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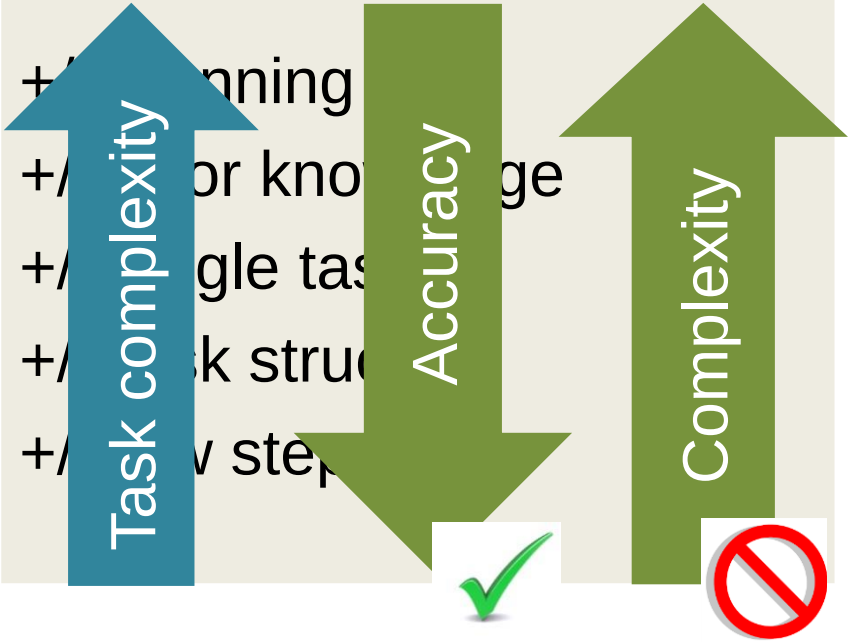

Mixed findings for Cognition Hypothesis

Adams, Nik & Newton (2015)

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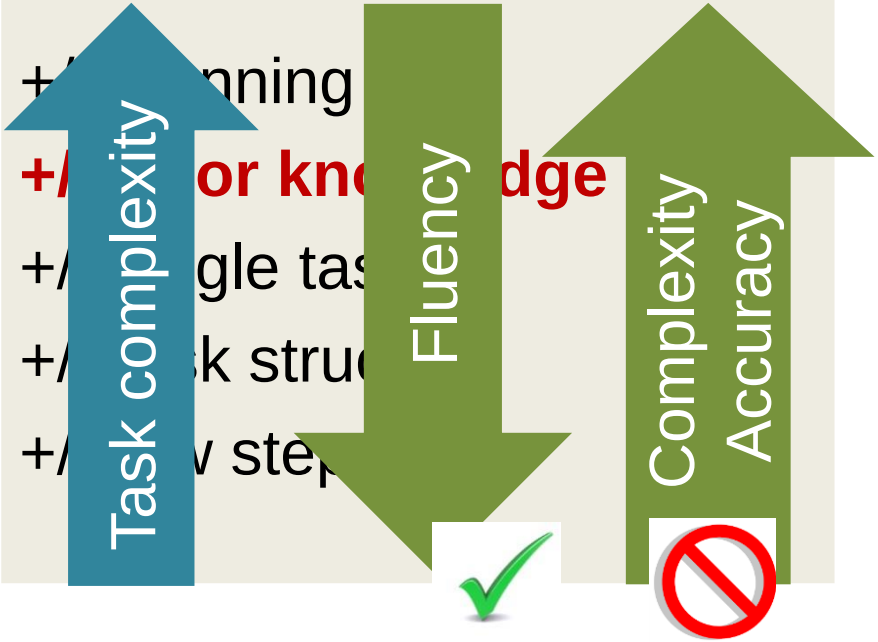

Mixed findings for Cognition Hypothesis

Role of planning in text-chat interaction

Lai et al (2008), Ziegler (2018), Hsu (2012, 2015)

Resource-directing (conceptual demands)	Resource-dispersing (procedural demands)
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Mixed findings for both
Trade-off and Cognition Hypotheses

Robinson's Cognition Hypothesis (2001)

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+/- causal r	
+/- intentional	

Are the results different for resource-directing features?

Baralt (2013)

- Pretest-posttest design
- Two treatment tasks
  - Interacting with researcher in text-chat or face-to-face
  - Participants required to retell story

A house keeper is wrongly accused of stealing jewelry

Two adolescents are invited to play for the city's football team

Task complexity manipulation

The Martínez family had a house cleaner, Srta. Gómez. Srta. Gómez always arrived on time, cleaned the house well, cooked good food, and cared for the children. The family really liked her and had trust in her. Srta. Gómez recently mentioned that the economic situation of her own family was bad, but overall, she was a positive and hard working person. Every morning, Sra. Martínez would wake up and make coffee as she waited for Srta. Gómez. When Srta. Gómez arrived, Sra. Martínez always smiled. She was happy that Srta. Gómez worked for them.

SIMPLE

<

Intentional reasoning

COMPLEX

Robinson's Cognition Hypothesis (2001)

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Task complexity

Development

✓ Face-to-face

⊘ Text-chat

To summarise, …

Overall, **results of empirical studies are mixed** providing no clear support for either hypothesis.

Trade-off Hypothesis

Cognition Hypothesis

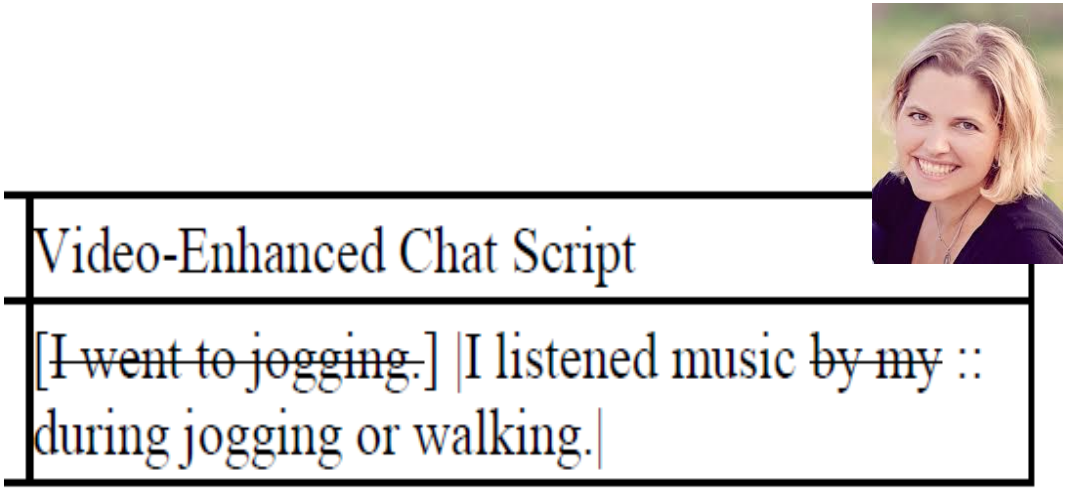
BUT they **DO show task effects** on L2 performance, interaction and development.

Why do you think previous empirical research has yielded mixed findings?

1. **Methodological problems in studies**
2. Theoretical models should make different predictions for SCMC
3. Different task complexity factors specific to SCMC should be studied

Different CAF constructs tapped in SCMC and FTF modalities

- In text-chat studies of task complexity, chat logs are typically used to measure accuracy and complexity.
- **<u>Problem</u>**: participant may edit production before sending off message
  - Self-corrections, false starts, repetitions excluded



Other methodological issues also apply to larger field of task complexity research …

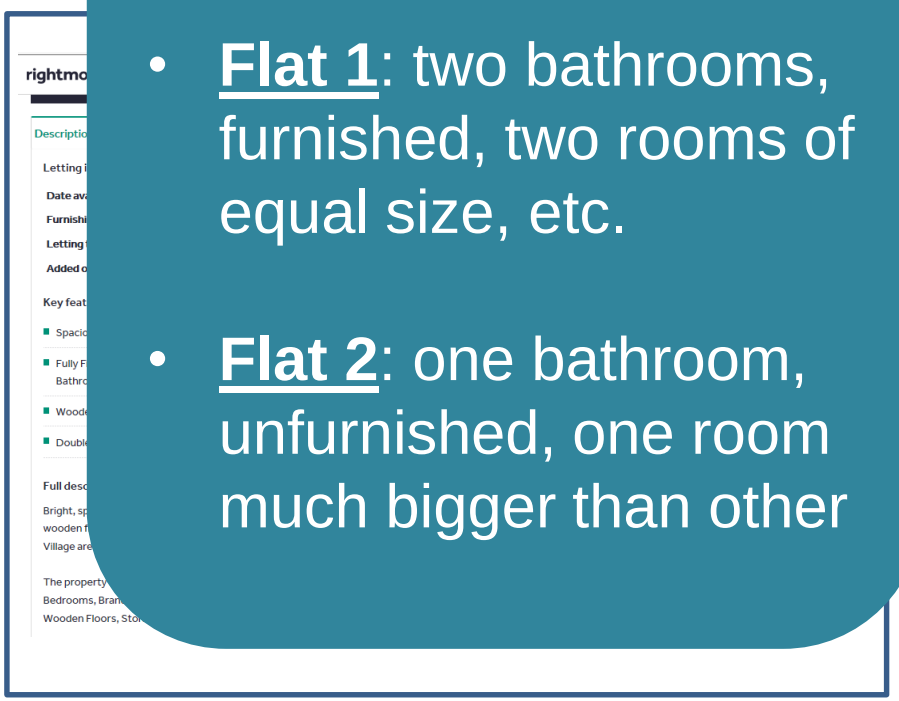
- Both in SCMC and FTF settings, the most common design investigating task complexity involves:

