KU LEUVEN kulak

imec itec

How do learners use an online multimedia language learning environment? An eye-tracking study

NEDBOX
OEFEN JE NEDERLANDS ONLINE

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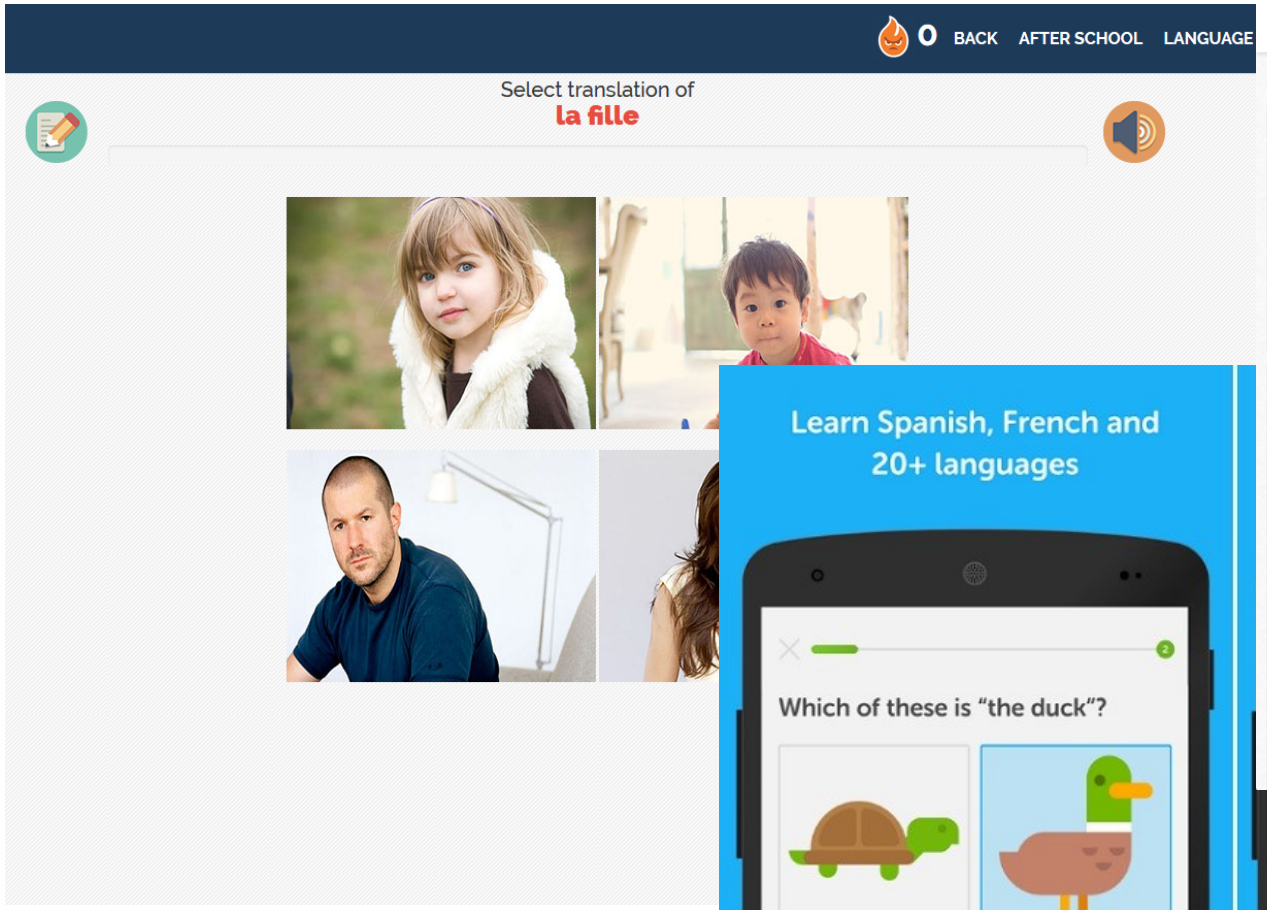
EUROCALL 28-31/08/2019

