EBERHARD KARLS UNIVERSITÄT TÜBINGEN

LEAD Graduate School & Research Network

# Künstliche Intelligenz und aufgabenorientiertes Fremdsprachenlernen

## Möglichkeiten und Herausforderungen

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Universität Tübingen

Festakt 20 Jahre Innsbrucker Modell der Fremdsprachendidaktik
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# Künstliche Intelligenz und Bildung?

- Digitalisierung der Bildung wird seit Jahren viel diskutiert, z.B.:

  *Computer in alle Schulen, alle Schüler an die Computer – dieses Programm wollen die Kultusminister zügig verwirklichen.* [Spiegel Nr. 47 / 18.11.1984]

- Inzwischen ist Künstliche Intelligenz als beliebtes Modewort dazugestoßen – aber meist als abstrakte Vision von Zukunft, gerne illustriert mit Robotern.

# KI@School Kick-Off Event in Bayern (7.11.22)

KI IN DER BILDUNG

# DER DIGITALE LEHRER

Von Katharina Lehmann · 2021

**Statt Frontalunterricht mit den gleichen Lerninhalten für über zwanzig Schüler zu geben, gehen KI-Systeme individuell auf die Lernbedürfnisse jedes einzelnen Schülers ein. Für Lehrer bedeutet das Entlastung – sie können sich vor allem um die Schüler kümmern, die ihre Hilfe am dringendsten brauchen.**

# Was ist Künstliche Intelligenz?

- mit dem Computer Fähigkeiten imitieren, für die ein Mensch Intelligenz benötigt
- traditioneller KI Ansatz, seit den 50ern: Wissen und Regeln explizit machen
  - Erfolgreich: z.B. Deep Blue schlägt 1997 Schachweltmeister Garry Kasparov
  - Begrenzt: Wissen und Regeln nicht in der Breite vorhanden & mangelnde Robustheit
- machine learning Ansatz, seit den 80ern: aus Daten lernende Systeme
  - Erfolgreich (nur) dort, wo viele Daten vorhanden sind
  - Und: Don't guess if you know! $\rightarrow$ hybride Ansätze
- KI in der Praxis seit 2011 zunehmend genutzt: Digitale Sprachassistenten (Siri, ...), Dialogsysteme im Auto, maschinelle Übersetzung (DeepL, ...), Empfehlungssysteme, ...

# Warum KI in der Bildung?

- Digitalisierung und KI sind kein Selbstwert an sich – es ist essentiell zu überlegen
  - was konkret ermöglicht werden soll,
  - um welche realen Desiderate des Bildungskontexts zu lösen, basierend auf welchen
  - wissenschaftlichen Erkenntnissen zum Lernen und Lehren (Psychologie, Fachdidaktiken, . . . )
- traditionell: Computer als Transportmedium
  - Lernmotivation steigern durch authentisches, multimediales Material
  - Kommunikation mit Muttersprachlern ermöglichen (Email, Skype, . . . )
- Strategiepapiere wie KMK *Bildung in der Digitalen Welt* (17, 21) gehen darüber hinaus:
  - Heterogenität! Lernende benötigen unterschiedlich komplexe Materialien, Zeit und Lernunterstützung

  $\Rightarrow$ Individuelle Lernförderung

# Mit KI das Potential digitaler Bildung realisieren

- Was brauchen wir zur pädagogisch wohlmotivierten individuellen Förderung?

I. **Adaptivität**: Komplexität des Inputs und der Aufgaben an Lerner anpassen

II. **Interaktivität**: Schüler beim Lernen schrittweise unterstützen

- Solche individuelle Förderung benötigt KI Methoden:
  - Automatische Analyse von **Sprache** ($\rightarrow$ Feedback, Komplexität)
  - Modellierung individueller **Lerner** und **Material** ($\rightarrow$ Adaptivität)

- Wie lässt sich ein solcher Ansatz so konkretisieren, dass er auf den wissenschaftlichen Erkenntnissen über den Fremdspracherwerb aufbaut?

# Erkenntnisse zum Spracherwerb

- Vielfältige Erkenntnisse zum Fremdspracherwerb in den letzten 30 Jahren (cf. u.a. Ellis 2015)
- Einige Konzepte mit nachgewiesener Relevanz für die Praxis:
  i. Impliziter Erwerb: entwicklungsproximaler **Input**, Sprachbewusstheit, **Noticing**
  ii. Explizites Lernen: **Üben** mit lernbegleitendem **Feedback** (Scaffolding)

  sowie deren Einbettung in funktionale, authentische Sprachnutzung:

  → **Aufgabenorientierung** im Task-Based Language Teaching and Learning

# Enwicklungsproximaler Input und Noticing

- **Input** Hypothesis (Krashen 1985)
  - bedeutungstragender Input essentiell für Spracherwerb
  - Input etwas komplexer als die Interlanguage der Lernenden ("i+1")
- Aber Input alleine führt nur zu Basic Varieties (Klein & Perdue 1997).
  - Fremdsprachlernende benötigen **Focus-on-Form** (Long 1991) $\rightarrow$ **Noticing** Hypothesis (Schmidt 1995)
  - Salienz davon erhöhen, was bemerkt werden soll: **Input enhancement** (Sharwood Smith 1993)
- Große individuelle Unterschiede im Fremdspracherwerb
  $\rightarrow$ Adaptive Binnendifferenzierung der Materialien notwendig

# Entwicklungsproximaler Input & Noticing – digital unterstützen

- Diagnose: Wie lassen sich
  - die sprachlichen Anforderungen von Lesetexten und
  - der Sprachstand von Lernenden anhand ihrer Sprachproduktion analysieren?

  Bsp Sprachliche Komplexitätsanalyse mit CTAP (http://ctapweb.com, Chen & Meurers 2016)

- Nutzung für aufgabenorientiertes Lernen?
  - Wie lassen sich Lernende dabei unterstützen, die sie interessierenden, authentischen Lesetexte zu finden, die auch sprachlich für sie entwicklungsproximal sind?

  Bsp SyB Syntactic Benchmark (http://complexity.schule, Chen & Meurers 2019)

  Bsp FLAIR Suchmaschine (http://flair.schule, Chinkina & Meurers 2016)

# Sprachliche Komplexität messen

- Was ist sprachliche Komplexität im Zweitspracherwerb?

  "the extent to which the language produced in performing a task is **elaborate** and **varied**." (Ellis 2003)

- Wie lässt sich der Grad der **Elaboriertheit** und **Vielfältigkeit** von Sprache dingfest machen?
  - CTAP: Analyse sprachlicher Komplexität (http://ctapweb.com, Chen & Meurers 2016)

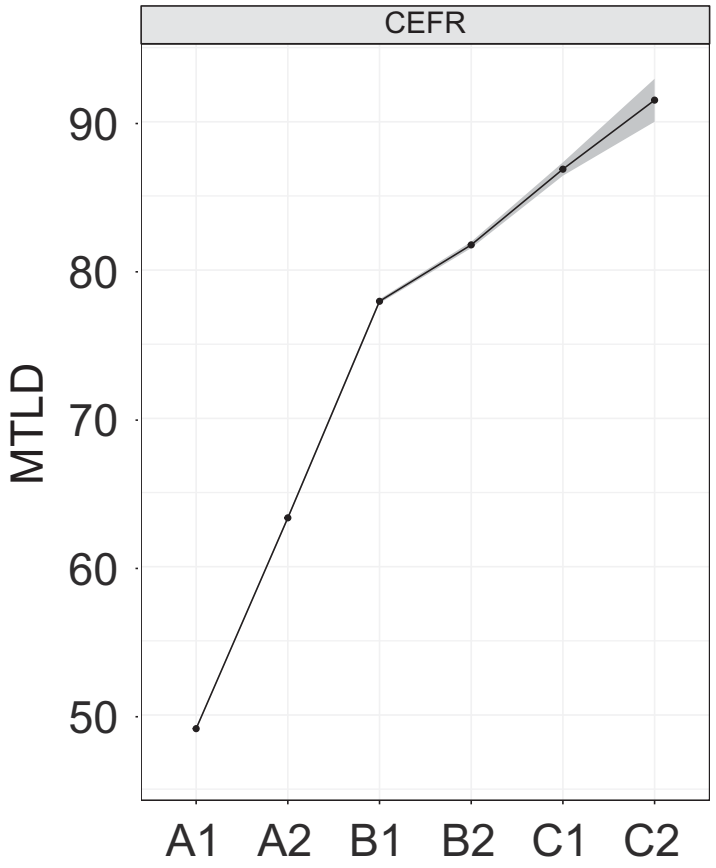
# Evidenz für sprachliche Komplexität

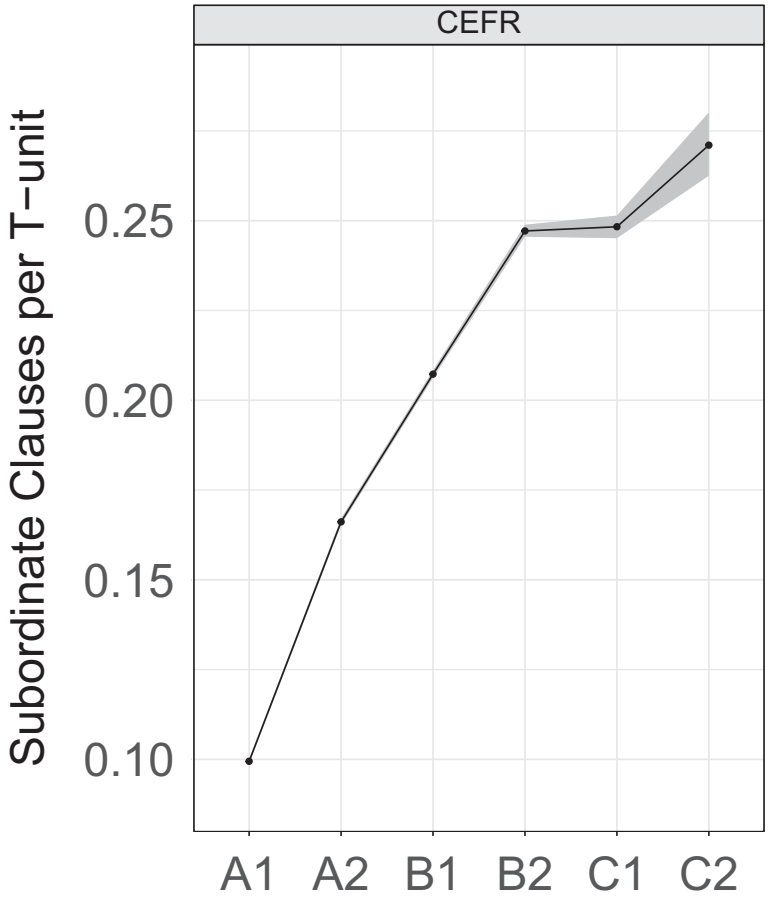
- Welche sprachliche **Formen** werden genutzt?
  - Art der Formen im ***linguistischen System***
    z.B. Anzahl komplexer Nominalphrasen pro Satz
  - Vorkommen von Formen in ***Sprachverwendung***
    z.B. Wortfrequenz, Age-of-Acquisition (AoA) Normen
- Welche Art & Menge von **Bedeutung** ist kodiert, und wie ist sie im **Diskurs** organisiert?
  z.B. Konkretheit, Ideendichte, Konnektoren, referentielle Kohäsion
- Welche **kognitive Anforderungen** werden gestellt?
  z.B. erwartete Fortsetzung (Surprisal), Gedächtnisanforderung (Dependency Locality Theory)