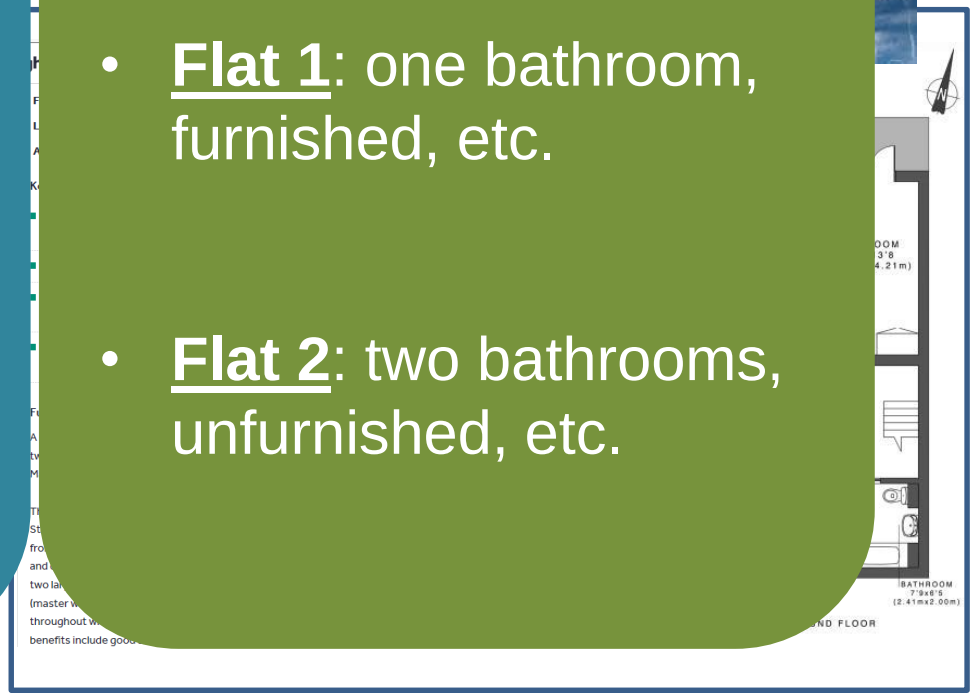
  1. Designing a task and manipulate the task along a task dimension believed to increase cognitive complexity

A technology-mediated task

You have decided to rent a flat a friend while studying in Londo ter viewin k, you down you de e. Be t the

Flat





SIMPLE VERSION

One flat much more suitable than the other

- **Flat 1**: two bathrooms, furnished, two rooms of equal size, etc.
- **Flat 2**: one bathroom, unfurnished, one room much bigger than other

COMPLEX VERSION

More difficult to decide between two flats

- **Flat 1**: one bathroom, furnished, etc.
- **Flat 2**: two bathrooms, unfurnished, etc.

Other methodological issues also apply to larger field of task complexity research …

- Both in SCMC and FTF settings, the most common design investigating task complexity involves:

  1. Designing a task and manipulate the task along a task dimension believed to increase cognitive complexity

  2. **Measuring learner performances in terms of accuracy and complexity under both simple and complex task conditions**

Cognitive-interactionist models of TBLT

Independent variable → **Causal processes** → **Dependent variables**

Trade-off Hypothesis

Cognition Hypothesis

Task demands/ complexity

Attention

Conceptualisation

Formulation

Monitoring

Complexity
Accuracy
Fluency

Other methodological issues also apply to larger field of task complexity research …

- Both

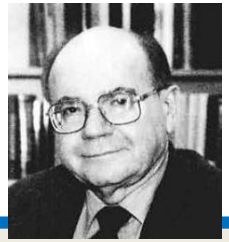
This conclusion, however, often lacks construct validity.

Why?

2. Meas
   and complexity under and co
   conditions

3. **If a significant difference found between the two complexity conditions in terms of CAF, this is usually taken to prove a significant relationship between cognitive and linguistic complexity.**

How to asses theoretical models

If we would like to assess theoretical models adequately, we need to **provide evidence for the validity of each and every construct** in them. Otherwise, we won't be able to reach valid and meaningful interpretations about the models.

(Kane, 2006; Messick, 1995; Norris & Ortega, 2003)

To take the TOH and CH as an example, …

Independent variable → **Causal processes** → **Dependent variables**

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To take the TOH and CH as an example, …

Independent variable → **Causal processes** → **Dependent variables**

Trade-off Hypothesis

Much progress has been made in understanding and exploring CAF measures (e.g., Bulte & Housen, 2013; Housen & Kuiken, 2009; Housen, Kuiken & Vedder, 2012; Norris & Ortega, 2009)

Cognition Hypothesis

These advances also reflected in SCMC work (e.g., Adams & Nik, 2014; Adams et al., 2015; Hsu, 2015; Ziegler, 2018)

Complexity
Accuracy
Fluency

To take the TOH and CH as an example, …

processes → **Dependent variables**

But how can we go about this?

Trade-off Hypothesis

Task c

more studies include
ependent measures of
cognitive load/ mental effort.
(e.g., Baralt, 2013; Malicka, 2019;
2012; Révész, Sachs,
Gilabert,

Cognition Hypothesis

How can we provide inpedendent evidence for a task complexity manipulation?

on to
follow this practice.