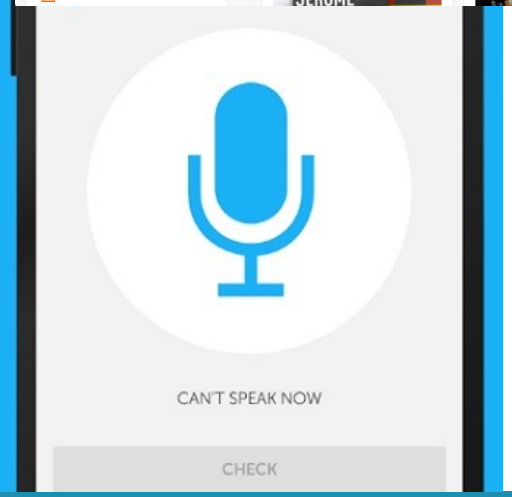
Interreg France-Wallonie-Vlaanderen

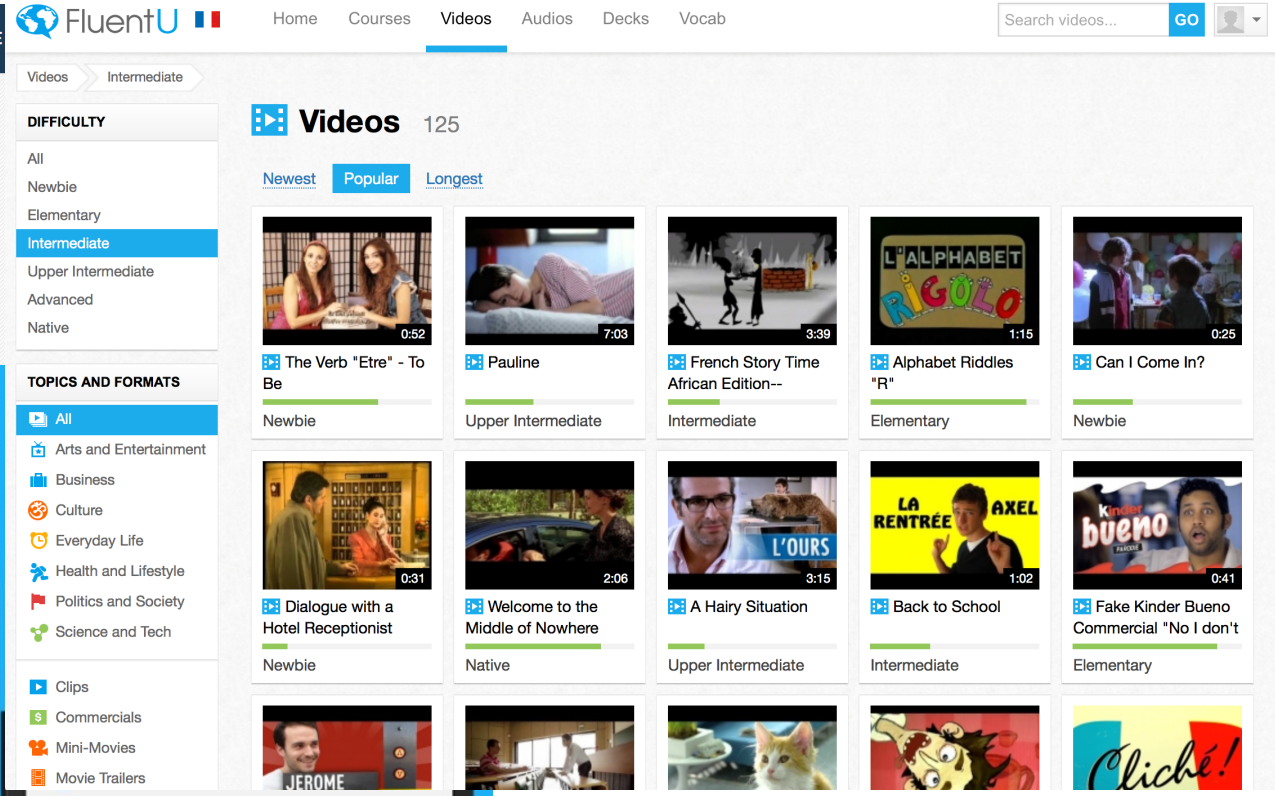
UNION EUROPÉENNE EUROPESE UNIE

Dig-e-Lab


0
BACK
AFTER SCHOOL
LANGUAGE
Select translation of
la fille

Learn Spanish, French and
20+ languages
Which of these is “the duck”?
la tortuga
el pato
el elefante
las gatas
CHECK


CAN'T SPEAK NOW
CHECK


FluentU
Home
Courses
Videos
Audios
Decks
Vocab
Search videos...
GO
Videos
Intermediate
DIFFICULTY
All
Newbie
Elementary
Intermediate
Upper Intermediate
Advanced
Native
TOPICS AND FORMATS
All
Arts and Entertainment
Business
Culture
Everyday Life
Health and Lifestyle
Politics and Society
Science and Tech
Clips
Commercials
Mini-Movies
Movie Trailers
Videos 125
Newest
Popular
Longest
0:52
The Verb "Etre" - To Be
Newbie
7:03
Pauline
Upper Intermediate
3:39
French Story Time African Edition--
Intermediate
1:15
Alphabet Riddles "R"
Elementary
0:25
Can I Come In?
Newbie
0:31
Dialogue with a Hotel Receptionist
Newbie
2:06
Welcome to the Middle of Nowhere
Native
3:15
A Hairy Situation
Upper Intermediate
1:02
Back to School
Intermediate
0:41
Fake Kinder Bueno Commercial "No I don't
Elementary

Introduction

- Different types of activities which may foster aspects of language learning such as:
  - Vocabulary and reading comprehension through reading in a multimedia environment supported by glossaries (e.g. Chun & Plass 1996; Chun & Payne 2004; Erçetin 2003)

Introduction

- However
  - Classroom/laboratory context
  - *Effects* of … *on* language learning

→ Little is known about the *learning process*

Background literature

- Studies on learners behaviour with CALL activities using tracking data which could determine
    - **Learners' profiles ←→ use of the platform** (Nelson, Bueno & Huffstutler, 1999)
    - **Learners' profiles ←→ use of help facilities** (Pujolà, 2002)
    - **Use of help facilities ←→ performance on the task** (Hegelheimer & Tower, 2004)

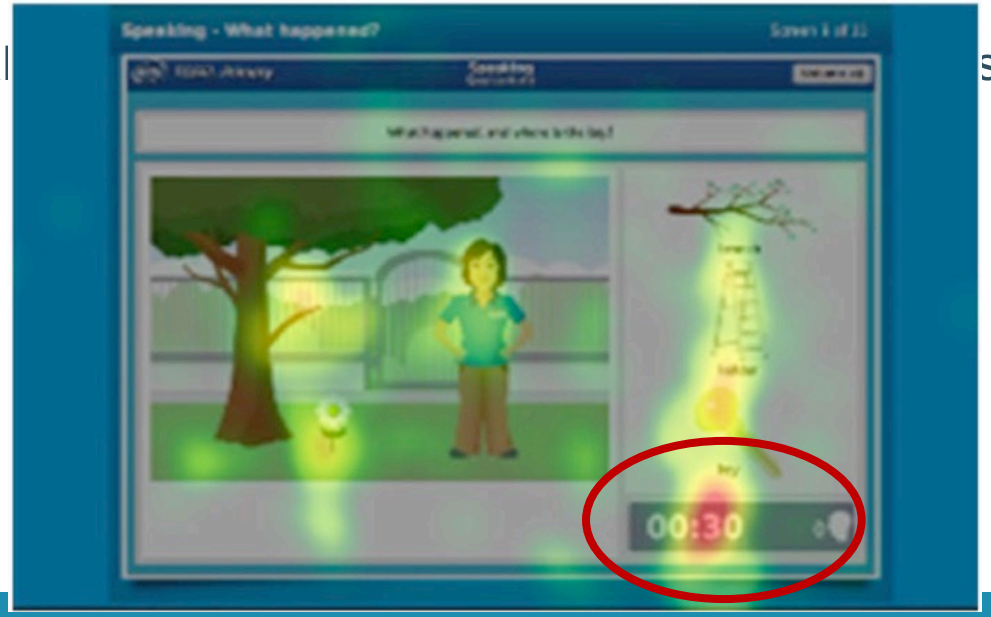
- Studies on learners

  - E.g. Learners spend

    the visual input in a subtitled video and an illustrate

  - E.g. Non native speal

    s and did it mostly when hesitating (Lee & Winke



Lee & Winke (2018)

