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 …

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

Task 1 Task 2 Task 3 Task 4 Etc.
Task-based language teaching (TBLT)

- syllabus is based on **pedagogic tasks**

- **Task 1**  **Task 2**  **Task 3**  **Task 4**  **Etc.**

- rather than

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

**Description**
- **Floor area**: 530 sq. ft.
- **Bedrooms**: 2
- **Bathrooms**: 2
- **Kitchen**: Fully fitted kitchen
- **Reception room**: Large two double bedroom
- **Key features**: Bright, spacious and fully furnished
- **Nearest stations**: Camden Town, Camden Road

**Full description**
Bright, spacious and fully furnished 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 fitted kitchen, brand new bathroom, wooden floors, storage and parking space.

Flat #2

**Description**
- **Floor area**: 787 sq. ft.
- **Bedrooms**: 2
- **Bathrooms**: 1
- **Kitchen**: Solid wood flooring throughout
- **Key features**: Bright and spacious
- **Nearest stations**: Camden Town, Camden Road

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

Flat #2
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

Task 1  Task 2  Task 3  Task 4  Etc.

How tasks should be graded and sequenced in the task-based syllabus in order to create optimal conditions for second language learning?
On what basis should teachers or course designers decide whether a task should come earlier or later in the syllabus?
Task complexity refers to the inherent cognitive demands of tasks.

For example,

More complex task

- more elements
- more reasoning

Less complex task

- fewer elements
- less reasoning
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.

**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.
Using task complexity as a basis, two models have been put forward to guide task grading and sequencing decisions.
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## Skehan’s scheme for task analysis (1998)

<table>
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<tr>
<th>Code complexity</th>
<th>Cognitive complexity</th>
<th>Communicative stress</th>
</tr>
</thead>
<tbody>
<tr>
<td>➢ Linguistic complexity and variety</td>
<td>➢ Cognitive familiarity</td>
<td>➢ Time pressure</td>
</tr>
<tr>
<td>➢ Vocabulary load and variety</td>
<td>➢ Familiarity of topic</td>
<td>➢ Number of participants</td>
</tr>
<tr>
<td>➢ Redundancy and density</td>
<td>➢ Familiarity of genre</td>
<td>➢ Text length</td>
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<tr>
<td></td>
<td>➢ Familiarity of task</td>
<td>➢ Opportunities to control interaction</td>
</tr>
<tr>
<td></td>
<td>Cognitive processing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>➢ Structure</td>
<td></td>
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<tr>
<td></td>
<td>➢ Explicitness</td>
<td></td>
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<tr>
<td></td>
<td>➢ Clarity</td>
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<td>➢ Amount of ‘computation’</td>
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Using task complexity as a basis, two models have been put forward to guide task grading and sequencing decisions.

- **Trade-off Hypothesis**
- **Cognition Hypothesis**
Task complexity refers to the inherent cognitive demands of tasks.

Similar to Skehan’s cognitive complexity
Robinson’s notion of task complexity (2001)

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Cognitive-interactionist models of TBLT

Independent variable → Causal processes → Dependent variables

- Task demands/complexity
- Attention
- Conceptualisation
- Formulation
- Monitoring
- Complexity
- Accuracy
- Fluency

Trade-off Hypothesis
Cognition Hypothesis
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
  - Task demands/complexity
- Cognition Hypothesis
  - 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

(Levett, 1989)
Planning what to say

Greater pressure (e.g., more reasoning) → Greater complexity
Lower accuracy

Greater pressure (e.g., time limit) → Lower accuracy

Grammatical, lexical, and phonological encoding of message

(Skehan, 2009)

(Levelt, 1989)
Robinson’s Cognition Hypothesis (2001)

Resource-directing (conceptual demands)
- Complexity
- Accuracy
- Fluency
- Task complexity
- Complexity
- Accuracy
- Fluency

Resource-dispersing (procedural demands)
- Complexity
- Accuracy
- Fluency
- Task complexity
- Complexity
- Accuracy
- Fluency