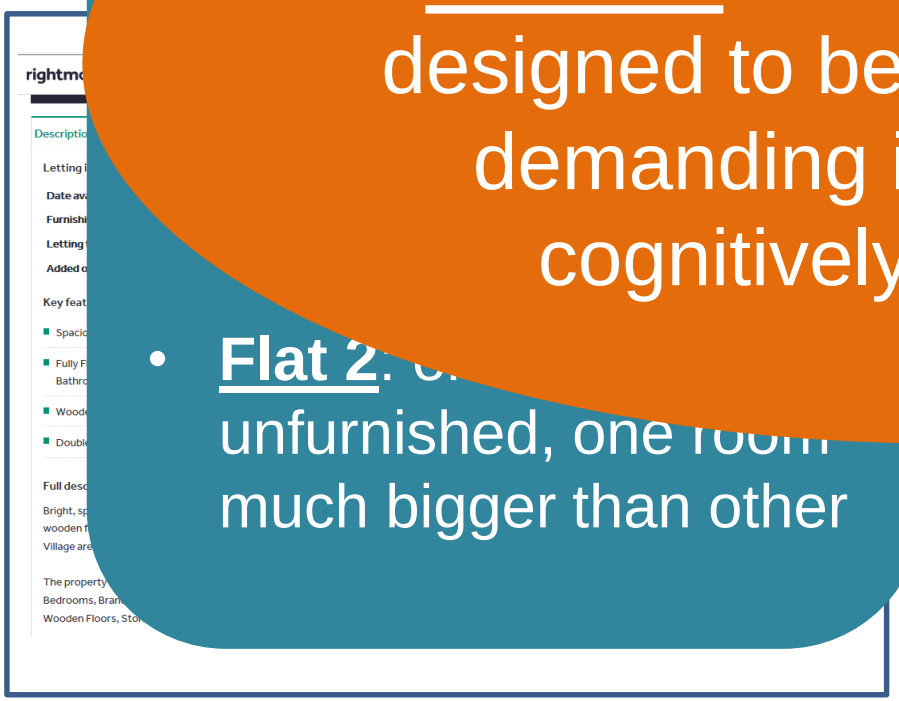
A technology-mediated task

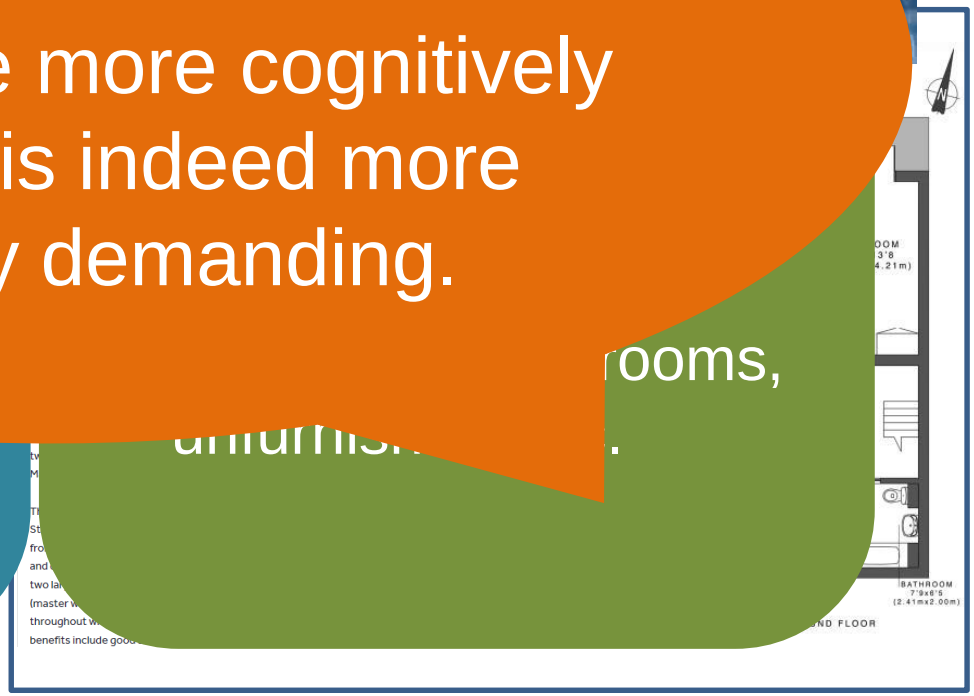
You have decided to rent a flat a friend while studying in Londo ter
viewin k, you down
you
de **SIMPLE VE** **Y VERSION** e.
Bef t
the

Flat

We need to **show rather than assume** that the task version designed to be more cognitively demanding is indeed more cognitively demanding.

- **Flat 2**: o rooms, unfurnished, one room unfurnis . much bigger than other





Independent measures of task complexity

What are some possible ways of independently measuring task complexity? How can we provide evidence that tasks designed to be more cognitively complex are indeed more cognitively demanding?

Methods used to determine cognitive load or mental effort by L2 researchers include:

1. Subjective self-ratings
2. Subjective time estimations
3. Dual-task methodology
4. Eye-tracking data

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Independent measures of task complexity: Rating scales

- Likert-scale statement from Robinson (2001):

1. **I thought this task was easy/I thought this task was hard.**
2. I felt relaxed doing this task/I felt frustrated doing this task.
3. I didn't do well on this task/I did well on this task.
4. This task was not interesting/This task was interesting.
5. I don't want to do more tasks like this/I want to do more tasks like this.

Perception of task difficulty

- Multiple semantic differential scale

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Perceived stress

- Multiple semantic differential scale

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Perceived ability to complete task

- Multiple semantic differential scale

Independent measures of task complexity: Rating scales

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4. **This task was not interesting/This task was interesting.** Interest in task
5. I don't want to do more tasks like this/I want to do more tasks like this.

- Multiple semantic differential scale

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Motivation

- Multiple semantic differential scale

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Independent measures of task complexity: Subjective time estimation

- Involves asking participants to estimate the length of time they have taken to perform a task.

- When participants are asked to assess task duration retrospectively, the estimated time increases as a result of increasing processing demands (Block et al., 2010)

- When working on a more cognitively demanding task, time is perceived to pass more slowly (if judgment made after task completion).

- Used in Baralt (2013)

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3. **Dual-task methodology**
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Dual task methodology

- Involves performing a secondary task concurrently with the primary task.
- Secondary tasks typically include simple activities that require sustained attention, such as detecting
  - a simple visual stimulus (Cierniak et al., 2009)

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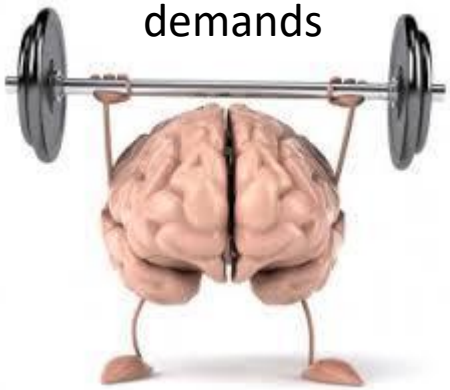
- Involves performing a secondary task concurrently with the primary task.
- Secondary tasks typically include simple activities that require sustained attention, such as detecting
  - a simple visual stimulus (Cierniak et al., 2009)
  - or auditory stimulus (Brünken et al., 2004).

Dual task methodology

Primary task

Cognitive demands



Secondary task

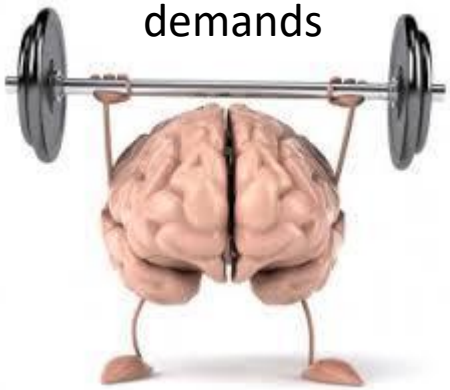
Accuracy

Reaction time

Dual task methodology

Primary task

Cognitive demands



Secondary task

Accuracy

Reaction time

Dual Task Methodology
(Révész et al., 2014; Révész et al., 2016)

- **Primary task**
  - simple versus complex versions of oral production tasks
- **Secondary task**
  - Colour of computer background screen changed to **red** or **green** at random (for 250ms within 2500ms).
  - Participants instructed to react as fast and accurately as possible to changes to **green** and ignore changes to **red**

From Révész, Michel, & Gilabert, 2016)

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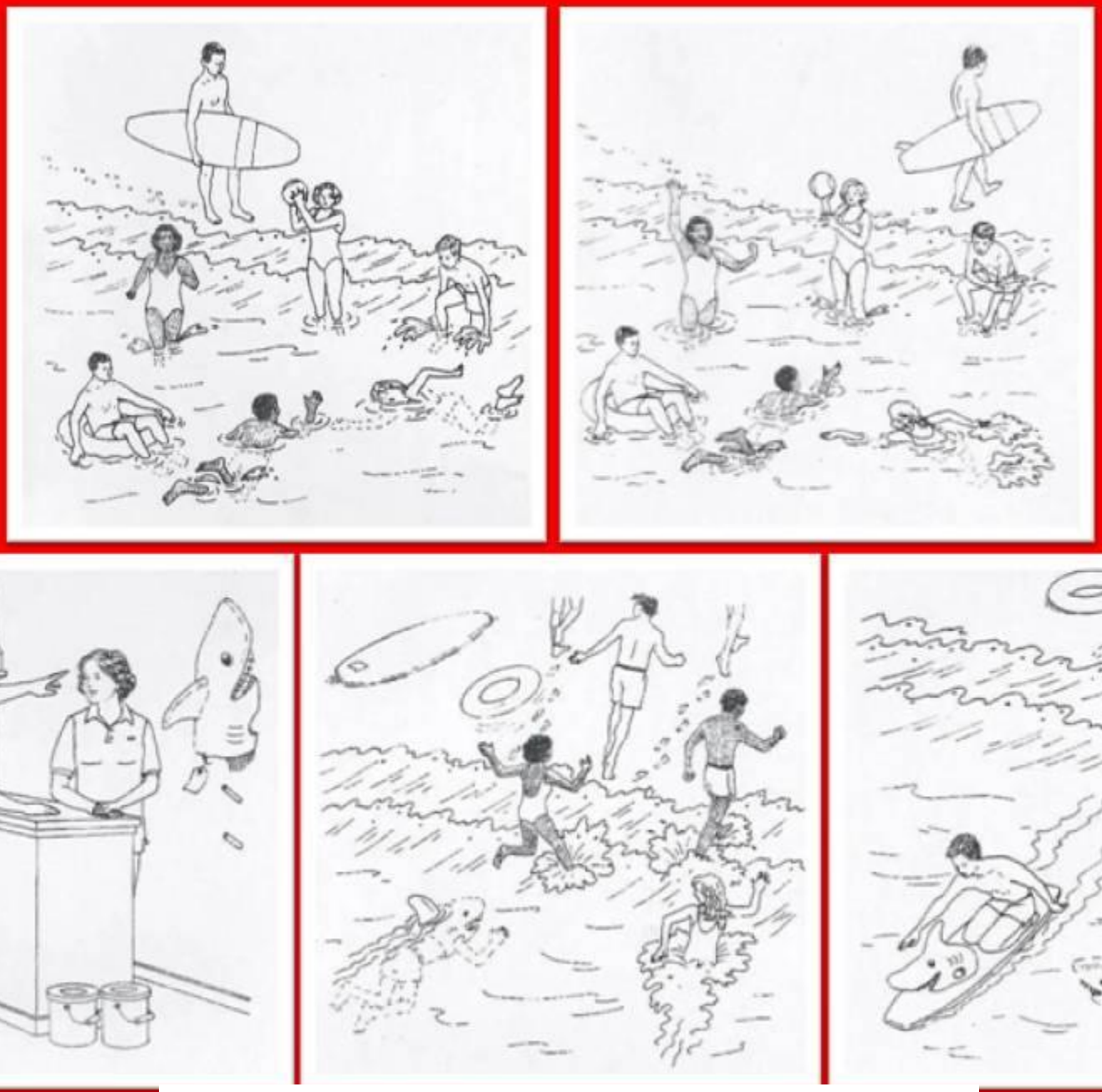