Objectives

- Investigate
  - Learners' **use** of a language **platform** (i.e., NedBox) and its **help options**
  - Their **attention** to the **multimedia material** & **exercises** with **eye-tracking** methodology

Research questions

1. How do learners **divide** their **attention** on the **screen**?

   1.1 How does **proficiency influence** attention allocation?

   1.2 How is **performance** on the exercises **related** to attention allocation?

2. How do learners **use NedBox** and the different **help options** available?

   2.1 How is the use of help options **influenced** by **learners' proficiency**?

   2.2 How is **performance** on the exercises **related to the use of help options**?

Methodology

Methodology

- Participants
  - For the pilot study:
    - 5 Adult following Dutch classes in a jobcentre
    - L1 = French; L2 = Dutch
    - Proficiency +- A1/A2
  - For the actual study:
    - 21 adult following Dutch classes at different training/job- centre (FOREM, IFAPME, CVOMiras)
    - L1 = French; L2 = Dutch
    - Proficiency from A1+ to B2 (as assessed by teachers and by vocabulary placement test)

Wat is ploggen?

★ ★★ ★★★

met ondertitels

ⓘ Dit filmpje komt uit Het journaal.

Kijk naar het filmpje.
Wat doen Bart en Dieter?
Klik alle juiste antwoorden aan.

Hint

- ☐ wandelen
- ☐ joggen
- ☐ afval oprapen
- ☐ winkelen

controle

Leer Nederlands met Vincent

★ ★★ ★★★

Leer Nederlands met Vincent

campagne

Definitie:
een grote actie om reclame te maken voor iets of iemand of om te protesteren tegen iets of iemand
de campagne [campagnes]

Vanaf **begin** oktober kon je de **filmpjes** of **foto's** van Kompany **zien** in de Brusselse metro, op de **radio** en in de **bioscoop**.De **campagne** is een **succes**. 1.210 Brusselse **werkzoekenden** zijn naar de VDAB gegaan voor een sessie …er Nederlands **leren** en …**ken** in Vlaanderen. Dat …ijn …r vier **keer** meer dan …ori… **jaar**.
Er …ijn ook **duidelijk** meer …usselse **werkzoekenden** die …ia de VDAB Nederlands **leren**.
In januari 2018 **organiseerde** de VDAB **dubbel** zoveel Nederlandse **opleidingen** voor Brusselse **werkzoekenden** als een **jaar** eerder.
Wil je ook Nederlands **leren**, **kijk** dan eens op de **website** **www.japprendsleflamandavecvinc**

…aan de **campagne** 'J'apprends le flamand avec Vincent'.
Met die **campagne** wil Kompany **werkzoekenden** uit Brussel **stimuleren** om Nederlands te **leren**. Zo kunnen ze gemakkelijker **werk vinden**.

ⓘ FOTO ARTIKEL Vincent Kompany: Pierre-Yves Thienpont/LE SOIR

Lees de tekst.
Wie of wat is Vincent Kompany?
Klik alle juiste antwoorden aan.

Hint

- [x] Een voetballer.
- [ ] Een Rode Duivel.
- [x] Een werkzoekende.
- [ ] Een Belg.

Nee, Vincent Kompany zoekt geen werk.

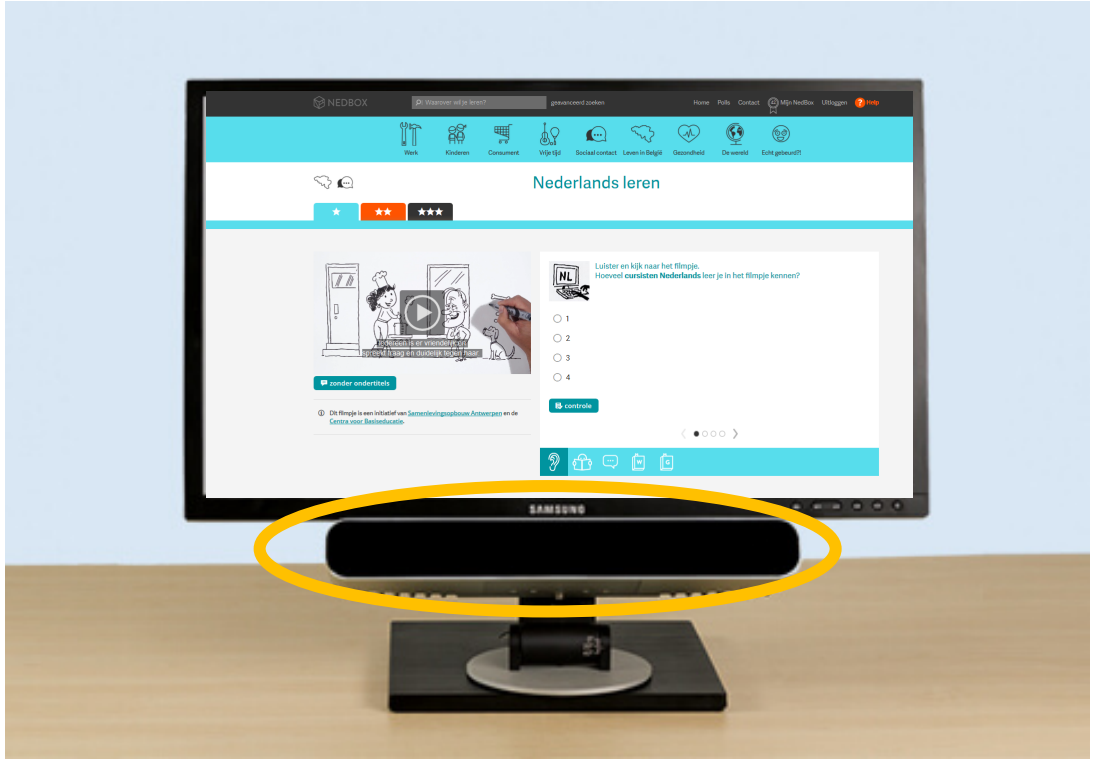
Probeer het nog eens!

Ga met de over de voor feedback.