# Beispielanalyse zur Sprachentwicklung in Big Data

- Big Data: systematische Sammlung von Lernerdaten in digitalen Lernsystemen
  - EF English Town → EFCamDat (Geertzen et al. 2013)
  - 1,18 Mio. Texte geschrieben von 175 Taus. Lernern auf 16 Niveaustufen (A1–C2 im GERS)
- Ermöglicht empirisch breit fundierte Analysen
  - des Erwerbs von spezifischen Aspekten des Sprachsystems, z.B. Relativsätze (Alexopoulou, Geertzen, Korhonen & Meurers 2015)
  - der Entwicklung sprachlicher Komplexität (Alexopoulou, Michel, Murakami & Meurers 2017; Michel, Murakami, Alexopoulou & Meurers 2019)

# Entwicklung Lexikalische Vielfalt und Syntaktische Subordination



# Von der Analyse von Texten zu adaptivem Input

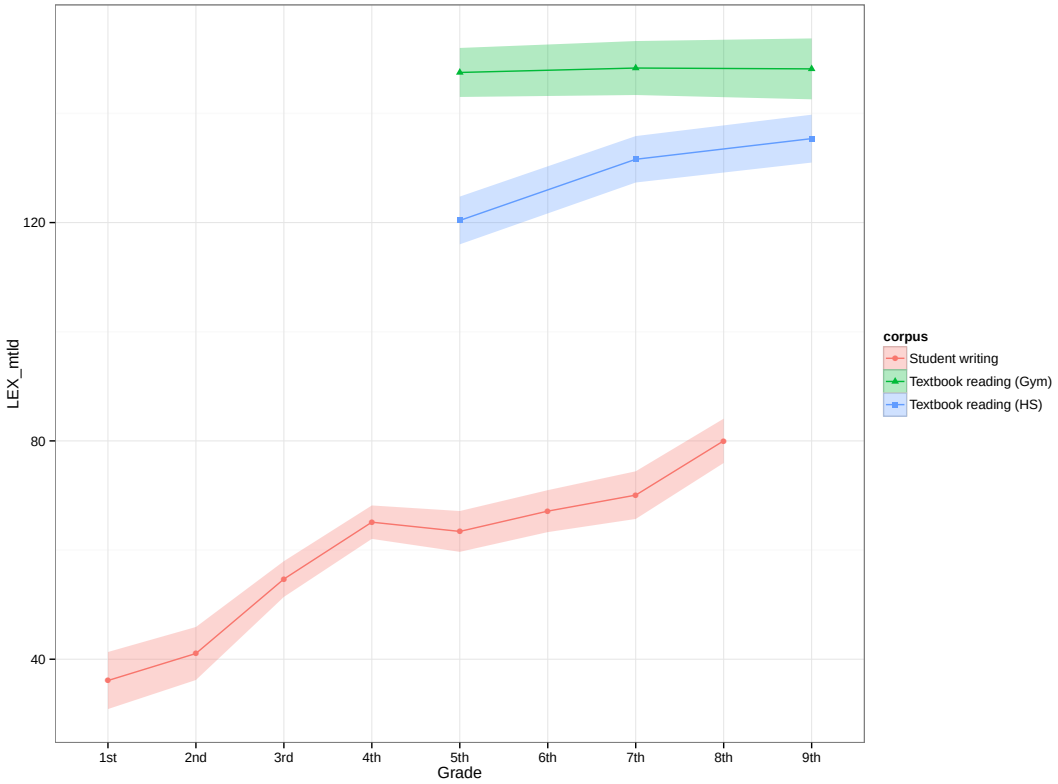
- Die Komplexitätsanalyse ermöglicht einen direkten Vergleich der Komplexität von Lesetexten & Schülertexten

i) Vergleichende Analyse:
   - Analyse aller zugelassenen Geographiebücher (Berendes, Vajjala, Meurers, Bryant, Wagner, Chinkina & Trautwein 2018)
   - Referenz: Aufsätze von 1.730 Schülern, 1–8 Klasse (KCT Corpus; Berkling et al. 2014)

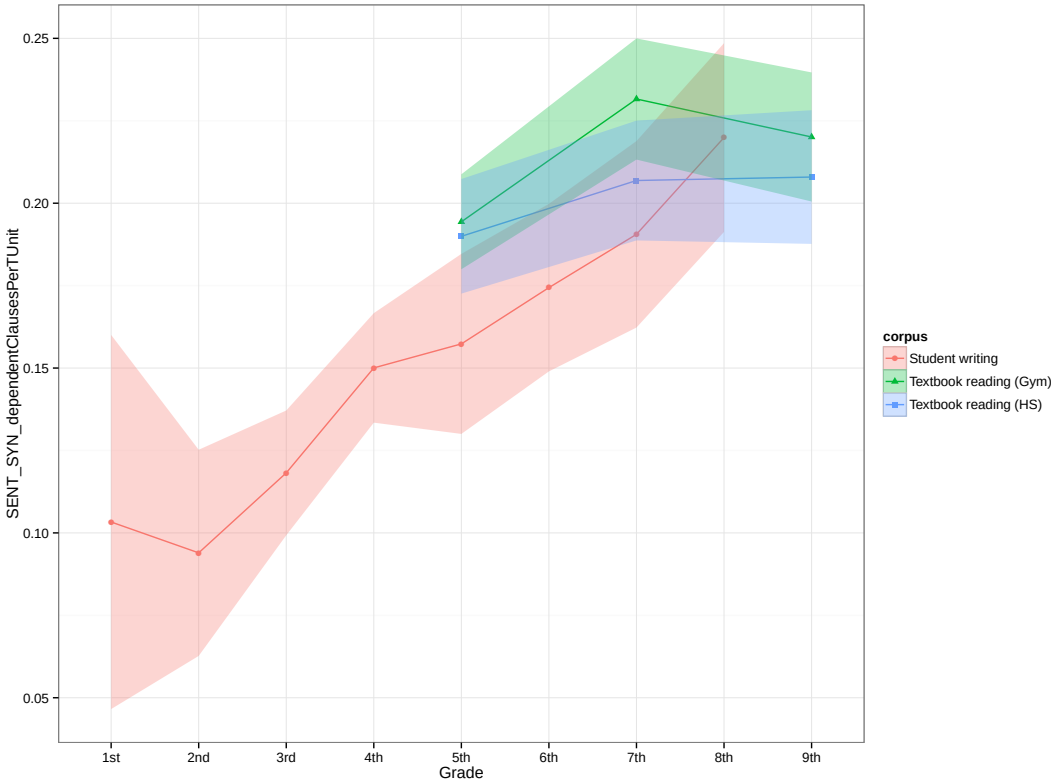
ii) Adaptiven Input suchen: “SyB: Syntactic Benchmark” System

# Verhältnis sprachlicher Komplexität in Lesetexten und Schülertexten

## Lexikalische Vielfalt (MTLD)




## Syntaktische Subordination



# Direkte Umsetzung für die Lehre? http://complexity.schule (Chen & Meurers 2019)

Complexity

How It Works | Analyzer | Challenge | Go to Analyzer

## Your Text

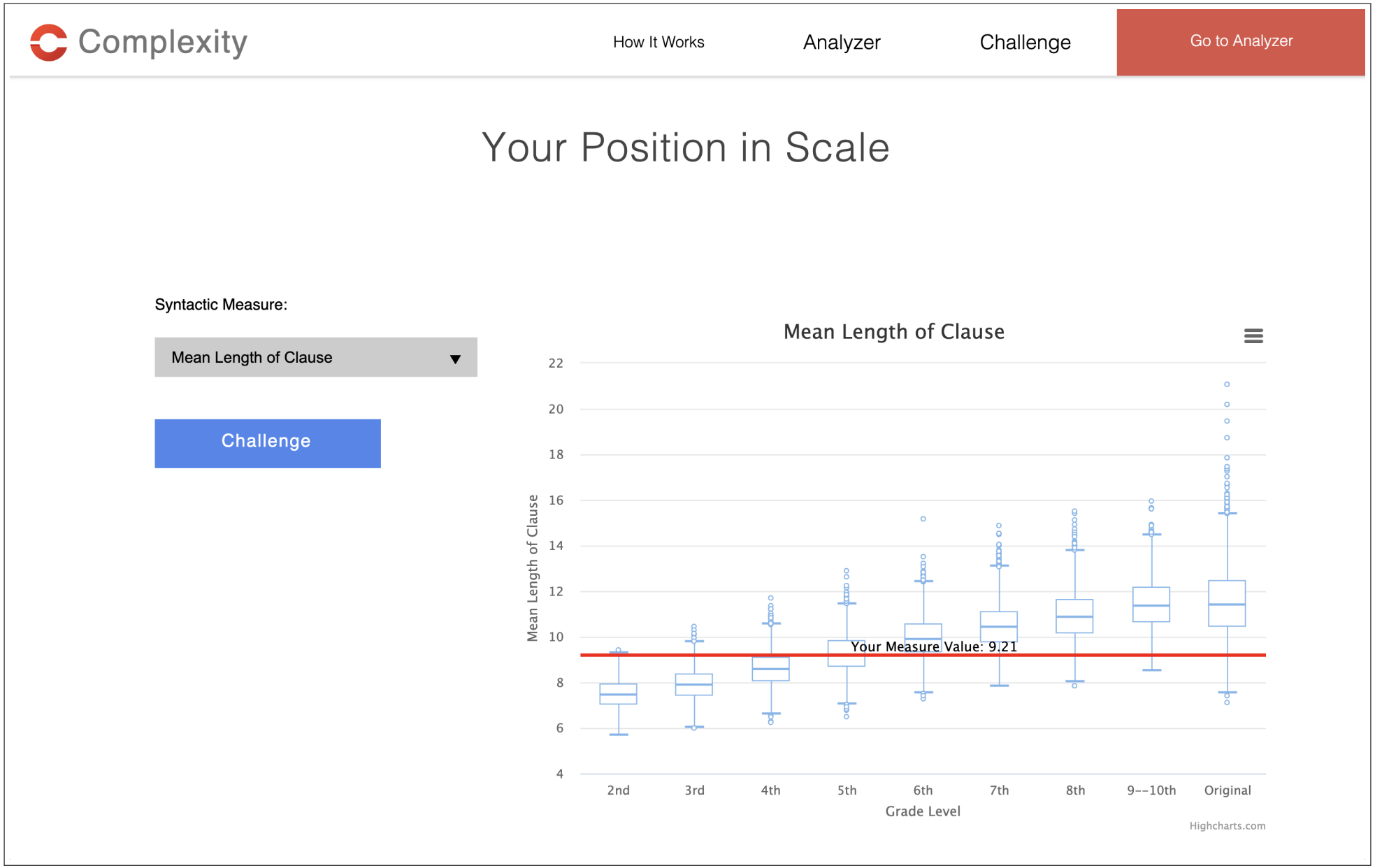
My first day at Hogwarts

This morning I woke up at 8 o'clock, then I went at breakfast. After breakfast I took my backpack and went with my parents to King's Cross by car. There I went in the red Hogwarts express, said good-bye to my Mum and the train has started. After 2 hours we had arrived there. Hagrid has received us. Then we went to the boats and over the sea to Hogwarts. In Hogwarts Professor has bringted us in the Great Hall. Hogwarts is so big. There we are to be sorted in the 4 houses by sorting hat. There are f4 houses, Griffindor, Huffelpuff, Ravenclaw and Slitherin. Nobody wanted to Slitherin because there were the dark Wizards. So I was sorted to Gryffindor. I was so happy. My friends Jonathan and Denny are Hufflepuffs. After sorting, we had eaten so much. I have heard that the house elves had maked the lunch. After lunch, Professor Dumbledore had said a lot of things with the forrest and other things. Then the trust student, it was James Sirius, the son of Harry Potter has bringed us to the Griffindor leasure room and to the dormitorys. I share my room with the son of Newt and Lunas son. Yet I lie on my bed and think about playing Quidditch and the teachers. Good bye diary book.