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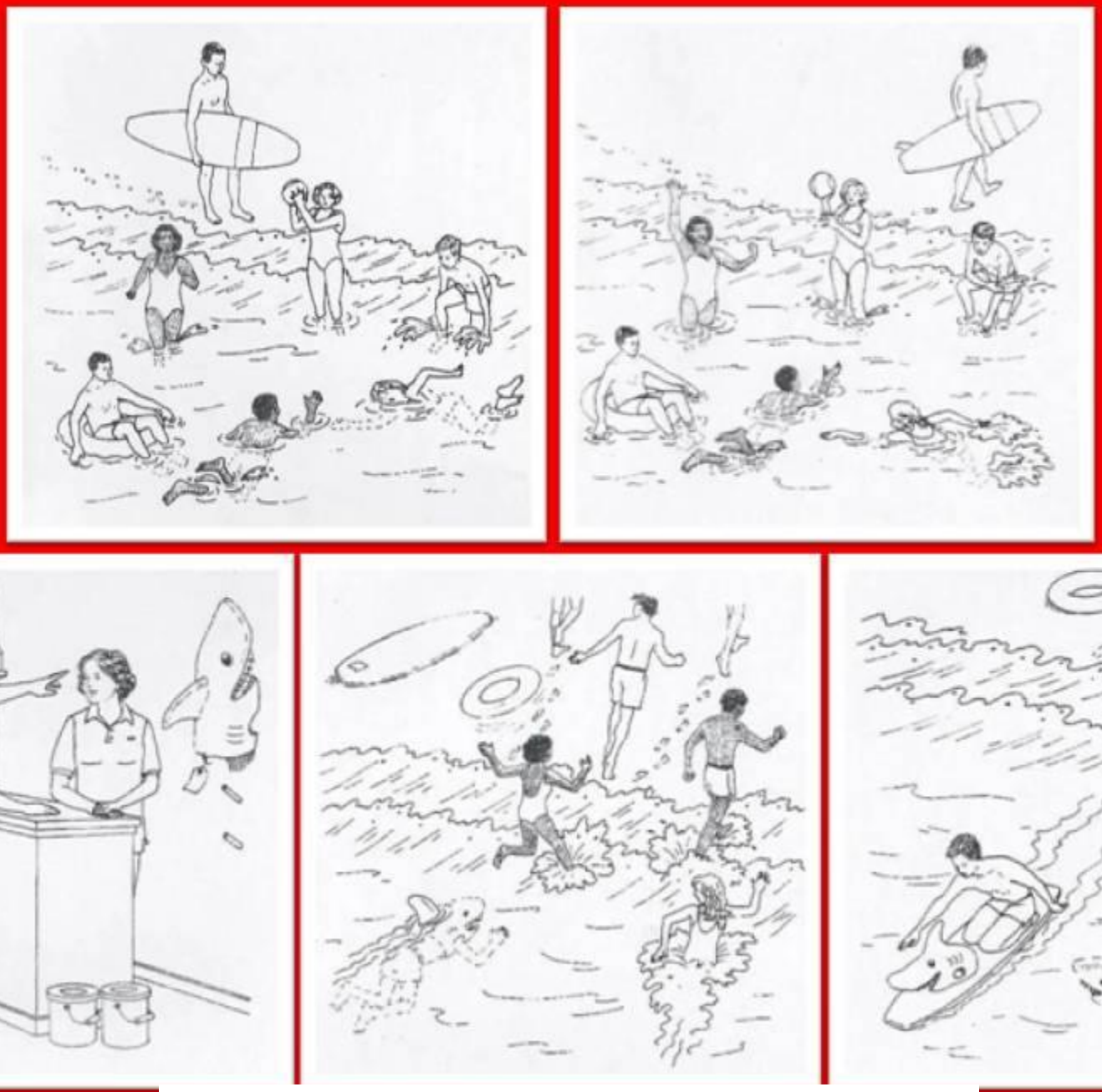

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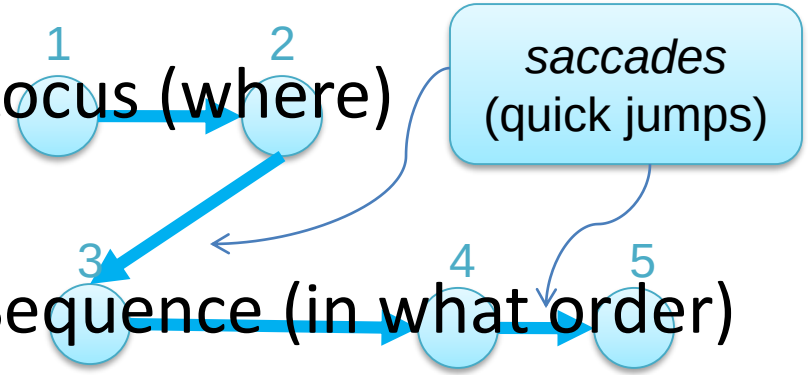
4. **Eye-tracking data**

Eye-tracking
(Conklin, Pellicer-Sánchez, & Carrol, 2018; Godfroid, 2019)

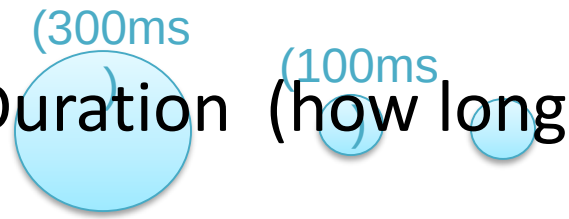
Recording the moment-by-moment **eye fixations** of an individual interacting with a visual stimulus

– Locus (where)