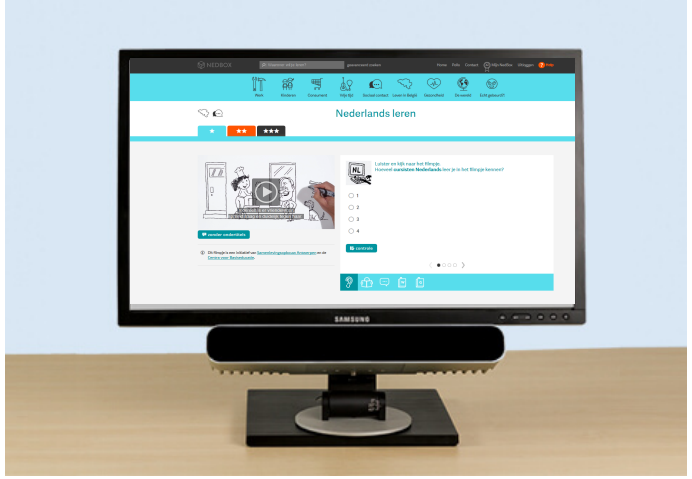
nog een keer | oplossing

Methodology

- Instruments:
  - Eye-tracker SMI Red Mobile (250Hz)



Methodology



- Instruments:
  - Eye-tracker SMI Red Mobile (250Hz)
  - Vocabulary Knowledge Test

3. Hoofd

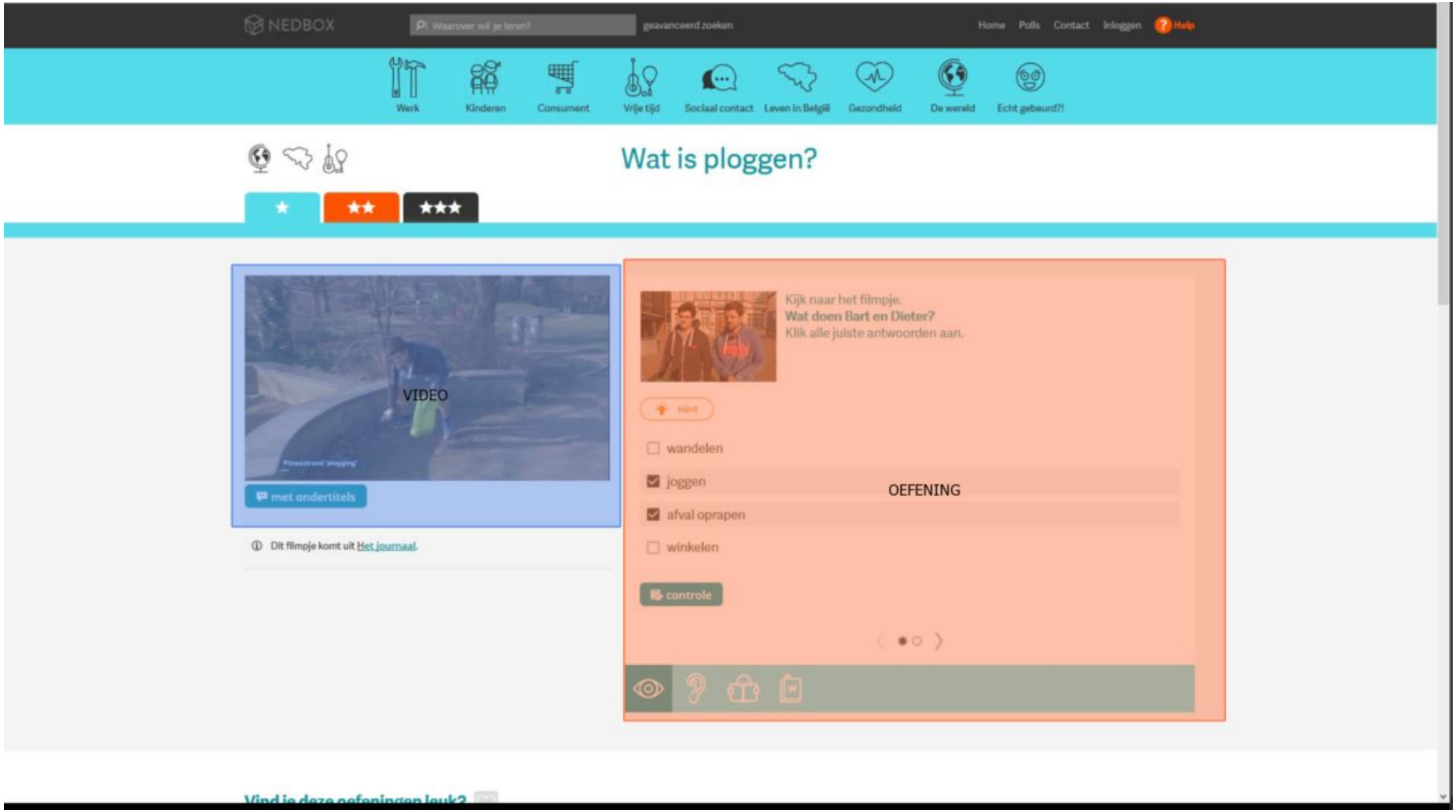
- Main
- Pied
- Tête
- Pouce
- Je ne sais pas

4. Sterven

- Oser
- Décevoir
- Interpréter
- Mourir

Je ne sais pas

  - Background questionnaire (language, education, use of NedBox, contact with Dutch…)


NEDBOX
Waarover wil je leren?
geavanceerd zoeken
Home
Polls
Contact
Inloggen
Help
Werk
Kinderen
Consument
Vrije tijd
Sociaal contact
Leven in België
Gezondheid
De wereld
Echt gebeurd?!
Wat is ploggen?
★
★★
★★★
VIDEO
met ondertitels
Dit filmpje komt uit Het journaal.
Kijk naar het filmpje.
Wat doen Bart en Dieter?
Klik alle juiste antwoorden aan.
Hint
wandelen
joggen
afval oprapen
winkelen
OEFENING
controle
Vind je deze oefeningen leuk?

Methodology

- Measures:
  - **Eye metrics** for different **Areas of Interest**:
    - Total fixation time %
    - Fixation proportion
    - Average fixation duration

Werk | Kinderen | Consument | Vrije tijd | Sociaal contact | Leven in België | Gezondheid | De wereld | Echt gebeurd?!

Lieve zoon, kom terug!