Challenge | Analyze

This text is used to scale your proficiency on the target levels. It will be analyzed automatically to identify the aspect of your language that needs to be further improved.

# SyB: Syntactic Benchmark (http://complexity.schule, Chen & Meurers 2019)



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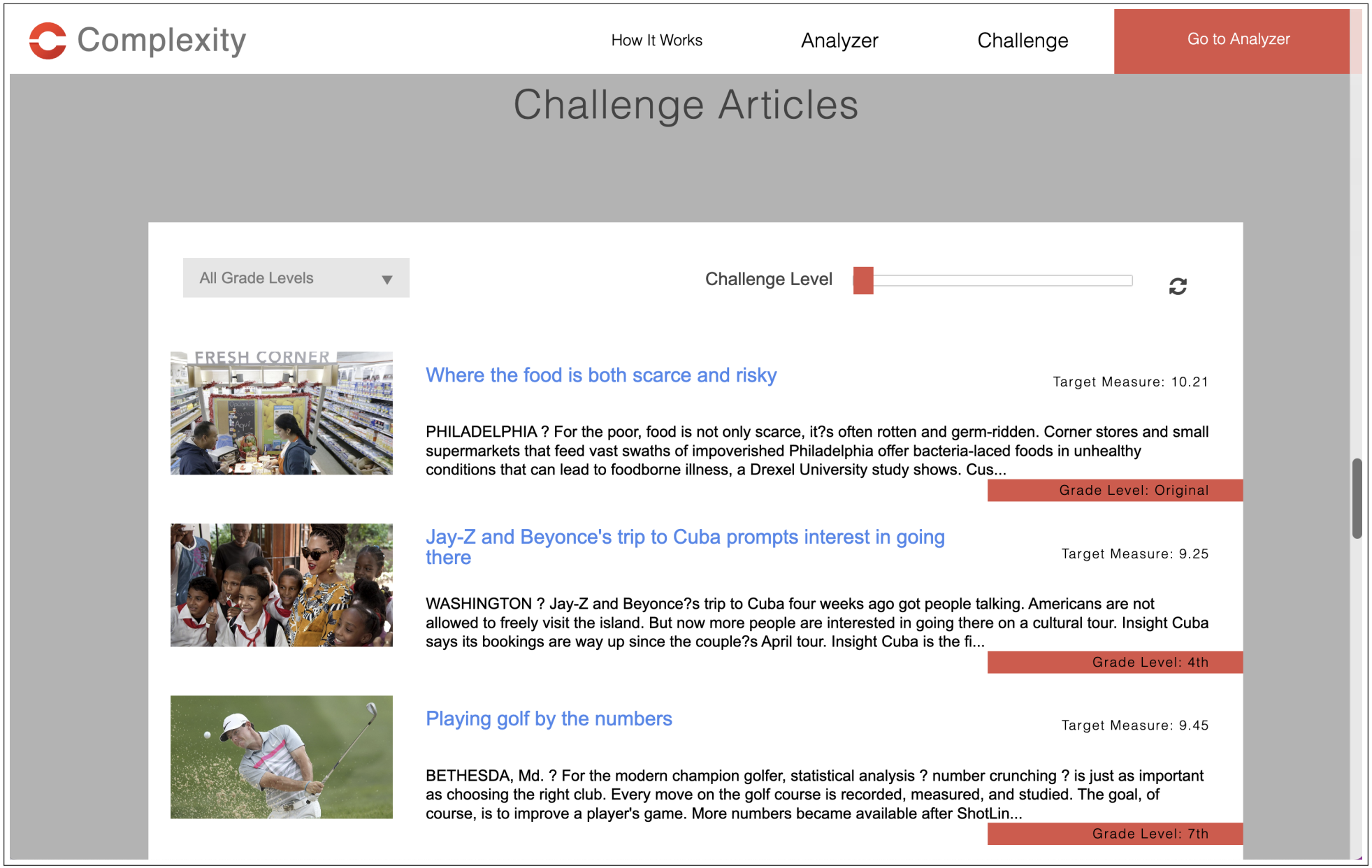


# SyB: Syntactic Benchmark (http://complexity.schule, Chen & Meurers 2019)

Complexity

How It Works | Analyzer | Challenge | Go to Analyzer

## Challenge Articles

All Grade Levels

Challenge Level

**Police demonstrations inspire new protest songs**

Target Measure: 11.63

BERKELEY, Calif. ? Stop. Hey, what's that sound? Protest songs are taking their place alongside chants of "I can't breathe" and "Hands up, don't shoot" as demonstrators raise their voices to condemn the deaths of unarmed black men at the hands of police. There's something happening here. The killing...

Grade Level: Original

**Are cities treading a slippery slope considering bans on sledding?**

Target Measure: 10.88

As his 10-year-old son, Wesley, bombed down a snow-packed hill Monday afternoon, Russell Pope smiled. ? Keep going, son!? he yelled. ?Have fun.? After a mostly snowless winter, the Overland Park, Kansas, man enjoyed finally getting to sled with his children on the Presidents Day holiday. But in a gro...

Grade Level: Original

**New virus linked to collapse of bee colonies crucial for agriculture**

Target Measure: 10.99

LOS ANGELES ? A study published this Tuesday has identified a previously unknown factor contributing to the collapse of honeybee colonies: A virus has spread from plants to the bees. Tobacco ringspot virus (TRSV) is a pathogen ? that is, a disease-causing microorganism. It is carried by pollen and i...

Grade Level: 7th

# Leseaufgaben mit Mehrwert für Lernende und Lehrenden

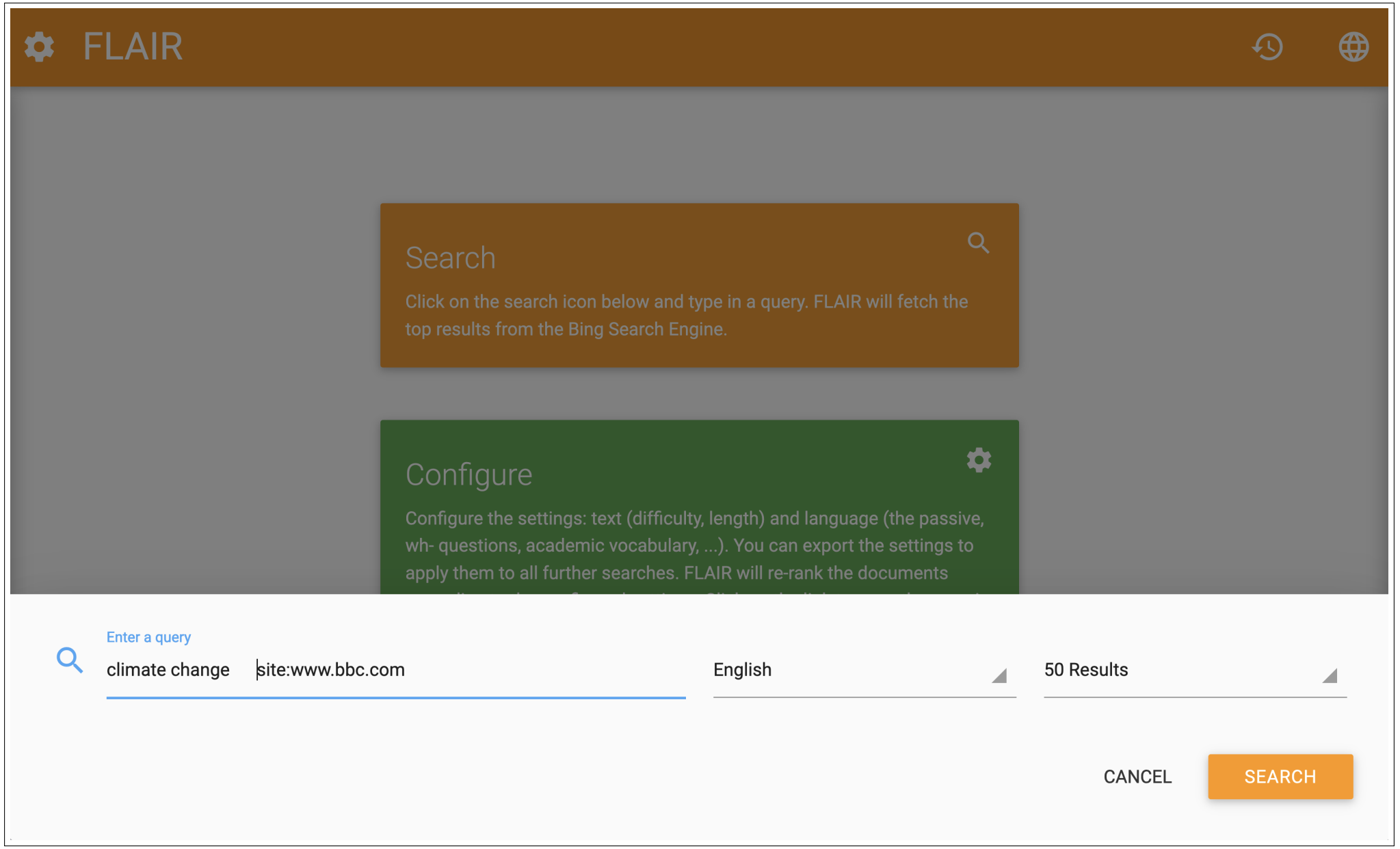
- Exklusiver Fokus von SyB auf adaptiven Input ist zu akademisch

+ Motivierende, authentische Leseaufgabe für Lernende?
  → Lernende suchen Texte nach ihren individuellen Interessen!

+ Lehrenden ermöglichen, neben globaler sprachlicher Komplexität auch reiche Repräsentation von pädagogisch fokussierten sprachlichen Mitteln sicherzustellen.

⇒ FLAIR: Form-focused Linguistically Aware Information Retrieval
  - globale Komplexitätsklassifikation nach GER A1–C2
  - Identifikation der 87 sprachlichen Mittel des Schulcurriculums Englisch

# FLAIR Suchmaschine (http://flair.schule, Chinkina & Meurers 2016)



# FLAIR Suchmaschine (http://flair.schule, Chinkina & Meurers 2016)

FLAIR

50 Results (0 Filtered)

VISUALIZE

SHARE SEARCH SETUP

Text Characteristics:

Length:

Prefer shorter texts.

Levels:

A1-A2 0 / 50

B1-B2 34 / 50

C1-C2 16 / 50

Constructions:

Sentences

Parts of Speech

Language Use:

Academic Vocabulary

'climate change site:www.bbc.com'

1 What is climate change? A really simple guide - BBC News
https://www.bbc.com/news/science-environment-24021772
Climate change is a shift in those average conditions. The rapid climate change we are now seeing is caused by humans using oil, gas and coal for their homes, factories and transport. When...

2 A brief history of climate change - BBC News
https://www.bbc.com/news/science-environment-15874560
Climate change hardly registers on the agenda, which centres on issues such as chemical pollution, atomic bomb testing and whaling. The United Nations Environment Programme (Unep) is formed as a ...

3 Climate change: IPCC report warns of 'irreversible' impacts ... - ...
https://www.bbc.com/news/science-environment-60525591
The Intergovernmental Panel on Climate Change says that humans and nature are being pushed beyond their abilities to adapt. Over 40% of the world's population are "highly vulnerable" to...