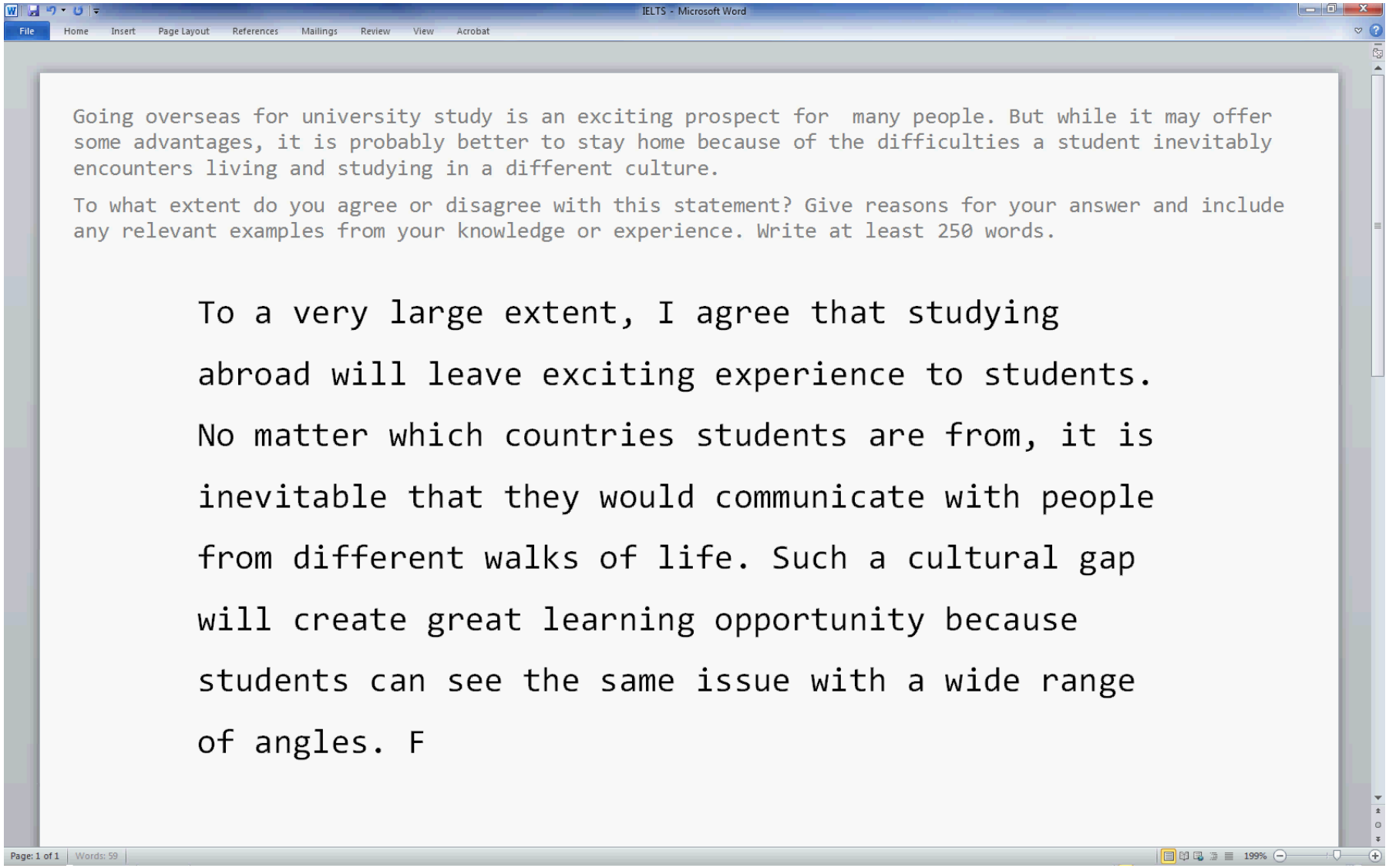


– Sequence (in what order)

– Duration (how long)



Eye fixations and saccades



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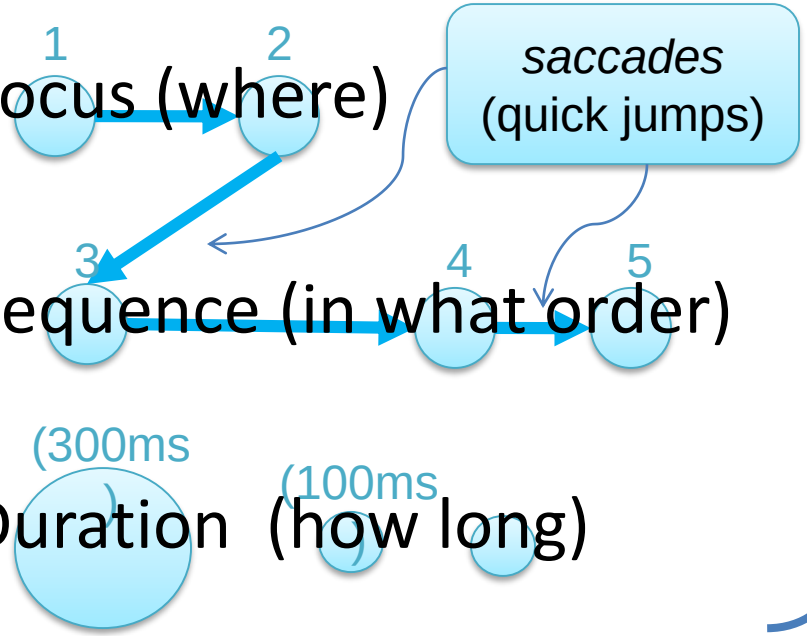
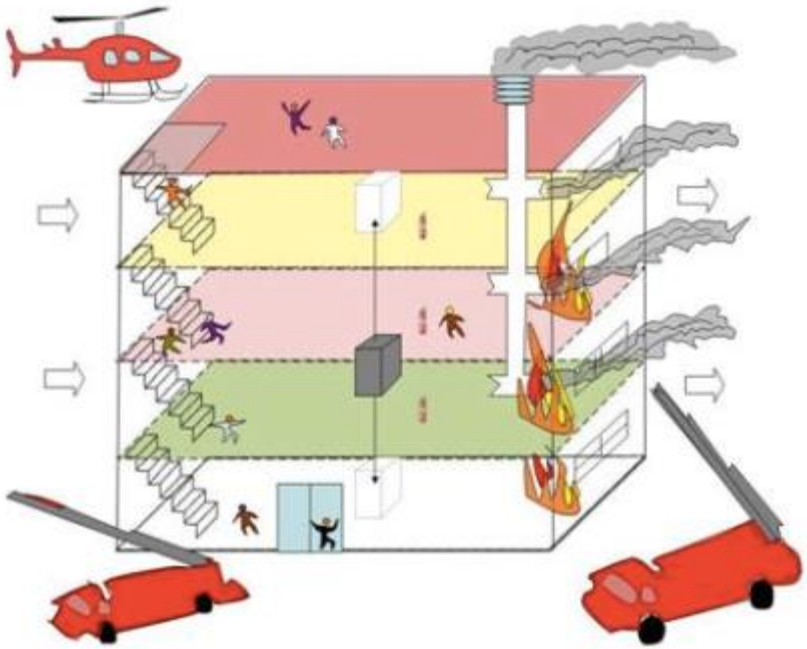


Reflect attentional processes in decoding & interpreting info

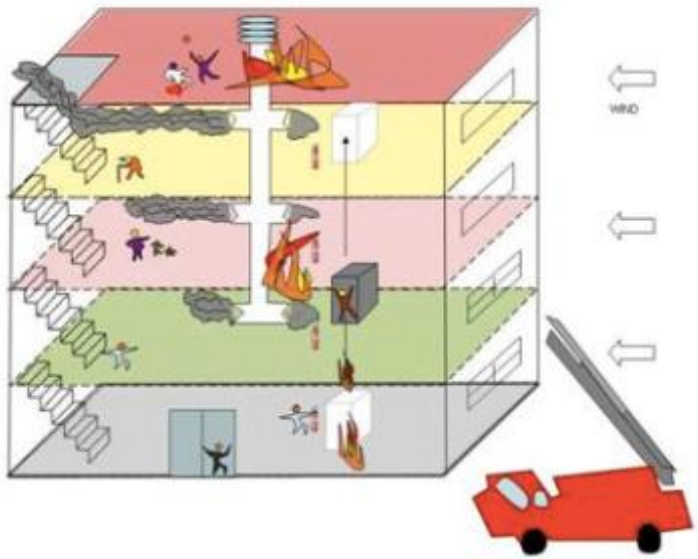
(Just & Carpenter, 1980; Rayner, 1998)


Michel, Gilabert, & Révész (2014)

- Participants asked to imagine that they volunteered for the university's fire emergency team, and explain which actions they would take and in what order to save as many people as possible in case of an emergency.