★ ★★ ★★★

"Kom terug, van ons hoef je niet meer te trouwen"

Als telefoons onbeantwoord blijven en mails worden genegeerd, moet een mens andere manieren vinden om een boodschap over te brengen. Een Chinese moeder maakte dit mee met haar zoon, die na een familietwist "gevlucht" is naar Australië. Hem bereiken deed ze als volgt: ze liet een open brief publiceren op de voorpagina van een lokale krant.
De jongeman verliet zijn thuisland, omdat hij het beu was dat zijn ouders hem voortdurend verplichtten te trouwen. Hij vond er werk en hoefde zich geen zorgen meer te maken over de opmerkingen van zijn ouders. Die ouders hebben nu spijt, zo blijkt uit de open brief.
"Een brief aan mijn zoon", staat er te lezen op de voorpagina van de Chinese Melbourne Daily."Misschien is dit de enige manier om je te bereiken. Mama en papa zullen je nooit meer onder druk zetten om te trouwen. Kom alstublieft terug naar huis om Nieuwjaar te komen vieren. Liefs, mam."
Het is voorlopig nog onbekend of Peng de brief van zijn mama heeft gelezen. En als dit het geval is, dan nog blijft de vraag of hij zin heeft om naar huis te gaan.

Naar: deredactie.be

http://www.deredactie.be

TEXT

Een Chinese [illegible] haar zoon in een krant publiceren.
In het krantenartikel kun je lezen waarom ze dat doet.

Reconstrueer de brief:
zet het einde van de zin (= de rechterkolom) bij het juiste begin (= de linkerkolom).

Brief aan mijn zoon

Peng, ik heb geprobeerd je te bellen	om te trouwen.
Misschien is dit de enige manier	Liefs, mam
Mama en papa zullen je nooit meer onder druk zetten	om je te bereiken.
Kom alstublieft terug naar huis	maar je neemt niet op.
	om Nieuwjaar te komen vieren.

controle

OEFENING **

149 150 151 152 153 154 155 156 157 158 159 160

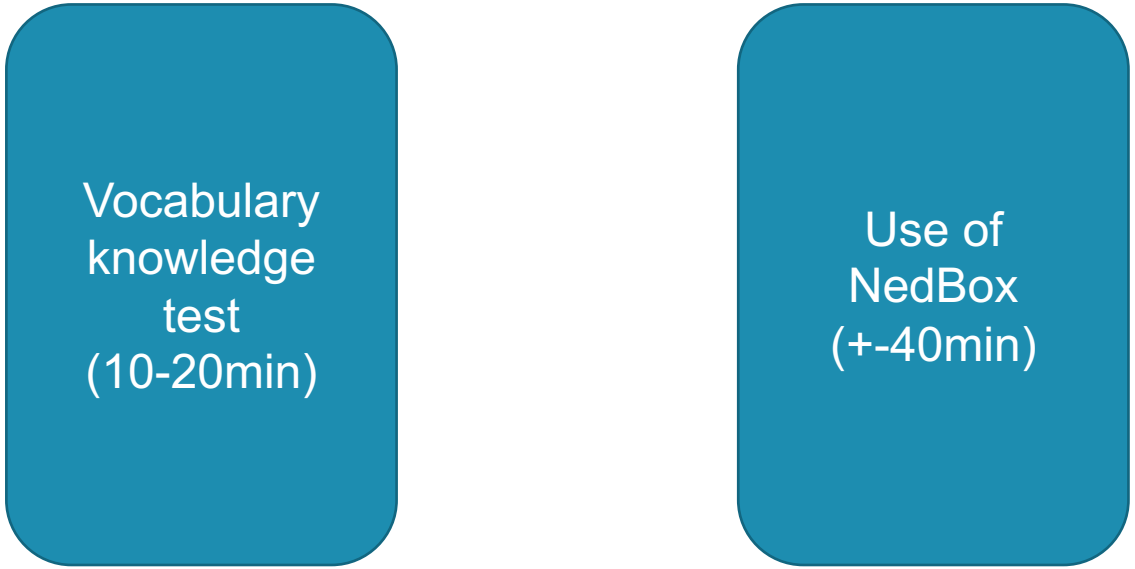
SensoMotoric Instruments

Methodology

- Measures:
  - **Eye metrics** for different **Areas of Interest**
  - Performance on each exercise on the platform
  - Use of help options (used or not for each exercise)