4 Climate change: 12 years to save the planet? Make that 18 mo...
https://www.bbc.com/news/science-environment-48964736
Prince Charles has stressed how important the next 12 months are in tackling climate change One of the understated headlines in last year's IPCC report was that global emissions of carbon dioxide...

5 Climate change: Young people very worried - survey - BBC News
https://www.bbc.com/news/world-58549373

# FLAIR Suchmaschine (http://flair.schule, Chinkina & Meurers 2016)

FLAIR

Sentences

Parts of Speech

Verbs

Verb Forms

Tenses

Aspect

Time

Voice

Phrasal

Phrasal verbs 48/50

Modal

Transitive

Imperative

'climate change site:www.bbc.com'

1 The law that could make climate change illegal - BBC Future
https://www.bbc.com/future/article/20200706-the-law-that-could-make-climate-change-illegal
Climate change is a global problem – if it is not tackled everywhere, it will affect everyone. The modern world is also incredibly intertwined: products – and resultant emissions – made in one...

2 Climate change: US formally withdraws from Paris agreement
https://www.bbc.com/news/science-environment-54797743
After a three-year delay, the US has become the first nation in the world to formally withdraw from the Paris climate agreement. President Trump announced the move in June 2017, but UN regulations ...

3 Climate change: Can an enormous seaweed farm help curb it?
https://www.bbc.com/news/science-environment-63200589
He's confident his Seafields floating farm will draw sufficient CO2 from the air to moderate the effects of climate change, while also earning its backers carbon credits. At 55,000 sq km (21,200 ...

4 Plant-based diet can fight climate change - UN - BBC News
https://www.bbc.com/news/science-environment-49238749
Climate change poses a threat to the security of our food supply. Rising temperatures, increased rain and more extreme weather events will all have an impact on crops and livestock.

5 The climate films shaping society - BBC Future
https://www.bbc.com/future/article/20221021-how-climate-change-in-film-shape-society

The law that could make climate chan...

B1-B2 | 149 Sentence(s) | 2802 Word(s)

2020. People are frustrated, but several governments have come and gone since the goal was set. "Don't blame us," the current government says. "We didn't take the decisions that led us here.".
The short-term cycles of government can be a real problem for climate change. Even if climate goals are laid down in law, there can often be few concrete measures to stop a succession of governments from taking decisions that collectively end up with them being missed.
But a new and ambitious climate law recently passed in Denmark tries to find a way around this problem, and some of the other common pitfalls of climate laws. It makes Denmark one of a small number of countries beginning to provide new blueprints of how government can genuinely tackle climate change. Its law could turn out to be one of the closest things yet to a law that would make climate change – or at least the lack of effort to stop it – genuinely illegal.
You might also like:

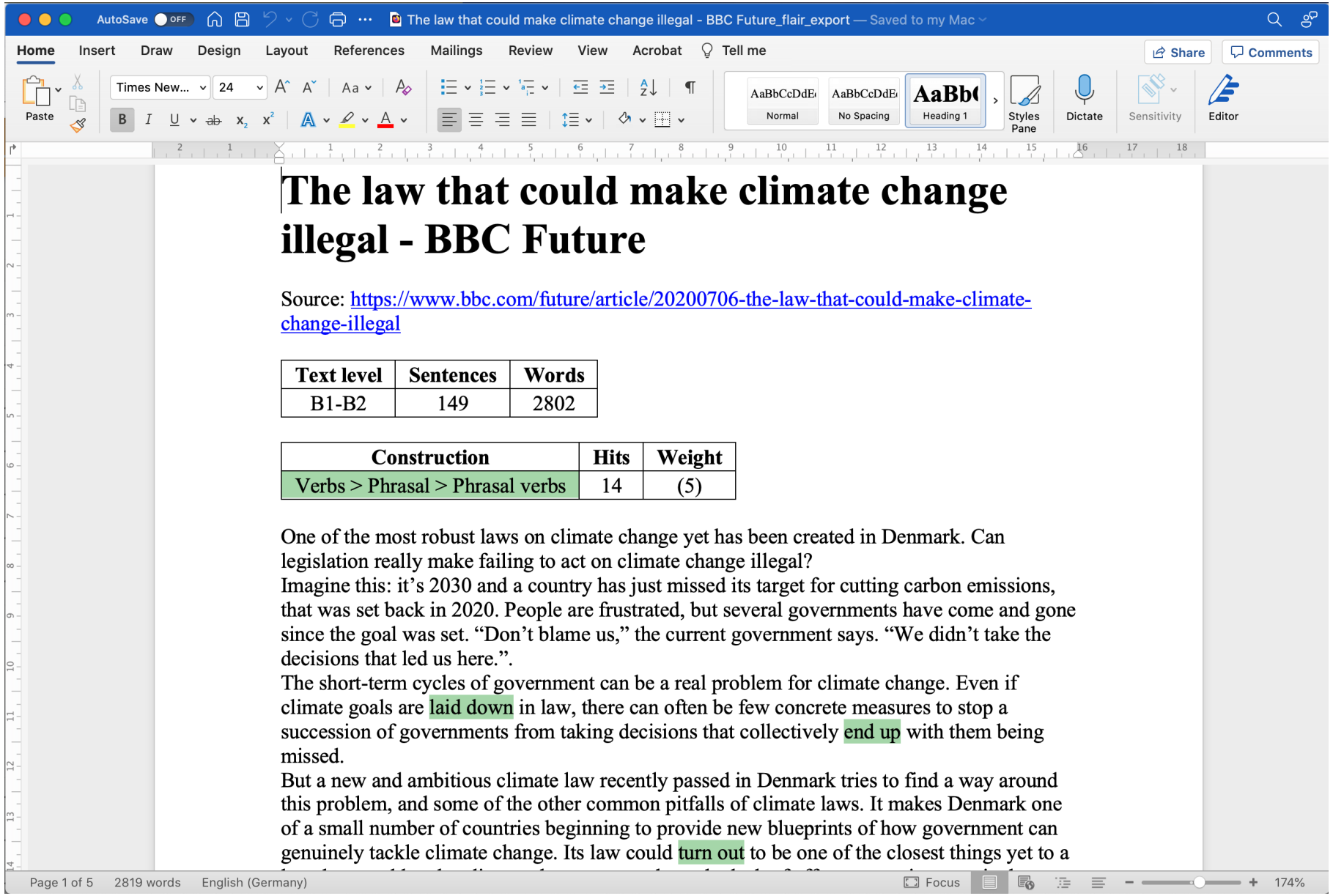
| Construction | Count | Weight |
|---|---|---|
| Verbs > Phrasal > Phrasal... | 14 | (5) |

ALL CONSTRUCTIONS

Export document

Include text formatting

# FLAIR Suchmaschine (http://flair.schule, Chinkina & Meurers 2016)



# The law that could make climate change illegal - BBC Future

Source: https://www.bbc.com/future/article/20200706-the-law-that-could-make-climate-change-illegal

| Text level | Sentences | Words |
|---|---|---|
| B1-B2 | 149 | 2802 |

| Construction | Hits | Weight |
|---|---|---|
| Verbs > Phrasal > Phrasal verbs | 14 | (5) |

One of the most robust laws on climate change yet has been created in Denmark. Can legislation really make failing to act on climate change illegal?
Imagine this: it's 2030 and a country has just missed its target for cutting carbon emissions, that was set back in 2020. People are frustrated, but several governments have come and gone since the goal was set. "Don't blame us," the current government says. "We didn't take the decisions that led us here.".
The short-term cycles of government can be a real problem for climate change. Even if climate goals are laid down in law, there can often be few concrete measures to stop a succession of governments from taking decisions that collectively end up with them being missed.
But a new and ambitious climate law recently passed in Denmark tries to find a way around this problem, and some of the other common pitfalls of climate laws. It makes Denmark one of a small number of countries beginning to provide new blueprints of how government can genuinely tackle climate change. Its law could turn out to be one of the closest things yet to a

# Output, Interaktion und Feedback beim Üben

- **Output** hypothesis (Swain 2005)
  - Sprachproduktion essentiell, da nur dann explizite Ausspezifikation erforderlich ist
- **Interaktion** zentral für sprachliche Entwicklung
  - Lernen resultiert aus Interaktion in der Zone of Proximal Development (Vygotsky 1986; Lantoff & Appel 1994)
  - Lernern wird unterstützendes Gerüst für die Entwicklung geboten (scaffolding)
  - **Feedback** einer der effektivsten Faktoren (Hattie & Timperley 2007)
- **Üben** im Zentrum der Skill Acquisition Theory (DeKeyser 2005)
  - Deklaratives Wissen ist wichtiger Ausgangspunkt des Lernens.
  - Üben führt dann zu flüssigem, prozeduraler Fähigkeit, die keine Aufmerksamkeit bindet.

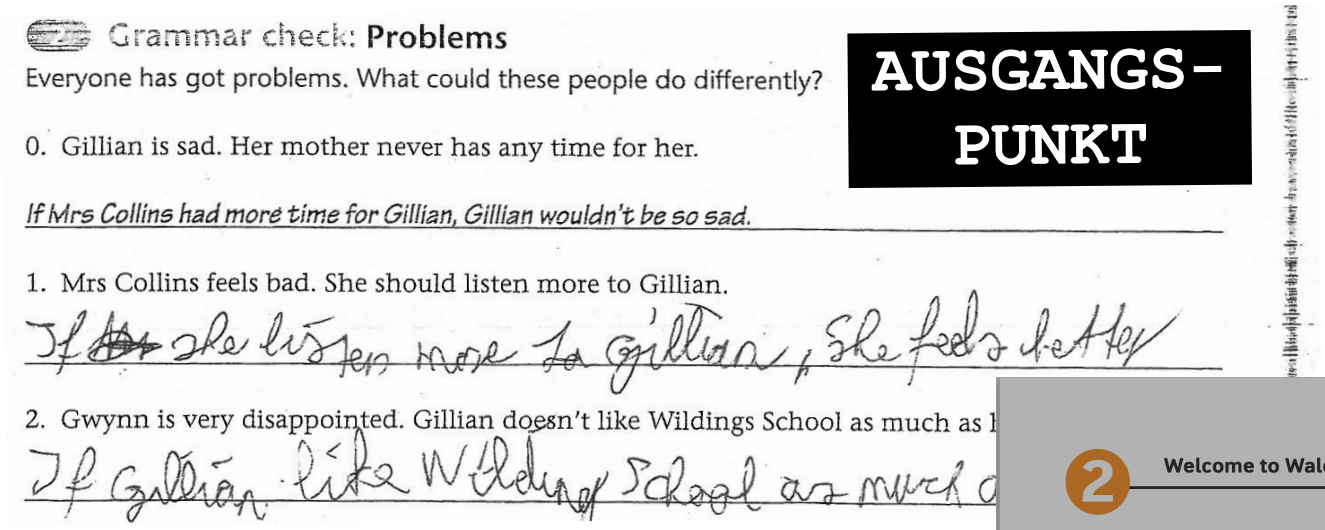
# Output, Interaktion und Feedback beim Üben – digital unterstützt