- Pre-analytic
- Few elements
- Spatial reasoning
- Causal reasoning
- Intentional reasoning
- Planning time
- Prior knowledge
- Single task
- Task structure
- Few steps
Robinson’s Cognition Hypothesis (2001)

**Resource-directing** (conceptual demands)
- pre-and-not
- new elements
- spatial reasoning
- causal reasoning
- intentional reasoning

**Resource-dispersing** (procedural demands)
- planning time
- prior knowledge
- single task
- task structure
- few steps

**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
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
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)
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Robinson’s Cognition Hypothesis (2001)
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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)

<table>
<thead>
<tr>
<th>Learner</th>
<th>Chat exchange</th>
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<tbody>
<tr>
<td>Yasmin</td>
<td>madi... hani will explains first ok</td>
</tr>
<tr>
<td>Hani</td>
<td>kk thanks</td>
</tr>
<tr>
<td>Yasmin</td>
<td>b quick hani</td>
</tr>
<tr>
<td>Madi</td>
<td>wiat! after will, we canot put s what madi?</td>
</tr>
<tr>
<td>Hani</td>
<td></td>
</tr>
<tr>
<td>Jack</td>
<td>*yasmin- she will explain- will explain - don’t pout s</td>
</tr>
<tr>
<td>Madi</td>
<td></td>
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<tr>
<td>Yasmin</td>
<td>oh ok ok, quick!</td>
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From Nik, Adams & Newton (2012)
### Robinson’s Cognition Hypothesis (2001)

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**Task complexity**:

- Language related episodes
- Language decoded
## Robinson’s Cognition Hypothesis (2001)

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Contrary to Cognition Hypothesis
How will task complexity affect linguistic complexity and accuracy?
Following the Cognition Hypothesis,

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Task complexity

Complexity

Accuracy

Resource-directing (conceptual demands):
- +/- here-and-now
- +/- few elements
- +/- spatial reasoning
- +/- causal reasoning
- +/- intentional reasoning

Resource-dispersing (procedural demands):
- +/- planning
- +/- prior knowledge
- +/- single task
- +/- task structure
- +/- few steps

Mixed findings for Cognition Hypothesis

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Mixed findings for Cognition Hypothesis
### Resource-directing (conceptual demands)

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### Resource-dispersing (procedural demands)

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#### Task complexity

- Fluency
- Complexity
- Accuracy

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**Mixed findings for Cognition Hypothesis**
## Role of planning in text-chat interaction


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**Mixed findings for both Trade-off and Cognition Hypotheses**
### Robinson’s Cognition Hypothesis (2001)

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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
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.
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- +/− task complexity
- +/- single task
- +/- task structure
- +/- few steps

**Task complexity**

- Text-chat

**Face-to-face Text-chat**
Overall, results of empirical studies are mixed providing no clear support for either 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.
- **Problem**: participant may edit production before sending off message
  - Self-corrections, false starts, repetitions excluded

Video-Enhanced Chat Script

```
[I went to jogging:] I listened music by my :: during jogging or walking.
```
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
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 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.

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One flat much more suitable than the other

**COMPLEX VERSION**
More difficult to decide between two flats

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

1. Designing a task and manipulating the task along a dimension believed to increase cognitive complexity
2. Measuring learner performances in terms of accuracy and complexity under both simple and complex task 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.

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

This conclusion, however, often lacks construct validity.

Why?
How to assess 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, ...
To take the TOH and CH as an example, ...

- Independent variable
  - Task demands/complexity
- Causal processes
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  - Fluency

Trade-off Hypothesis

Cognition Hypothesis
To take the TOH and CH as an example, ...
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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)

These advances also reflected in SCMC work (e.g., Adams & Nik, 2014; Adams et al., 2015; Hsu, 2015; Ziegler, 2018)
To take the TOH and CH as an example, ... 

But how can we go about this?