Methodology

- Procedure



Results & discussion

Results: Attention allocation

1. How do learners divide their attention on the screen (e.g. between multimedia material and exercises)?

Results: Attention allocation

1. How do learners divide their attention on the screen (e.g. between multimedia material and exercises)?

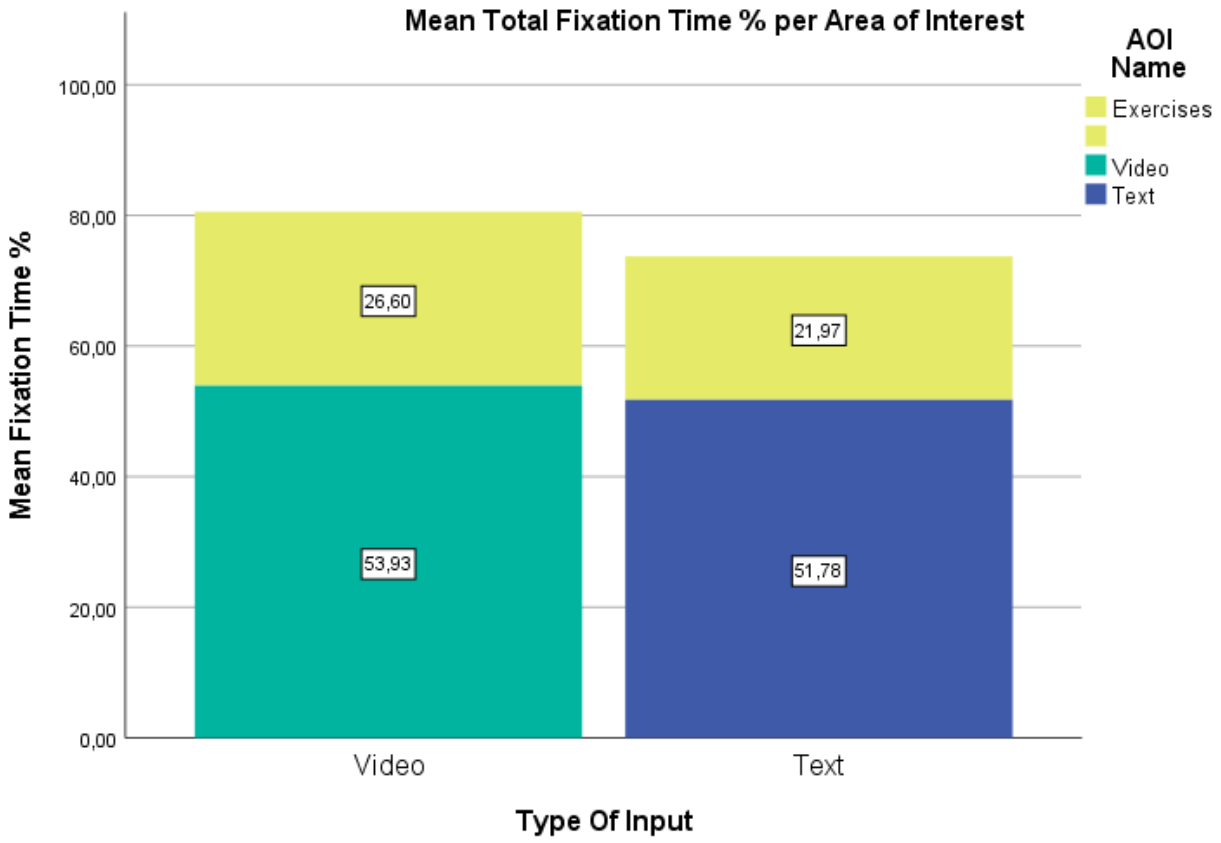
- **Total fixation time (%)***

$$\left(\frac{Fixation\ Time\ in\ AOI[ms]}{Visible\ Time\ of\ AOI\ [ms]}\right)*100$$

* As in e.g., Tragant-Mestres & Pellicer-Sanchez (2019)

Results: Attention allocation

1. How do learners divide their attention on the screen (e.g. between multimedia material and exercises)?



Video > Exercises

($t(138) = 13,85$; $p < .000$, $d = 2,341$)

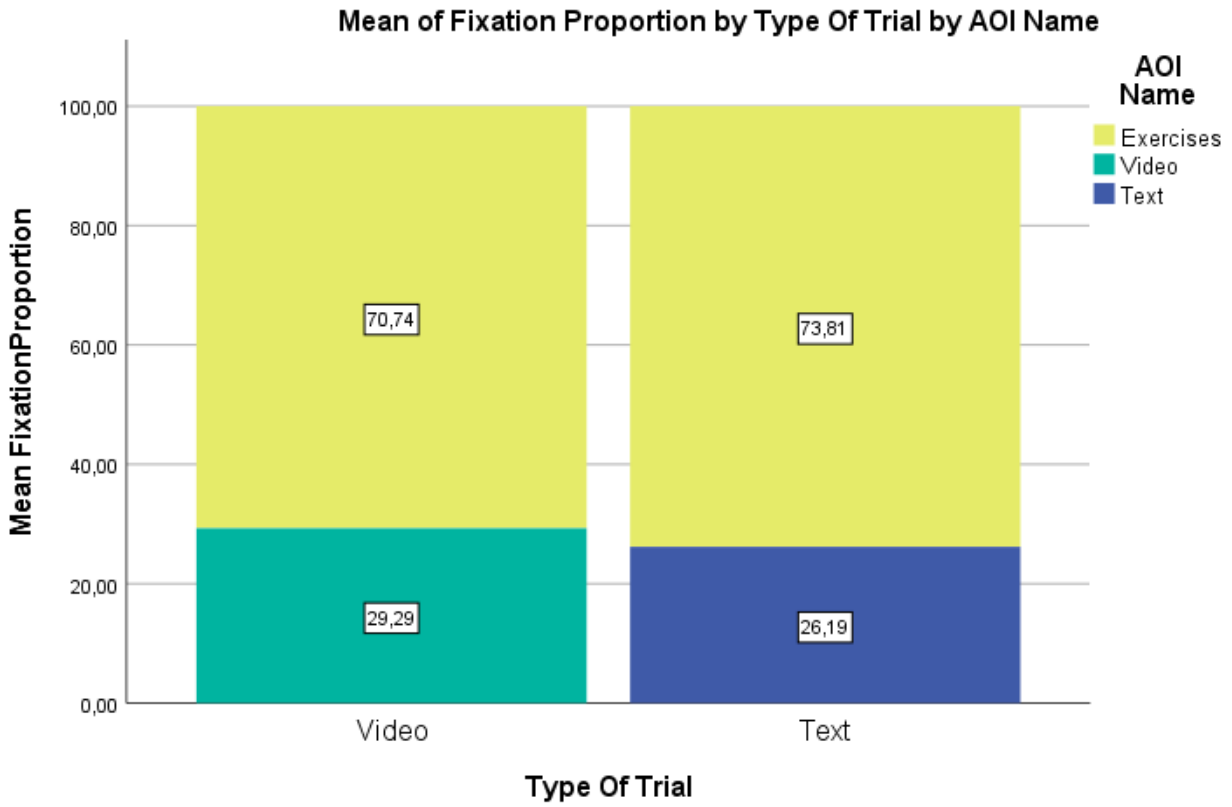
Text > Exercises

($t(88,12) = 9,63$; $p < .000$, $d = 1,926$)

Results: Attention allocation

1. How do learners divide their attention on the screen (e.g. between multimedia material and exercises)?

- **Total fi**
- **Fixatio**



Exercises **>** Video

(*t*(138) = 22,93; *p* < .000)