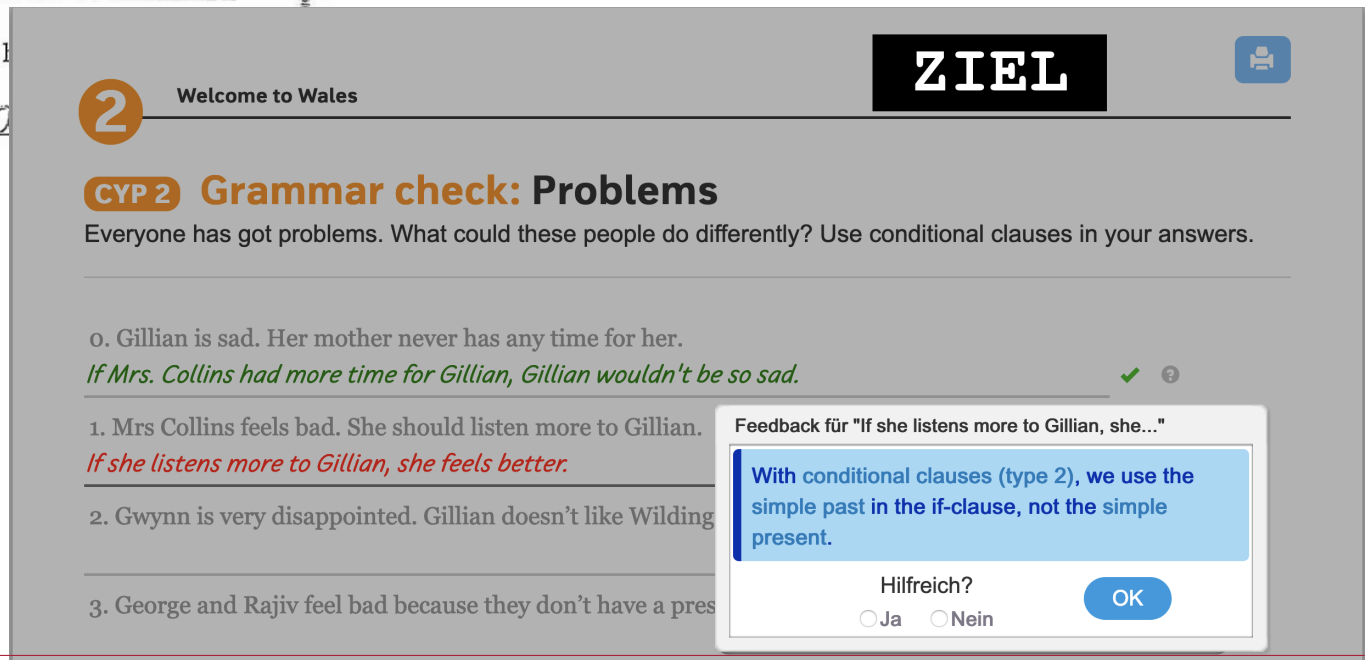
- Wie können SchülerInnen effektiv individuell üben?
  - große individuellen Unterschiede
  - Ohne adaptive Aufgabenauswahl und scaffolding Feedback zu Hause kein effektives Üben möglich.
- Wie können SchülerInnen individuelles Feedback zu Output und Interaktion erhalten?
  - wenig Zeit mit LehrerInnen
  - Abhängigkeit vom Bildungsstand der Eltern $\rightarrow$ schlecht für Bildungsgerechtigkeit

$\Rightarrow$ Intelligentes Tutorsystem: FeedBook (http://feedbook.website, Rudzewitz et al. 2017)

- Feedback unterstützt SchülerInnen erfolgreich beim Lernen (Meurers et al. 2019)

# Vom Workbook zum FeedBook



# FeedBook: Feedback zu Sprachformen

## B1 Off to Greece again

Mr Lambraki is checking flights to Greece. Read the information he has found on the two airlines and use the adjectives below to compare them.

- *LiF8R: Comparison of adjectives*

*expensive (ticket) · early (departure) · attractive (shopping on board) · good (choice of food offered on board) · healthy (food and drinks) · suitable (airport) · cheap (tickets for shuttle bus) · friendly (service on board) · easy (online booking)*

| Midair | Air-Con |
|---|---|
| • London – Athens from 39 pounds<br>• departure 7.00 am<br>• non-stop<br>• small choice of duty free articles for shopping on board<br>• low-calorie and vegetarian food available[1]<br>• from Gatwick only 28 miles from London<br>• tickets for shuttle bus are 10 euros | • London – Athens from 57 pounds<br>• departure 12.15 pm<br>• via Berlin<br>• all international brands for shopping on board<br>• snacks: crisps and chocolate bars<br>• from Stansted only 40 miles from London<br>• tickets for shuttle bus are 10 euros |

1.

*The tickets at Air-Con are expensiver than at Midair.*

2.

# FeedBook: Feedback zu Sprachformen

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1. *The tickets at Air-Con are expensiver than at Midair.*

2.

**Feedback für "The tickets at Air-Con are expensiv..."**

**When an adjective has three or more syllables, we form the comparative with 'more' and the superlative with 'most'.**

Hilfreich? ◯Ja ◯Nein

OK

# FeedBook: Feedback zu Bedeutung und Form

2 Welcome to Wales

## B1 Gillian's diary

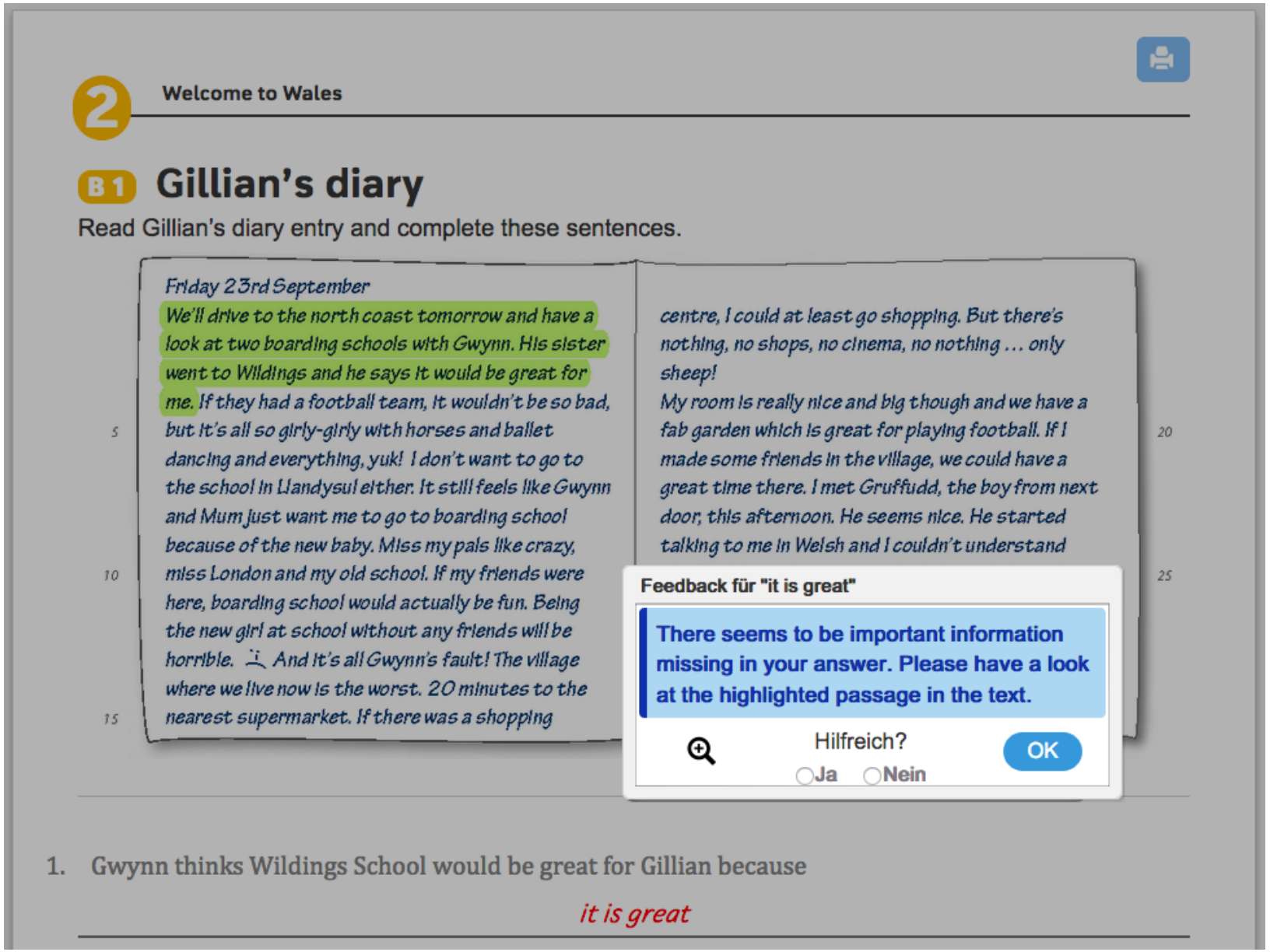
Read Gillian's diary entry and complete these sentences.

Friday 23rd September
We'll drive to the north coast tomorrow and have a look at two boarding schools with Gwynn. His sister went to Wildings and he says it would be great for me. If they had a football team, it wouldn't be so bad, but it's all so girly-girly with horses and ballet dancing and everything, yuk! I don't want to go to the school in Llandysul either. It still feels like Gwynn and Mum just want me to go to boarding school because of the new baby. Miss my pals like crazy, miss London and my old school. If my friends were here, boarding school would actually be fun. Being the new girl at school without any friends will be horrible. ☹ And it's all Gwynn's fault! The village where we live now is the worst. 20 minutes to the nearest supermarket. If there was a shopping centre, I could at least go shopping. But there's nothing, no shops, no cinema, no nothing … only sheep!
My room is really nice and big though and we have a fab garden which is great for playing football. If I made some friends in the village, we could have a great time there. I met Gruffudd, the boy from next door, this afternoon. He seems nice. He started talking to me in Welsh and I couldn't understand ANYTHING. He then spoke English and told me he plays rugby. Well, it's not football but I might have to learn to like it. They all love rugby here.
Aargh, if I had some credit on my phone, I could call Caroline. Hope I get some pocket money tomorrow.

1. Gwynn thinks Wildings School would be great for Gillian because

*it is great*

# FeedBook: Feedback zu Bedeutung und Form



2 Welcome to Wales

B1 **Gillian's diary**

Read Gillian's diary entry and complete these sentences.