How can we provide independent evidence for a task complexity manipulation?
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**
- Two bathrooms
- Furnished
- Two rooms of equal size

**Flat #2**
- One bathroom
- Unfurnished
- One room much bigger than other

**SIMPLE VERSION**
- One flat much more suitable than the other

**COMPLEX VERSION**
- More difficult to decide between two flats

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

Multiple semantic differential scale
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. (Perceived stress)
  3. I didn’t do well on this task/I did well on this task.
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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)
Independent measures of task complexity

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

1. Subjective self-ratings
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3. **Dual-task methodology**
4. Eye-tracking data
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)
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)
  - or auditory stimulus (Brünken et al., 2004).
Dual task methodology

Primary task

Secondary task

Cognitive demands

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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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)

**saccades** (quick jumps)
Eye fixations and saccades

Going overseas for university study is an exciting prospect for many people. But while it may offer some advantages, it is probably better to stay home because of the difficulties a student inevitably encounters living and studying in a different culture.

To what extent do you agree or disagree with this statement? Give reasons for your answer and include any relevant examples from your knowledge or experience. Write at least 250 words.

To a very large extent, I agree that studying abroad will leave exciting experience to students. No matter which countries students are from, it is inevitable that they would communicate with people from different walks of life. Such a cultural gap will create great learning opportunity because students can see the same issue with a wide range of angles.
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)

*saccades* (quick jumps)

Reflect attentional processes in decoding & interpreting info

(Just & Carpenter, 1980; Rayner, 1998)
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.
We hypothesized that:

- **↑ number of fixations** did not occur as hypothesized.
- **↑ mean fixation duration** did occur as hypothesized.

**SIMPLE**
less reasoning

**COMPLEX**
more reasoning
To take the TOH and CH as an example, …
How to investigate task-based processes? What tools do TBLT researchers have to look into task-based processes?
How to investigate task-based processes?

Subjective measures:
- Questionnaires
- Interviews
- Stimulated recall
- Think-aloud

Objective measures:
- Dual-task method
- Keystroke logging
- Screen-recording
- Eye-tracking
- Neuro-imaging
Each method has pros and cons …

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!
Aim: To explore the effects of post-task manipulations on cognitive processes during text-chat interactions
How to investigate task-based processes?

Stiefenhöfer & Michel (in press)

Aim: 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.
J: There are Ax, Rake, and so on.

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,

<table>
<thead>
<tr>
<th>Resource-directing (conceptual demands)</th>
<th>Resource-dispersing (procedural demands)</th>
</tr>
</thead>
<tbody>
<tr>
<td>+/- here-and-now</td>
<td>+/- planning time</td>
</tr>
<tr>
<td>+/- few elements</td>
<td>+/- prior knowledge</td>
</tr>
<tr>
<td>+/- spatial reasoning</td>
<td>+/- single task</td>
</tr>
<tr>
<td>+/- causal reasoning</td>
<td>+/- task structure</td>
</tr>
<tr>
<td>+/- intentional reasoning</td>
<td>+/- few steps</td>
</tr>
</tbody>
</table>

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.

- Single/multiple modalities
- Synchronous/asynchronous
- Ease of technology use
- Voice/video chat
In our own project,

Skype chat with estate agent

Voice chat with estate agent
In our own project,

Skype chat with estate agent < Voice chat with estate agent

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.

Brainstorming about task complexity factors can be fruitful, but how to go about building a model of task complexity for technology-mediated learning in a systematic way?
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.

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

**Hypothesis-testing**

**Exploratory**
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.
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.
“So I would include more, way more items in the picture.”

“A way to make it less complex would be to go over vocabulary or any grammar that may be needed to complete the task.”

“Changing the groups, umm, so you could do it in pairs, and then you could, umm swap those.”

“You could make it timed, to make it more complex, for example, say, ‘okay, you got five minutes to agree on the best list.’”
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
Building a model of task complexity for technology-mediated learning

**Top-down**
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**Hypothesis-testing**

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**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
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
THANK YOU