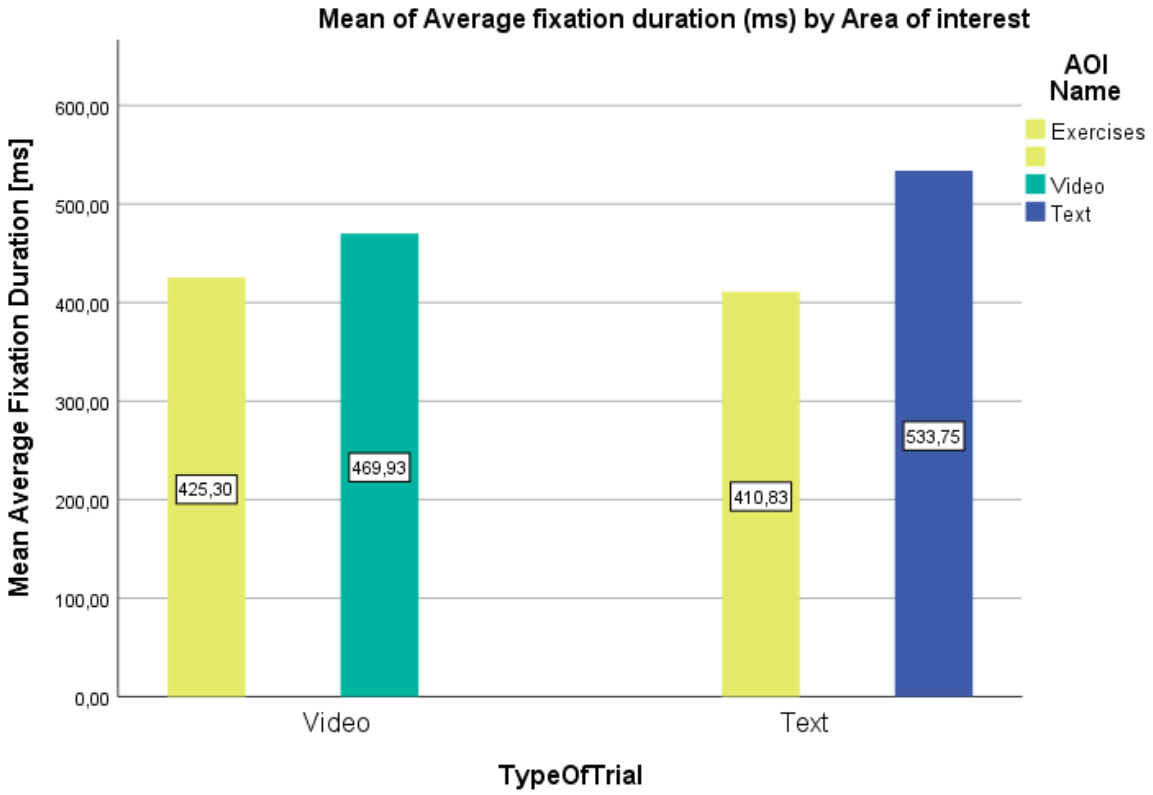
Exercises **>** Text

(*t*(98) = 18,99; *p* < .000)

Results: Attention allocation

1. How do learners divide their attention on the screen (e.g. between multimedia material and exercises)?

- T
- Fi
- A



Video > Exercises

($t(118{,}05) = 2{,}30$; $p < .023$)

Text > Exercises

($t(73{,}03) = 3{,}12$; $p < .003$)

Results: Attention allocation

1. How do learners divide their attention on the screen (e.g. between multimedia material and exercises)?

- **Exercises** get the **most fixations**
- **Multimedia** input gets **attention for the longest total time**
- And **multimedia** input also gets **longer fixations** than exercises

→ When looking at input, there is a search for answers. The engagement seems higher than when completing exercises.

Results – Attention allocation, proficiency & performance

1.1 How does proficiency influence attention allocation?

1.2 How is performance on the exercises related to attention allocation?

Results – Attention allocation, proficiency & performance

1.1 How does proficiency influence attention allocation?

Descriptives statistics – Total Vocabulary Size Test	
	TOTAL
Mean	71,90
Median	**62,00**
N	21
Std. Deviation	26,540

- Median = threshold to distinguish more and less proficient learners
- To look for differences in use of help options, we calculated subtotals per participants

Results – Attention allocation, proficiency & performance

1.1 How does proficiency influence attention allocation?

1.2 How is performance on the exercises related to attention allocation?

	Media = VIDEO
	General proficiency
Total fixation time (%)	No difference between groups
Fixation proportion	No difference between groups
Average fixation duration	**Group 2** had longer average fixation durations on videos and exercises ($t(40,51) = 4,80$; $p < .000$ & $t(53,40) = 2,32$; $p = .0024$

Group 1 = above median VST
Group 2 = under median VST

Results – Attention allocation, proficiency & performance

1.1 How does proficiency influence attention allocation?

1.2 How is performance on the exercises related to attention allocation?

	Media = VIDEO	
	General proficiency	**Performance on platform**
Total fixation time (%)	No difference between groups	No influence
Fixation proportion	No difference between groups	**More** fixations on **exercises** → **lower** scores
Average fixation duration	**Group 2** had longer average fixations durations on videos and exercises ($t(40,51) = 4,80$; $p < .000$ & $t(53,40) = 2,32$; $p = .0024$	**Longer** average fixation durations on **video** → **lower** scores

Group 1 = above median VST
Group 2 = under median VST

Results – Attention allocation, proficiency & performance

1.1 How does proficiency influence attention allocation?

1.2 How is performance on the exercises related to attention allocation?

	Media = TEXT
	General proficiency
Total fixation time (%)	Group **1** had the longest total fixation time on text ($t(33,55) = 3,44$; $p = .002$)
Fixation proportion	Group **2** had more fixations on text ($t(32,23) = 3,77$; $p = .001$)
Average fixation duration	No difference between groups

Group 1 = above median VST
Group 2 = under median VST

Results – Attention allocation, proficiency & performance

1.1 How does proficiency influence attention allocation?

1.2 How is performance on the exercises related to attention allocation?

	Media = TEXT	
	General proficiency	**Performance on platform**
Total fixation time (%)	Group **1** had the longest total fixation time on text ($t(33,55) = 3,44$; $p = .002$)	**Longer** they fixate **text** → **higher** scores
Fixation proportion	Group **2** had more fixations on text ($t(32,23) = 3,77$; $p = .001$)	**More** fixations on **text** → **lower** scores
Average fixation duration	No difference between groups	No influence

Group 1 = above median VST
Group 2 = under median VST

Results – Attention allocation, proficiency & performance

1. How do learners divide their attention on the screen (e.g. between multimedia material and exercises)?

- In general, media gets the more attention (// total fixation time) → more engagement when reading/watching than when completing exercises

1.1 How does proficiency influence attention allocation?

- More differences when media is a text
- Group 1 seems to allocate their attention in a more logical way and seems more able to get the information more effectively (e.g. fewer fixations but a longer total fixation time)

1.2 How is performance on the exercises related to attention allocation?

- When media is a video, attention allocation does not seem to be related in a strong way to performance
- When media is a text, attention allocation seems to be an important factor to succeed in the exercises