*Friday 23rd September*
*We'll drive to the north coast tomorrow and have a look at two boarding schools with Gwynn. His sister went to Wildings and he says it would be great for me. If they had a football team, it wouldn't be so bad, but it's all so girly-girly with horses and ballet dancing and everything, yuk! I don't want to go to the school in Llandysul either. It still feels like Gwynn and Mum just want me to go to boarding school because of the new baby. Miss my pals like crazy, miss London and my old school. If my friends were here, boarding school would actually be fun. Being the new girl at school without any friends will be horrible. ☹ And it's all Gwynn's fault! The village where we live now is the worst. 20 minutes to the nearest supermarket. If there was a shopping centre, I could at least go shopping. But there's nothing, no shops, no cinema, no nothing … only sheep!*
*My room is really nice and big though and we have a fab garden which is great for playing football. If I made some friends in the village, we could have a great time there. I met Gruffudd, the boy from next door, this afternoon. He seems nice. He started talking to me in Welsh and I couldn't understand*

Feedback für "it is great"

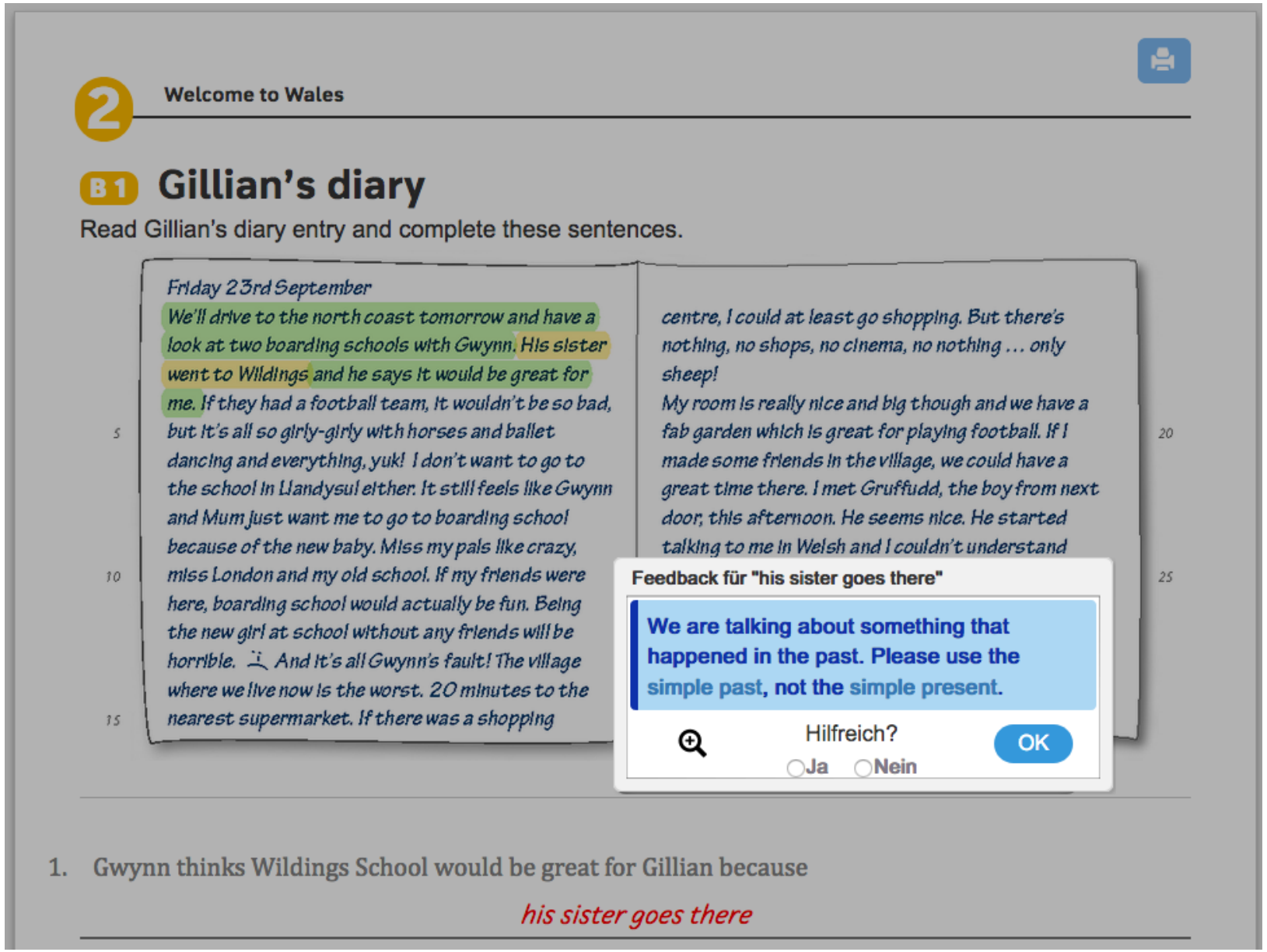
There seems to be important information missing in your answer. Please have a look at the highlighted passage in the text.

Hilfreich? ○Ja ○Nein OK

1. Gwynn thinks Wildings School would be great for Gillian because

*it is great*

# FeedBook: Feedback zu Bedeutung und Form



2 Welcome to Wales

B1 **Gillian's diary**

Read Gillian's diary entry and complete these sentences.

*Friday 23rd September*
*We'll drive to the north coast tomorrow and have a look at two boarding schools with Gwynn. His sister went to Wildings and he says it would be great for me. If they had a football team, it wouldn't be so bad, but it's all so girly-girly with horses and ballet dancing and everything, yuk! I don't want to go to the school in Llandysul either. It still feels like Gwynn and Mum just want me to go to boarding school because of the new baby. Miss my pals like crazy, miss London and my old school. If my friends were here, boarding school would actually be fun. Being the new girl at school without any friends will be horrible. ☹ And it's all Gwynn's fault! The village where we live now is the worst. 20 minutes to the nearest supermarket. If there was a shopping centre, I could at least go shopping. But there's nothing, no shops, no cinema, no nothing … only sheep!*
*My room is really nice and big though and we have a fab garden which is great for playing football. If I made some friends in the village, we could have a great time there. I met Gruffudd, the boy from next door, this afternoon. He seems nice. He started talking to me in Welsh and I couldn't understand*

Feedback für "his sister goes there"

We are talking about something that happened in the past. Please use the simple past, not the simple present.

Hilfreich? Ja Nein OK

1. Gwynn thinks Wildings School would be great for Gillian because

*his sister goes there*

# FeedBook: Feedback zu Bedeutung und Form

2 Welcome to Wales

## B1 Gillian's diary

Read Gillian's diary entry and complete these sentences.

*Friday 23rd September*

*We'll drive to the north coast tomorrow and have a look at two boarding schools with Gwynn. His sister went to Wildings and he says it would be great for me. If they had a football team, it wouldn't be so bad, but it's all so girly-girly with horses and ballet dancing and everything, yuk! I don't want to go to the school in Llandysul either. It still feels like Gwynn and Mum just want me to go to boarding school because of the new baby. Miss my pals like crazy, miss London and my old school. If my friends were here, boarding school would actually be fun. Being the new girl at school without any friends will be horrible. ☹ And it's all Gwynn's fault! The village where we live now is the worst. 20 minutes to the nearest supermarket. If there was a shopping centre, I could at least go shopping. But there's nothing, no shops, no cinema, no nothing … only sheep!*

*My room is really nice and big though and we have a fab garden which is great for playing football. If I made some friends in the village, we could have a great time there. I met Gruffudd, the boy from next door, this afternoon. He seems nice. He started talking to me in Welsh and I couldn't understand ANYTHING. He then spoke English and told me he plays rugby. Well, it's not football but I might have to learn to like it. They all love rugby here.*

*Aargh, if I had some credit on my phone, I could call Caroline. Hope I get some pocket money tomorrow.*

1. Gwynn thinks Wildings School would be great for Gillian because

*his sister went there*

# Was bietet das FeedBook?

- sofortige, unterstützende Rückmeldungen, die Schüler zu einem Verständnis des Lerngegenstandes führen
- Automatische Analyse mit KI Methoden
  - 188 verschiedene Feedbacktypen zu tenses, comparatives, relative & reflexive pronouns, gerunds, passive, conditionals, (in)direct speech.
  - Deckt alle Sprachkonstrukte des Bildungsplanes 7. Klasse ab.
- Was bringt das in der Schulrealität?
  - Erste randomisierte Feldstudie mit intelligentem Sprachtutorsystem in Deutschland (Meurers et al. 2019).
  - Regulärer Englischunterricht, aber FeedBook als Arbeitsheft.
  - Randomisierung: Kinder erhalten spezifisches Feedback zu unterschiedlichen Grammatikthemen

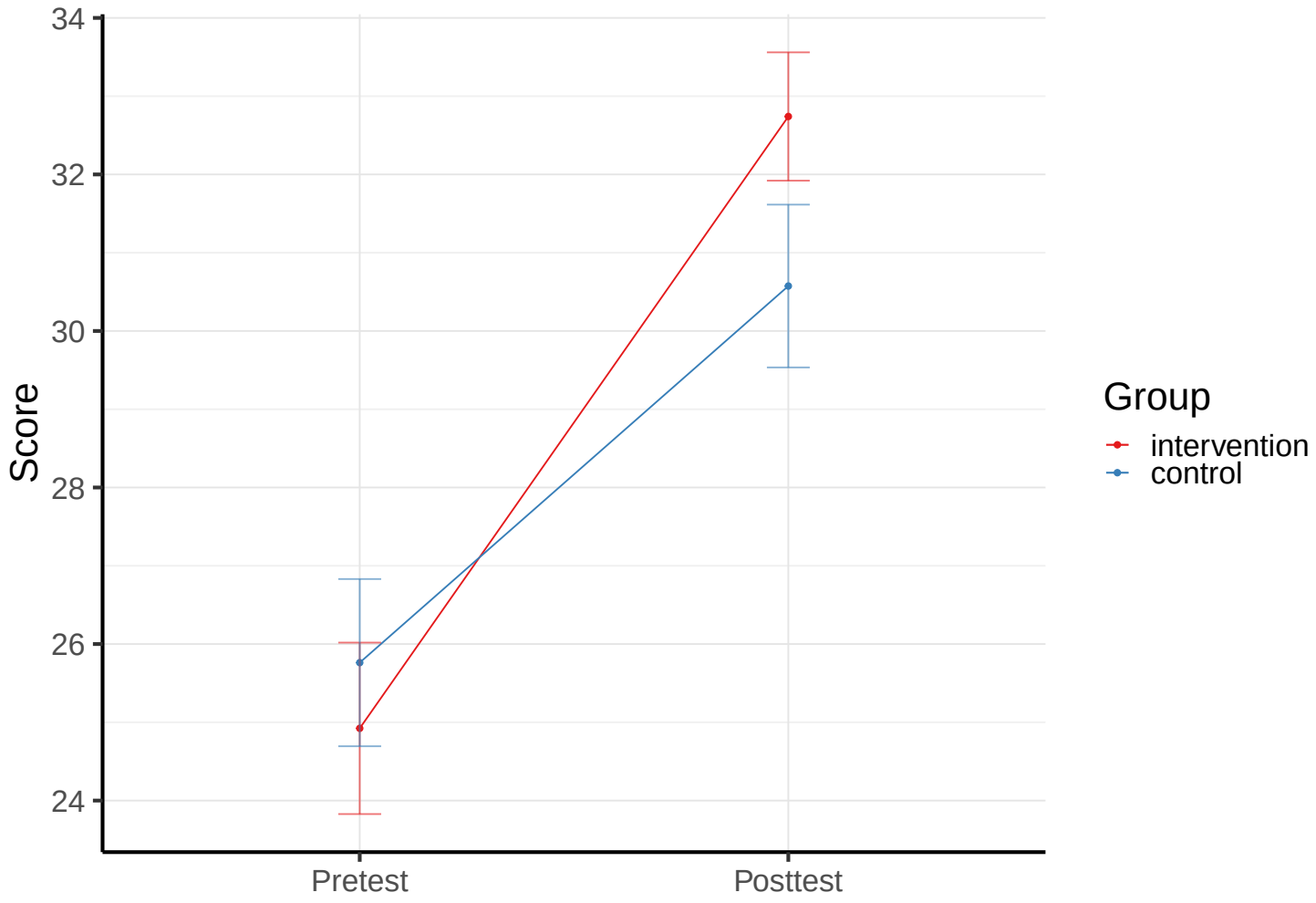
# Ergebnis: Substanzieller Lernerfolg durch spezifisches Feedback