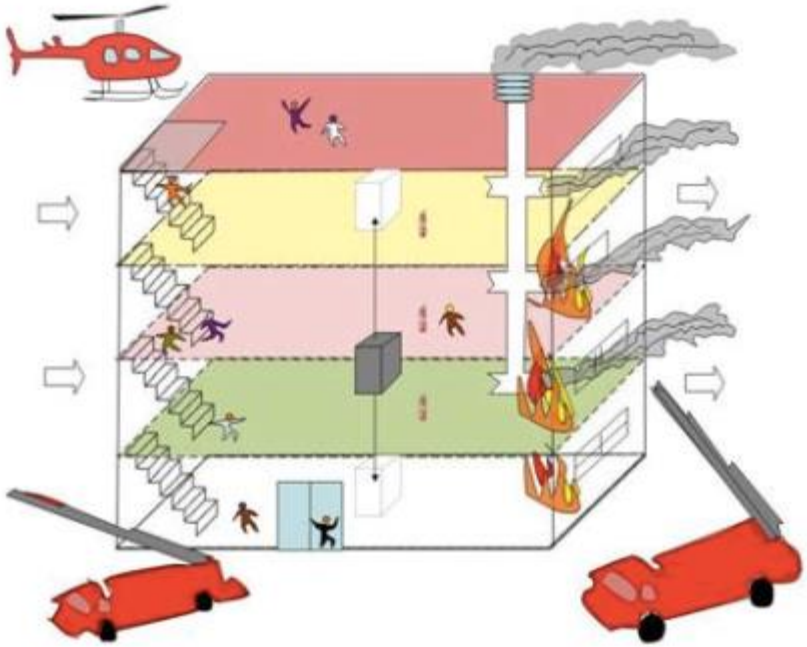
SIMPLE
less reasoning



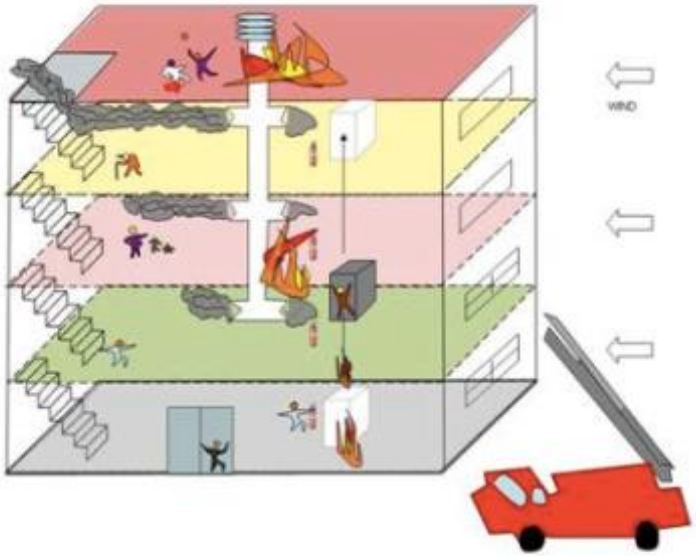
COMPLEX
more reasoning


We hypothesized ….

- ↑ number of fixations ✗
- ↑ mean fixation duration ✓



SIMPLE
less reasoning



COMPLEX
more reasoning

To take the TOH and CH as an example, …

Independent variable → **Causal processes** → **Dependent variables**

Trade-off Hypothesis

Cognition Hypothesis

Task demands/ complexity

Attention

Conceptualisation

Formulation

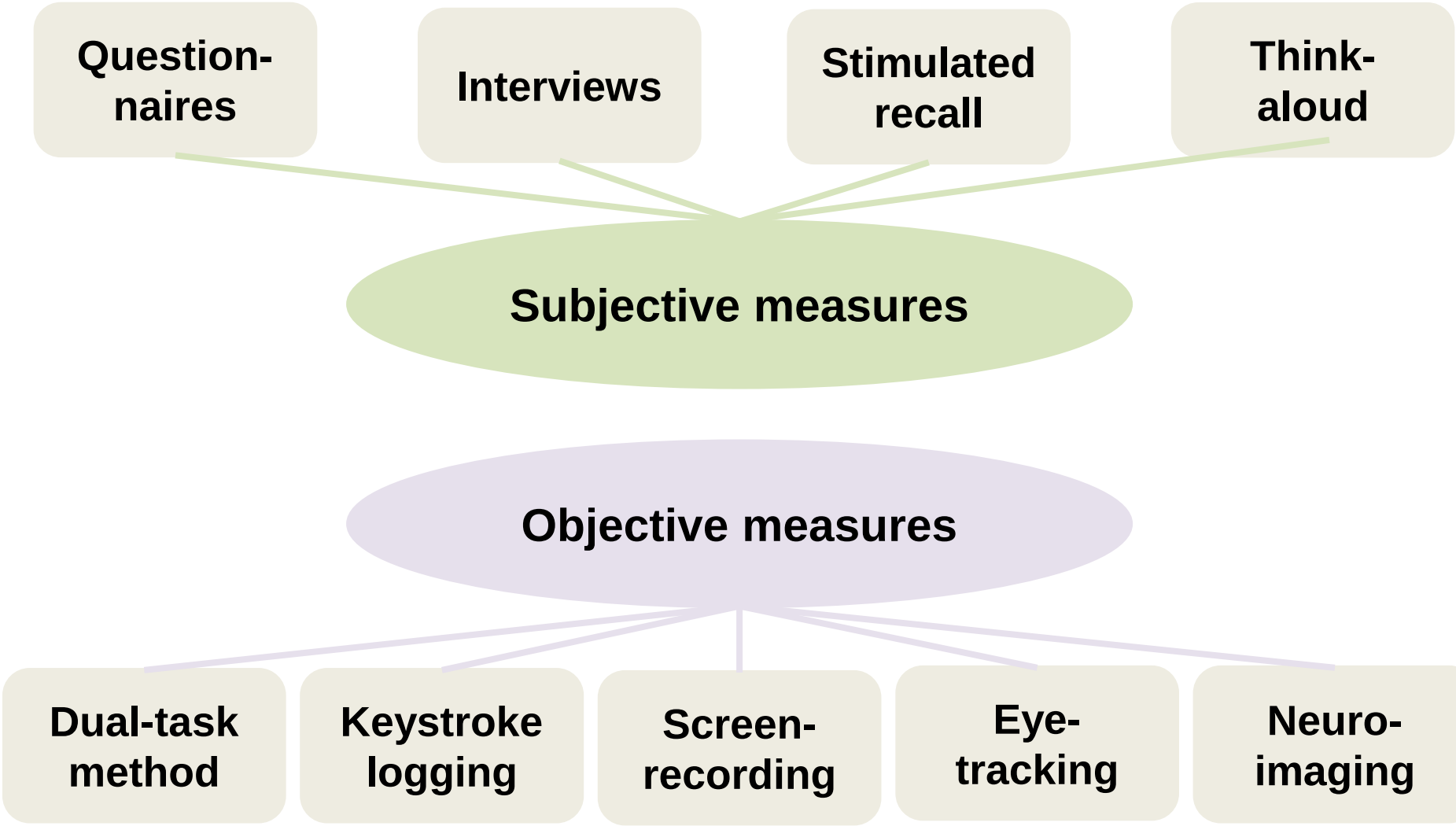
Monitoring

Complexity
Accuracy
Fluency

Providing validity evidence for task-based processes

How to investigate task-based processes? **What tools** do TBLT researchers have to look into task-based processes?

How to investigate task-based processes?



Each method has pros and cons …

Question-
nai

Think-
d

The best way to overcome these is to combine them in ways that suit our research questions.

Some technology-mediated TBLT studies have done exactly this!