Results: Use of help options

2. How do learners use NedBox and the different help options available?

Results: Use of help options

2. How do learners use NedBox and the different help options available?

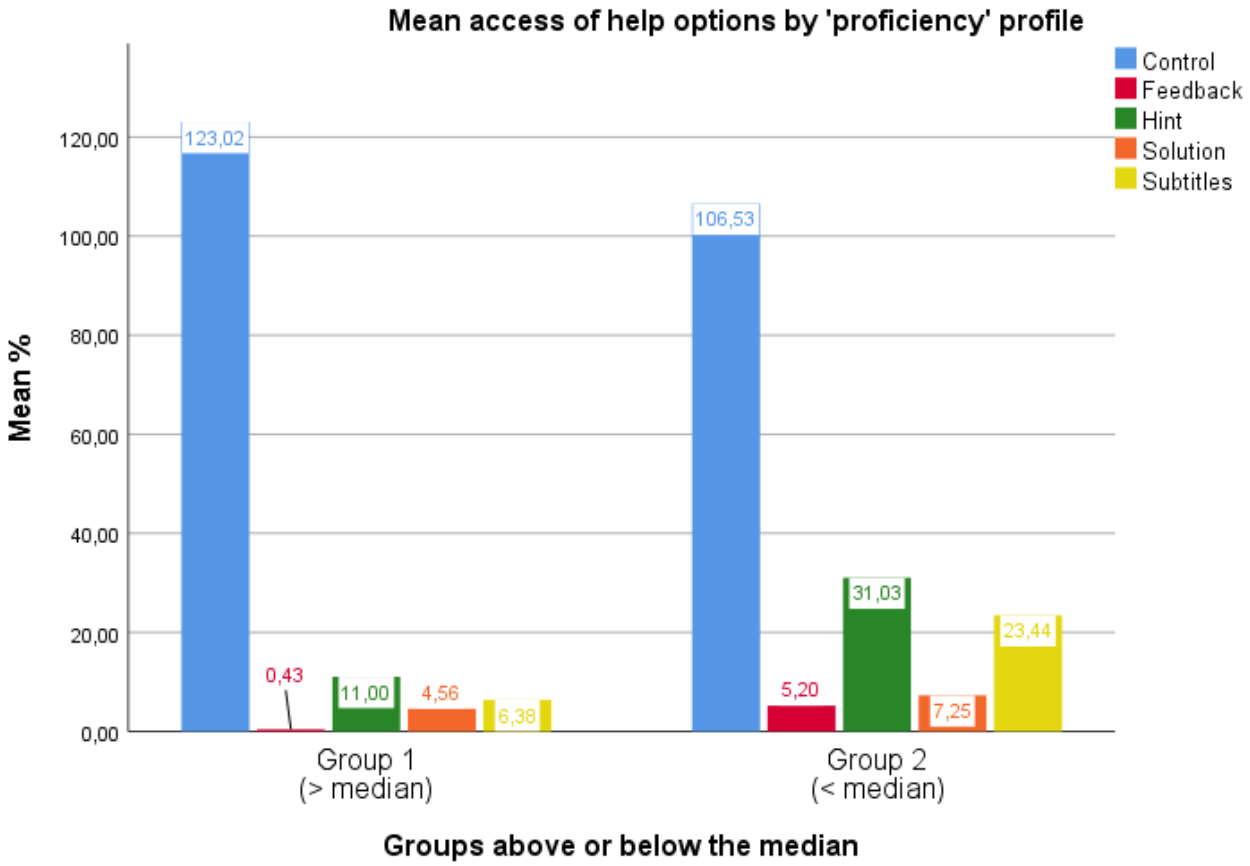
	CONTROL	SUBTITLES	HINT	SOLUTION	FEEDBACK	DEFINITIONS
Number of times **help option** was **offered**	883	592	273	883	883	291
Number of times **help option** was **used (%)**	**1017**	**147**	**51**	**47**	**13**	**4**
Average number of **times help option** was **used**	48,43	7	2,43	2,24	0,62	0,20

Results: Use of help options & proficiency

2.1 How is the use of help options influenced by learners' proficiency?

Results: Use of help options & proficiency

2.1 How is use of help options influenced by learners' proficiency?



- Group **2** made **more** use of:
  - **Feedback** (*U*= 13272; *p* = .004)
  - **Hint** (*U*= 8560; *p* < .000)
  - **Subtitles/Definitions** (*U*= 12380; *p* < .000)
- Group **2 needed** the **media** more **often** to **answer** the exercises (*U*= 11434; *p* = .002)
- Group **1 watched/read** the **entire media more** than group 2 (*U*= 11492; *p* < .000)

Results: Use of help options & performance

2.2 How is performance on the exercises related to the use of help options?

Results: Use of help options & performance

2.2 How is **performance** on the exercises **related** to the use of help **options**?

↗ Control, feedback, hint, solution ←→ ↘ performance on the exercises

↗ Subtitles, definitions ←→ ↘ performance on the exercises

↗ Using media in its entirety ←→ ↗ performanceon the exercises

		Control	Feedback	Hint	Solution	Subtitles Definitions	Entire Media
Performance on the exercises	*Correlation Coefficient*	-,228**	-,168**	-,158**	-,301**	-,143**	,111*
	Sig. (2-tailed)	**,000**	**,000**	**,000**	**,000**	**,002**	**,017**
	N	312	312	292	312	312	312

Discussion

How do learners use NedBox and the different help options available? Is it related to their proficiency and performance on the platform?

- Big differences between use of help options
  - Feedback; solution; definitions → almost never used
  - Control → almost always used
- Clear distinct patterns of the use of help options and input between group 1 and 2:
  - **Group 1 seemed to know how** to **use input** to **perform better** on exercises
  - **Group 2 seemed to need more help** and did **not** seem to **find** the **answers** directly in **input**

Discussion

- Use of help options data corroborate attention measures:

Group **1** watched/read the **input** in its **entirety** more often → Group **1** have a **higher total** fixation **time** on **text** than group 2

Group **2** used the **input more often** to complete exercises → Group **2** have **more fixations** on **text** than group 1

Group **2** made **more** use of **subtitles** than group 1 → Group **2** have **longer average** fixation **durations** on **video** than group 1 = maybe more engagement, but also reading of subtitles is less fluent (// Tragant-Mestres & Pellicer-Sanchez, 2019)

Implications

- Material developments
  - **Feedback**
  - **Highlighted** words in texts

- Individual differences → **guidance** (e.g. Hubbard, 2018)

Thank you !

http://nedbox.be