10 Klassen, 205 Kinder

Mean change scores:
7.81 vs. 4.81

**Verbesserung**
**von 63%**

Effektgröße
Cohen's d = 0.56



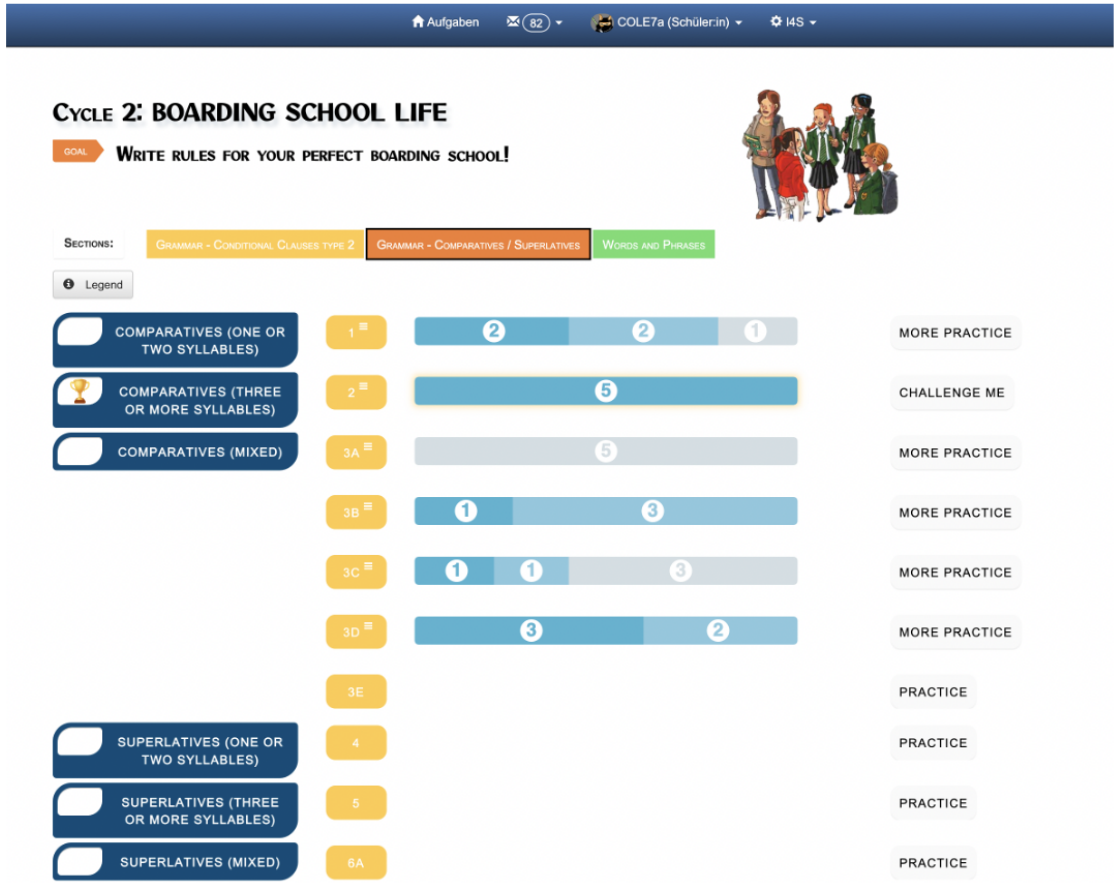
# Ein klare Win-Win Situation

- Schüler
  - + erhalten individuelle Unterstützung beim Üben → 63% Lernverbesserung
  - + auf ihrem Niveau → automatische Binnendifferenzierung
  - + unabhängig vom Elternhaus → Bildungsgerechtigkeit
- Lehrer
  - + werden von Korrekturaufwand entlastet
  - + können binnendifferenziert üben lassen ohne Mehraufwand
  - + Arbeit in der Klasse mit besser vorbereiteten Kindern
- Aufgaben- und Bildungsplanersteller
  - + Learner und activity analytics ermöglichen systematische, empirisch fundierte Verbesserung der Materialien und des Bildungsplans

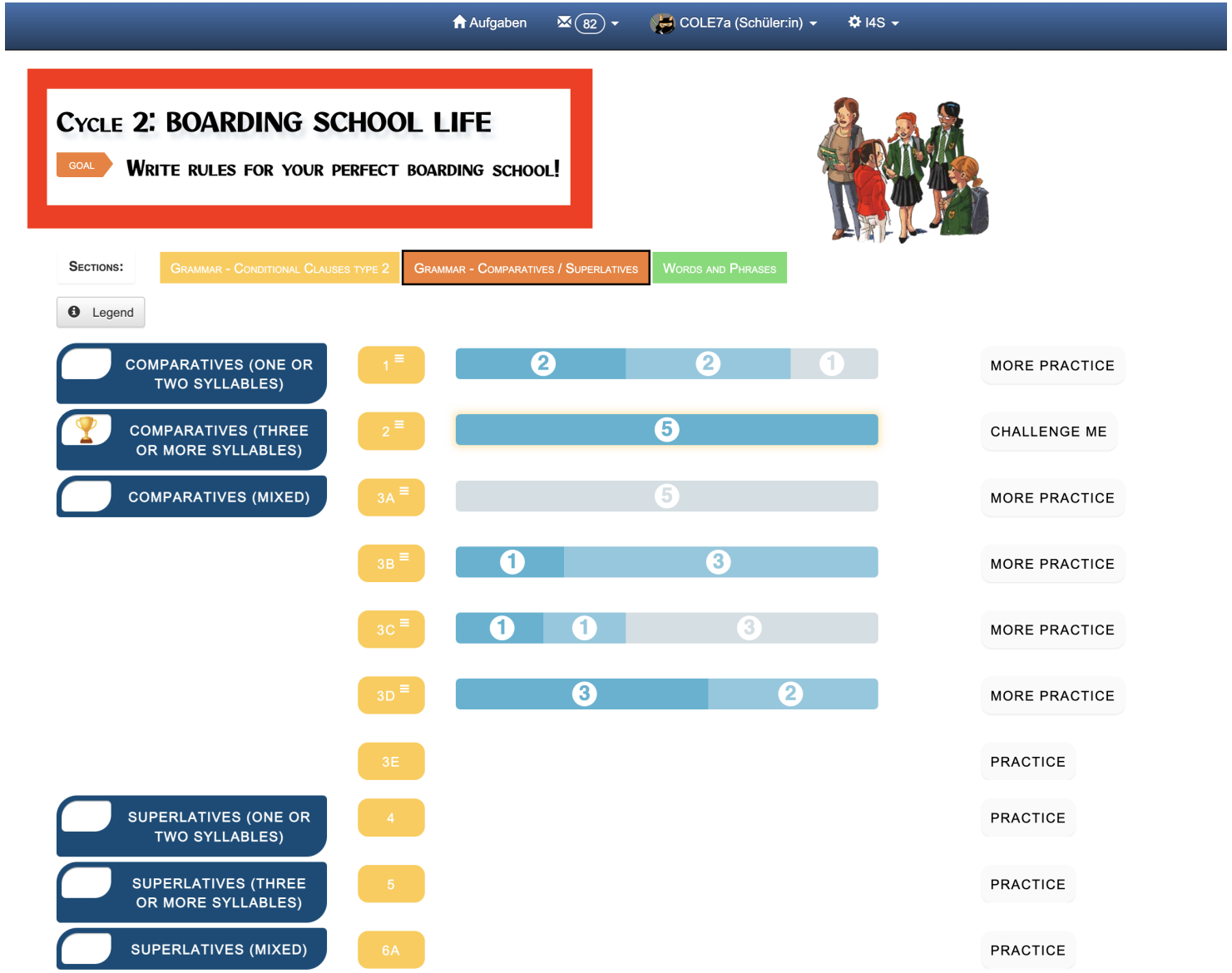
# Wie kann man individuelles Üben in den Lernzusammenhang integrieren?

- SchülerIn: “Wozu soll ich üben, und was bringt mir das für den Unterricht in der Klasse?”
- Idee des Interact4School.de Projekts: Übungen systematisch so organisieren, dass sie für eine echte funktionale Aufgabe in der Klasse befähigen
  - *practice of task-essential language as pre-task activities*
  - höhere intrinsische Motivation der SchülerInnen durch systematische Verbindung des Übens zum funktionalem Sprachverwendungszweck
- Leona Colling, Ines Pieronczyk und KollegInnen (Colling et al. in prep) haben hierzu ein Lernerdashboard als neue Zentrale des FeedBook entwickelt.

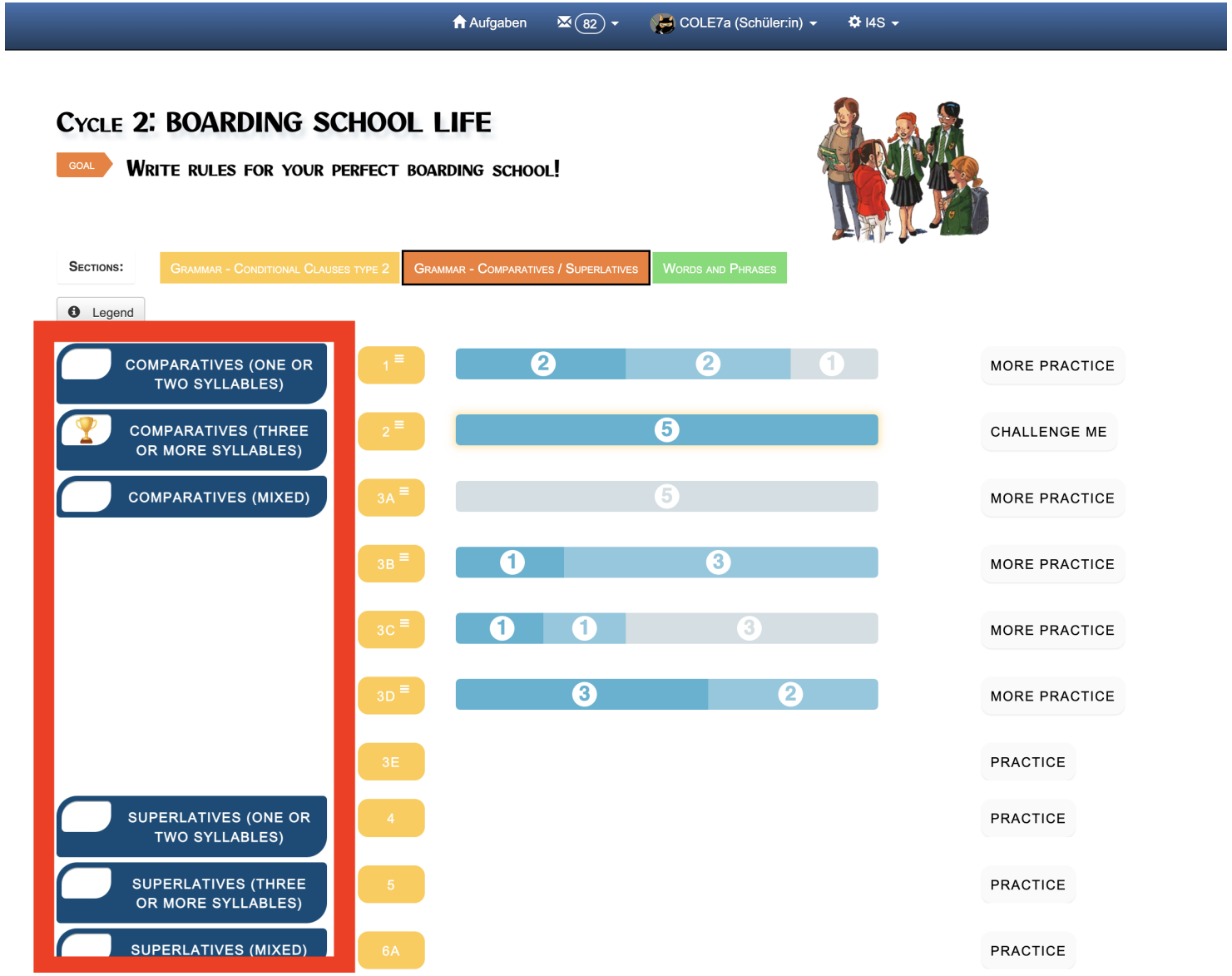
# Üben als pre-task activities organisieren