Dual-task method

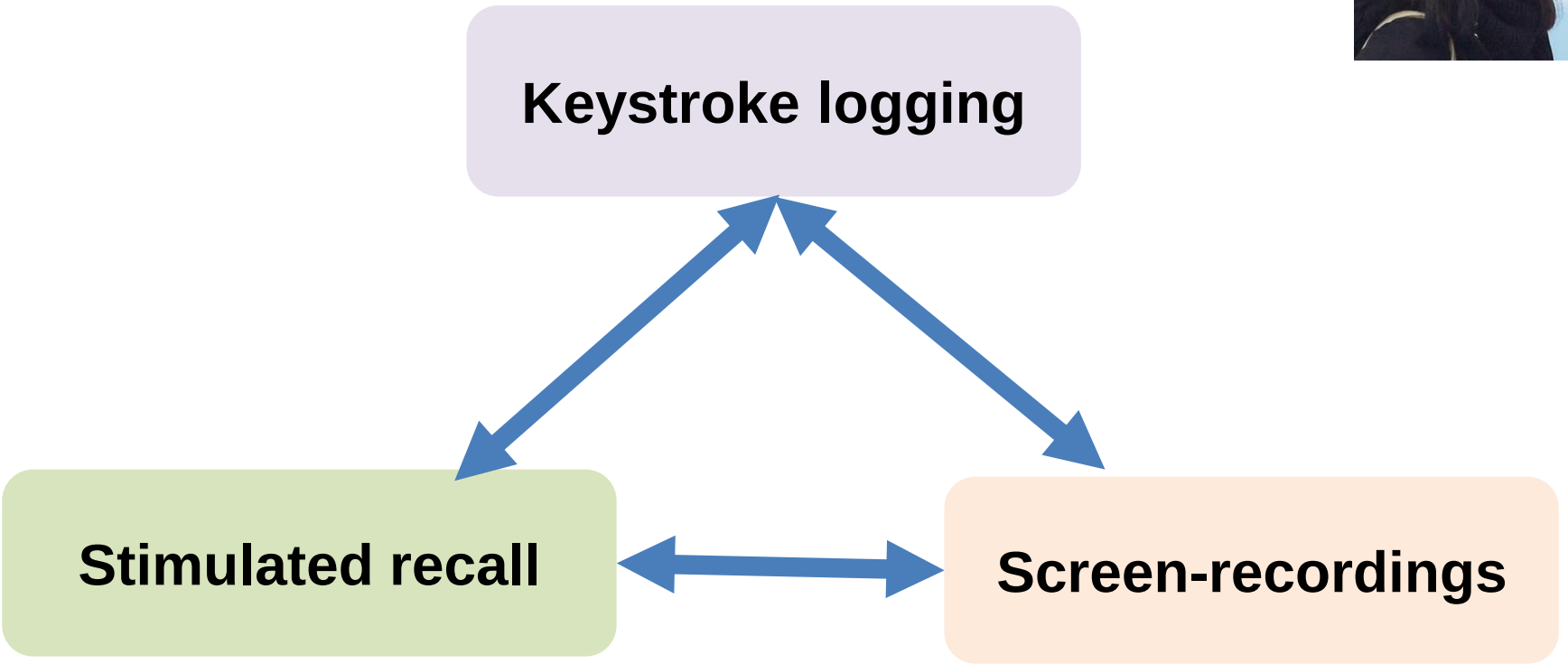
logging

recording

tracking

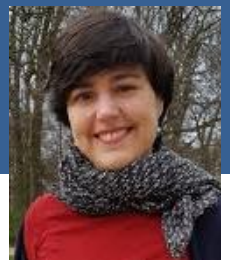
Neuro-imaging

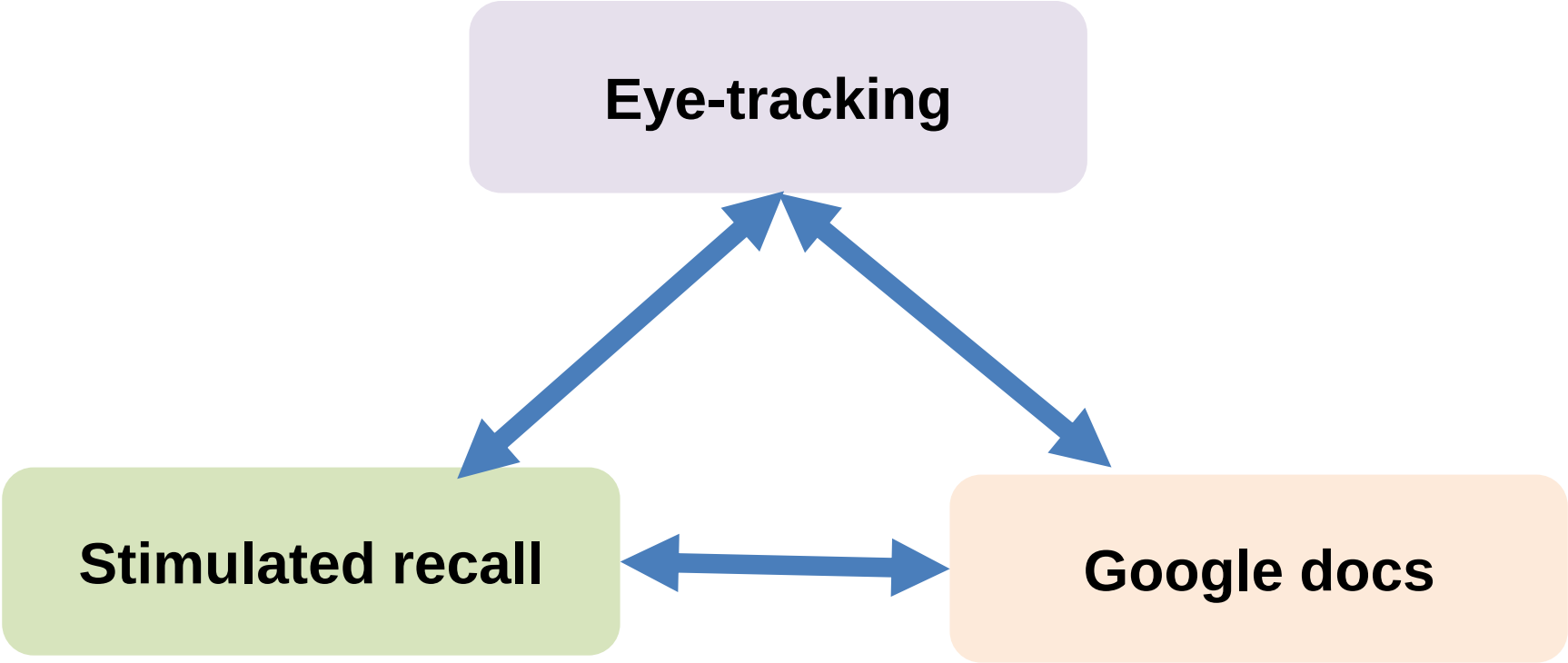
Charoenchaikorn (2019)



<u>Aim</u>: To explore the effects of **post-task manipulations** on **cognitive processes** during **text-chat interactions**

Stiefenhöfer & Michel (in press)





<u>Aim</u>: To explore cognitive processes during **collaborative writing**.

Why do you think previous empirical research has yielded mixed findings?

1. Methodological problems in studies
2. **Theoretical models should make different predictions for SCMC**
3. Different task complexity factors specific to SCMC should be studied

Mixed findings?

Maybe we need theoretical models specific to technology-mediated contexts …

There are important differences between technology-mediated and face-to-face communication. Theoretical predictions would need to reflect this.

Split negotiation (Smith, 2003)

J: There are **Ax**, Rake, and so on

[11 lines of text]

J: He hold **ax** in a clean gar
and everything is in order in
everywhere.

[43 lines of text]

B: **ax** mean is hammer?
J: no
J: That's different
B: what is it?
J: Ax is used to cut tree
J: or wood

Due to memory limitations, split negotiation are less likely to occur in face-to-face communication.

During complex tasks, learners might have lower capacity to engage in split negotiation.

In text-chat, maybe models should predict less negotiation?

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Mixed findings?

Maybe we need theoretical models specific to technology-mediated contexts …

There are important differences between technology-mediated and face-to-face communication. Theoretical predictions would need to reflect this.

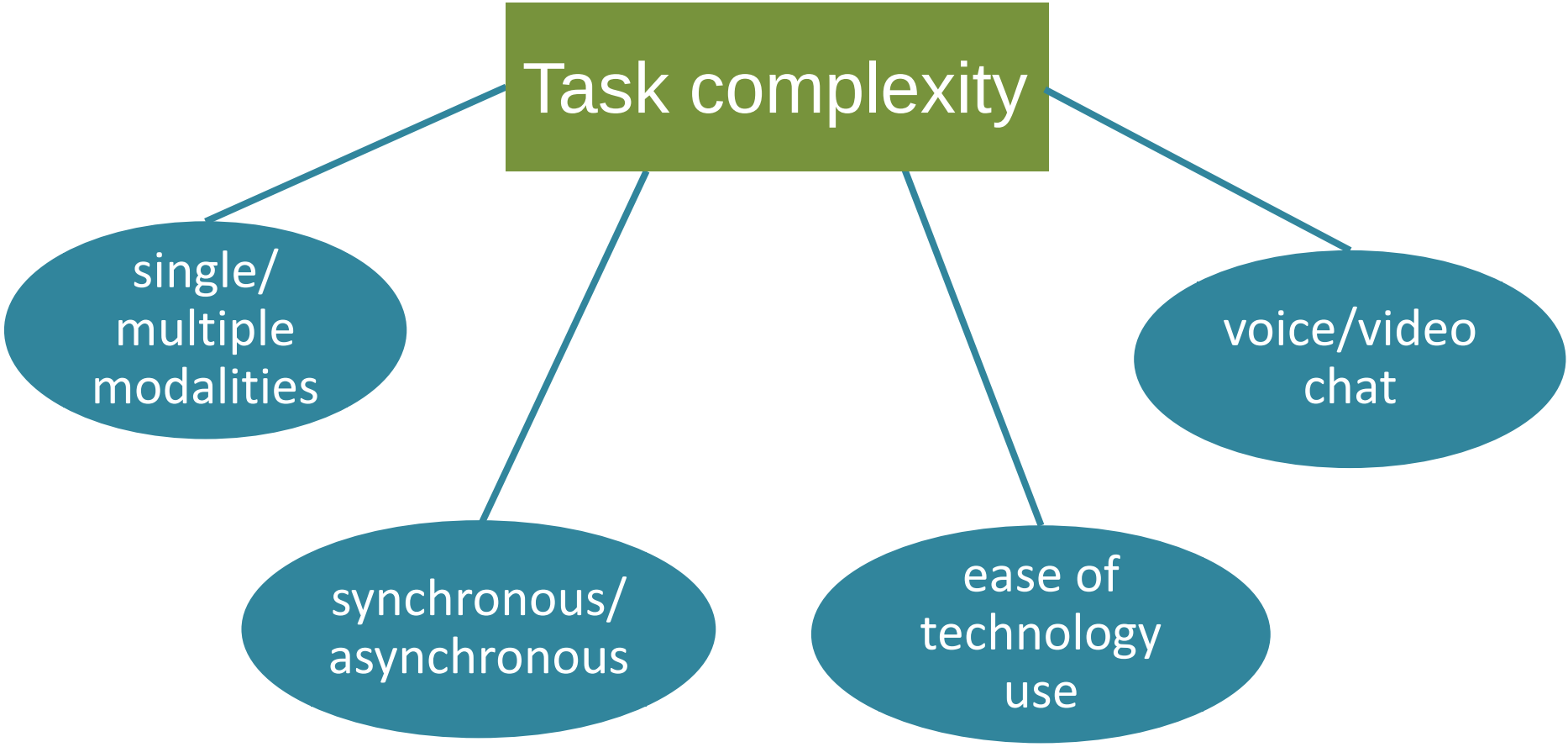
Maybe we have the wrong task complexity factors in the Trade-Off and Cognition Hypotheses. We likely need different /additional ones when theorising technology-mediated communication.

For example,

Resource-directing (conceptual demands)	Resource-dispersing (procedural demands)
+/- here-and-now	+/- planning time
+/- few elements	+/- prior knowledge
+/- spatial reasoning	+/- single task
+/- causal reasoning	+/- task structure
+/- intentional reasoning	+/- few steps

The feature **+/-here and now** does not seem transferable to the CMC mode. What is here and now and there and then online? (González-Lloret & Ortega, 2014)

There might be task complexity factors unique to technology-mediated contexts



In our own project,

Skype chat with estate agent

Voice chat with estate agent

In our own project,

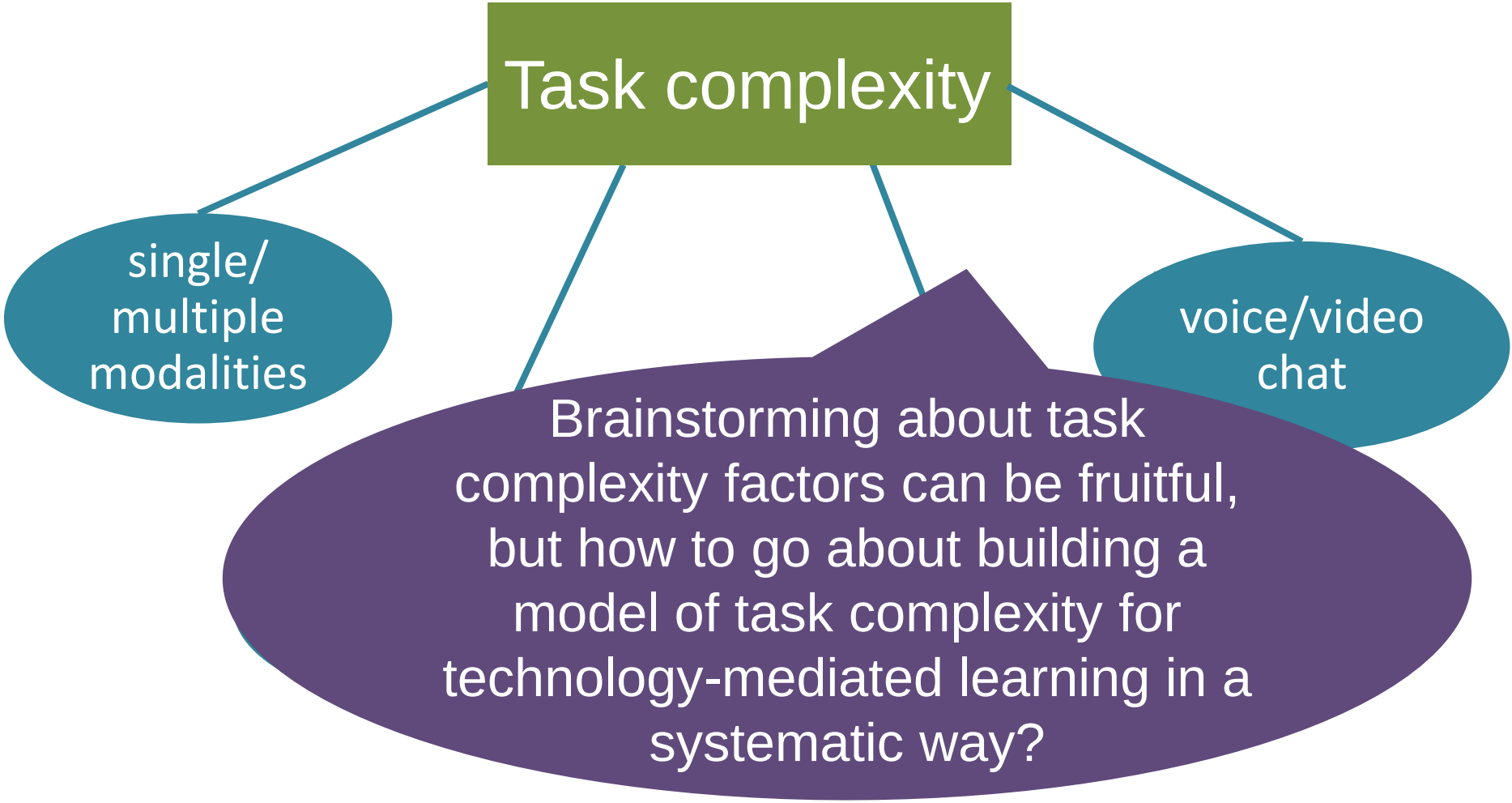
Visual clues

No visual clues

Skype chat with estate agent

Voice chat with estate agent

There might be task complexity factors unique to technology-mediated contexts



Building a model of task complexity for technology-mediated learning

Top-down

- Informed by models of L2 writing, speaking, and/or multimodal learning
- Using theoretical models as a basis, identify task factors likely to affect technology-mediated processes and performance
- Once putative task complexity factors identified, test whether anticipated effects are borne out.

Hypothesis-testing

Bottom-up

- Looking into teachers' and learners' perspectives about sources of task difficulty?
- Qualitative approaches (interviews, think-alouds)

Exploratory

Révész & Gurzynski-Weiss (2018)

- Asked 16 teachers to consider how to make four tasks from the Cutting Edge series more or less difficult
- While considering the tasks, teachers thought aloud and their eye-movements were recorded

Think-aloud ⟷ **Eye-tracking**

Révész & Gurzynski-Weiss (2018)

Task: Decide what you need for a jungle trip

The TV show *Survival!* is sending a group of people to the island of Bedaira. Each person will be sent to a different part of the island. They need to survive for seventy-two hours without help from the others.

Imagine you are going to take part in *Survival!*

a Work in groups. Each person explains to the rest of the group which **eight** items he/she would take and why.

b Try to agree on the best list of twelve items. Explain your group's choice to the rest of the class.

Révész & Gurzynski-Weiss (2018)

"So I would include more, way more items in the picture."	Conceptual demands
"A way to make it less complex would be to go over vocabulary or any grammar that may be needed to complete the task."	Linguistic demands
"Changing the groups, umm, so you could do it in pairs, and then you could, umm swap those."	Interactional demands
"You could make it timed, to make it more complex, for example, say, 'okay, you got five minutes to agree on the best list."	Procedural demands

Révész & Gurzynski-Weiss (2018)

Two key conclusions:

- Teachers proposed features already in the Trade-off and/or Cognition Hypotheses (looking at the right features!)
- Skehan's model more aligned with findings as teachers also made reference to linguistic demands

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Hypothesis-testing

Bottom-up

- **Looking into teachers' and learners' perspectives about sources of task difficulty?**
- **Qualitative approaches (interviews, think-alouds)**

Exploratory

Summary

- Described steps in designing a task-based syllabus
- Defined task complexity
- Introduced cognitive-interactionist models of task complexity
- Reviewed previous research on task complexity in technology-mediated contexts
- Mixed findings, not aligned with Trade-Off and Cognition Hypotheses
- Argued mixed findings may be due to
  - Methodological issues
  - Theoretical issues (TOH and CH not appropriate as theoretical models for technology-mediated studies)

Looking ahead

- Engage in constructing a model of task complexity specific to technology-mediated learning
  - Combine bottom-up, exploratory and top-down, hypothesis-testing research

- Test predictions using appropriate methodology, making sure that evidence is provided for all constructs included in models

Looking ahead

- Explore how to blend technology-mediated and face-to-face tasks in order to create optimal conditions for L2 development
  - For example, would it be beneficial to start a task in text-chat first and then move onto face-to-face modality?

- Explore task complexity in relation to input-based tasks involving listening and reading in technology-mediated contexts

Looking ahead

- Conduct longitudinal studies to capture how task complexity affects development in technology-mediated contexts
- Share instruments in open-science platforms such as IRIS
  - Transparency
  - Replication
  - Education of CALL and TBLT researchers

IRIS
A digital repository of instruments and materials for research into second languages


THANK YOU