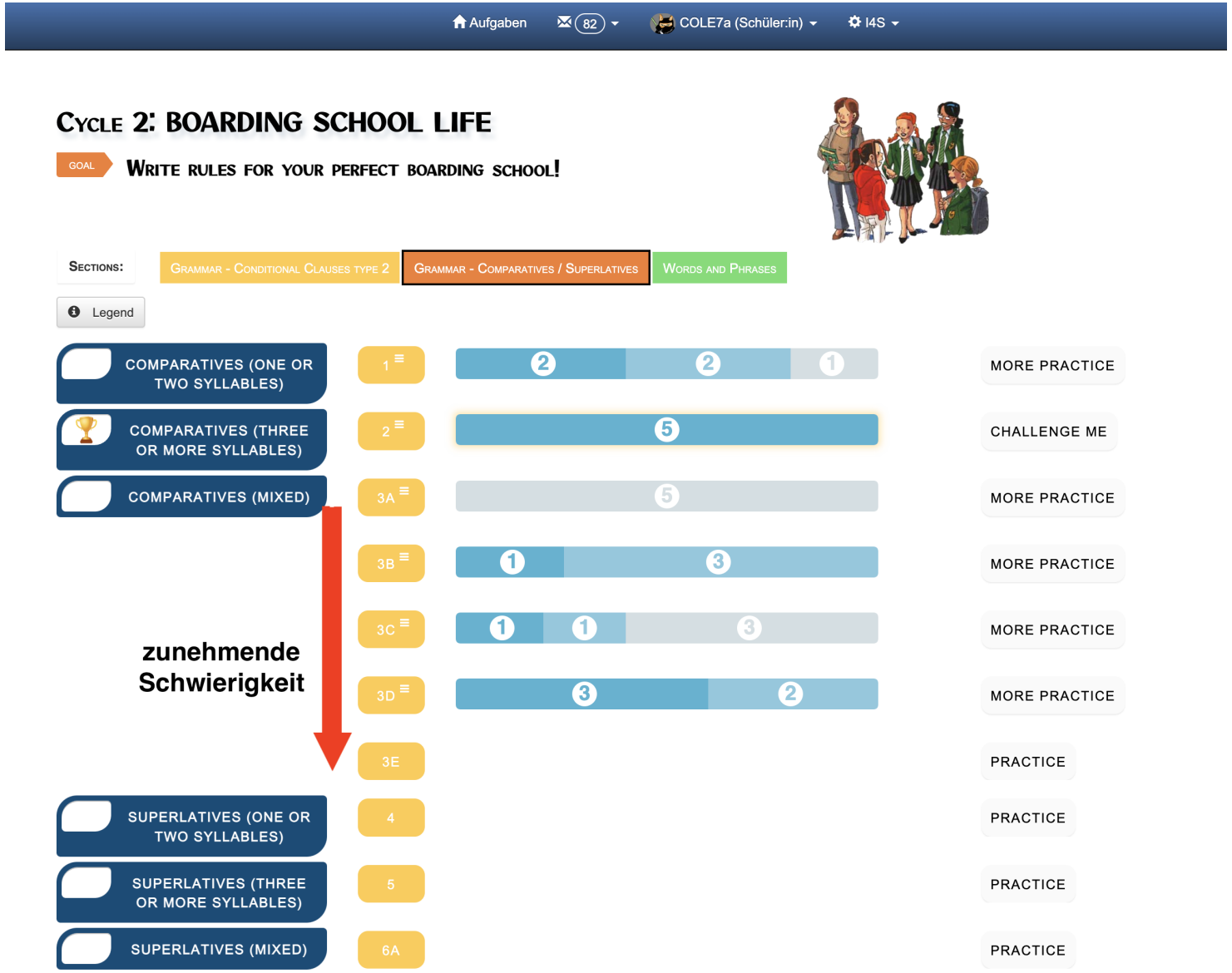
# 1. Die Aufgabe (final task) explizit machen



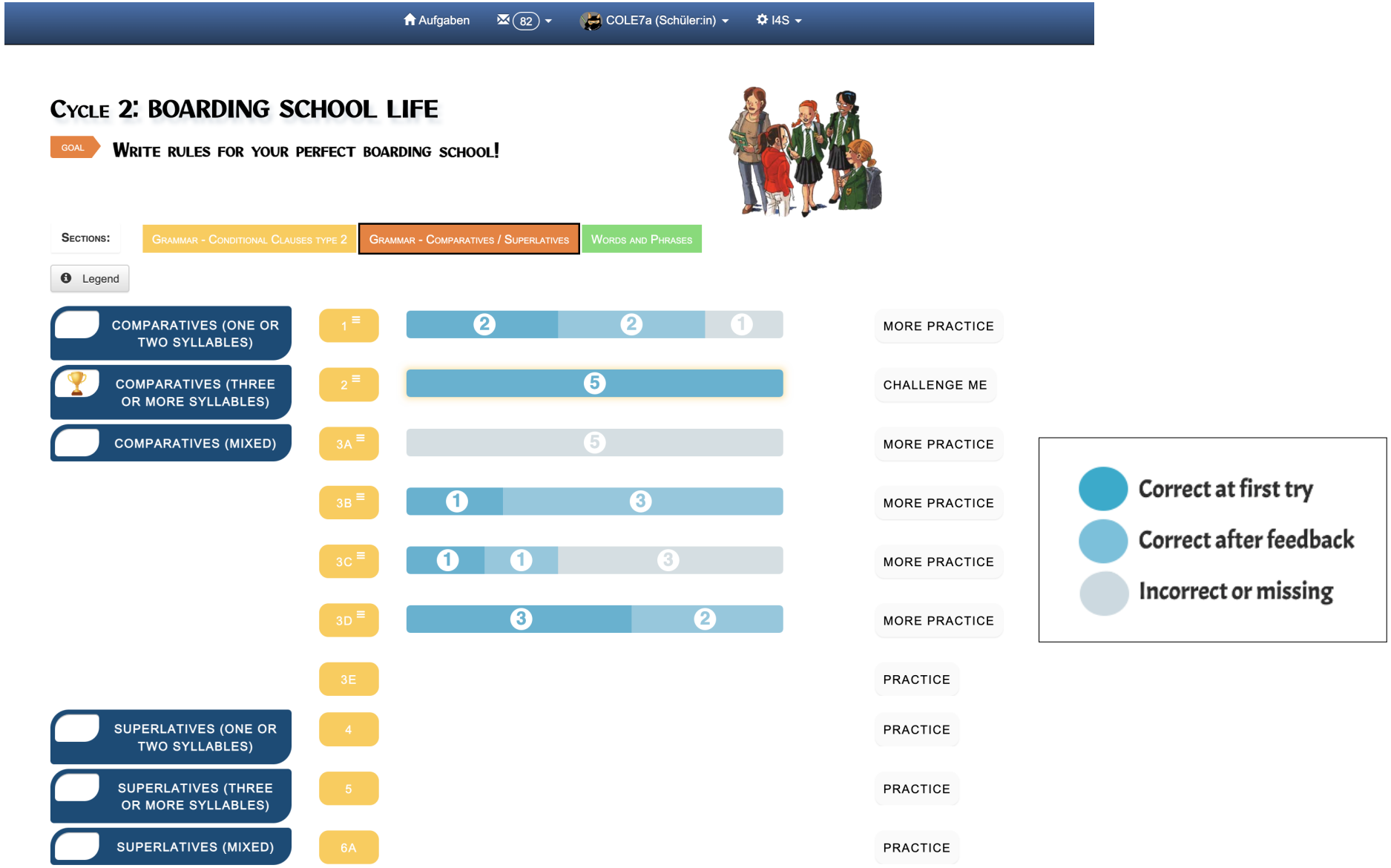
# 2. Organisation nach den zu übenden sprachlichen Mitteln



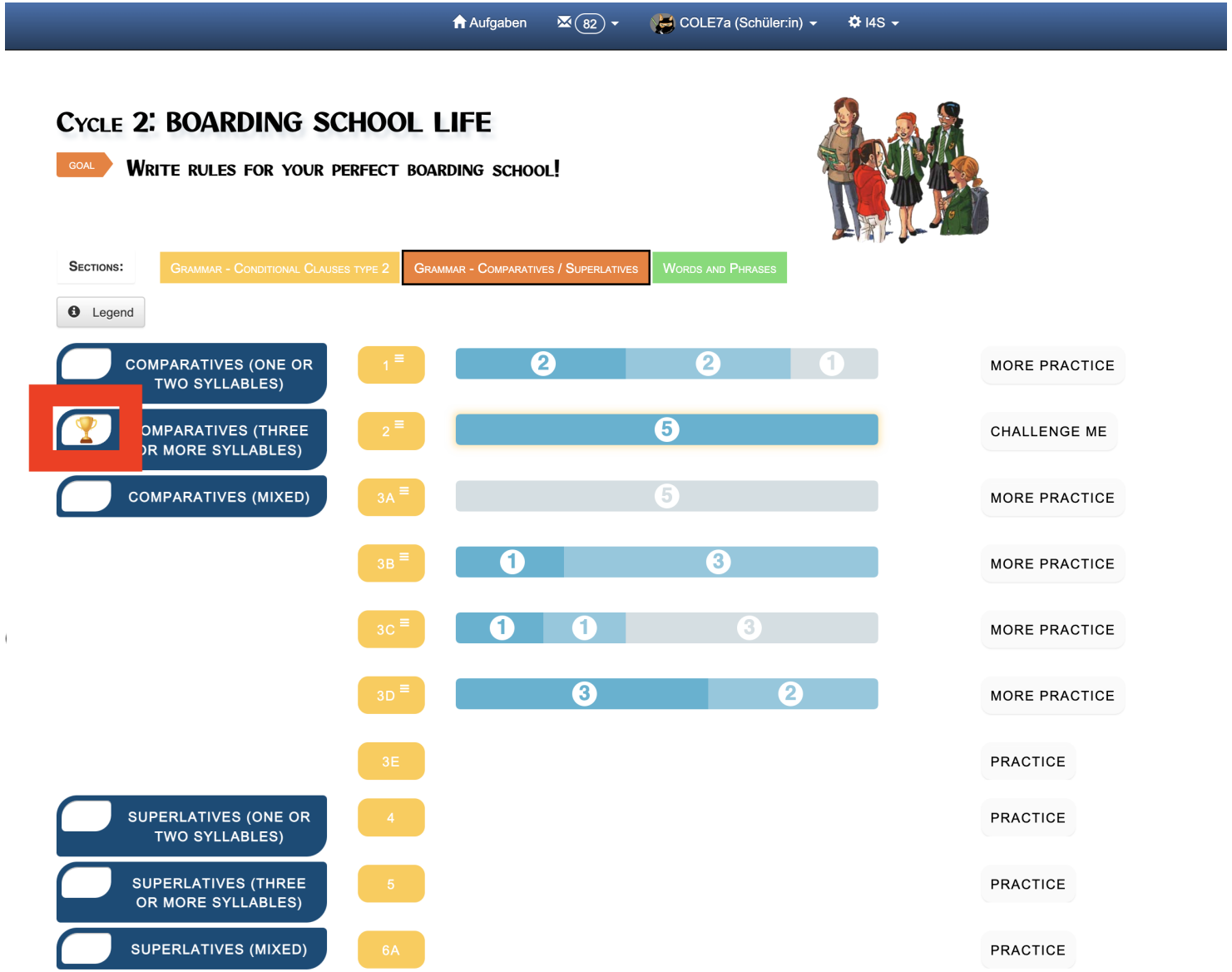
# 3. Inkrementelle Aufgabenkomplexität



# 4. Rückmeldung zum Erfolg nach Grad der Unterstützung



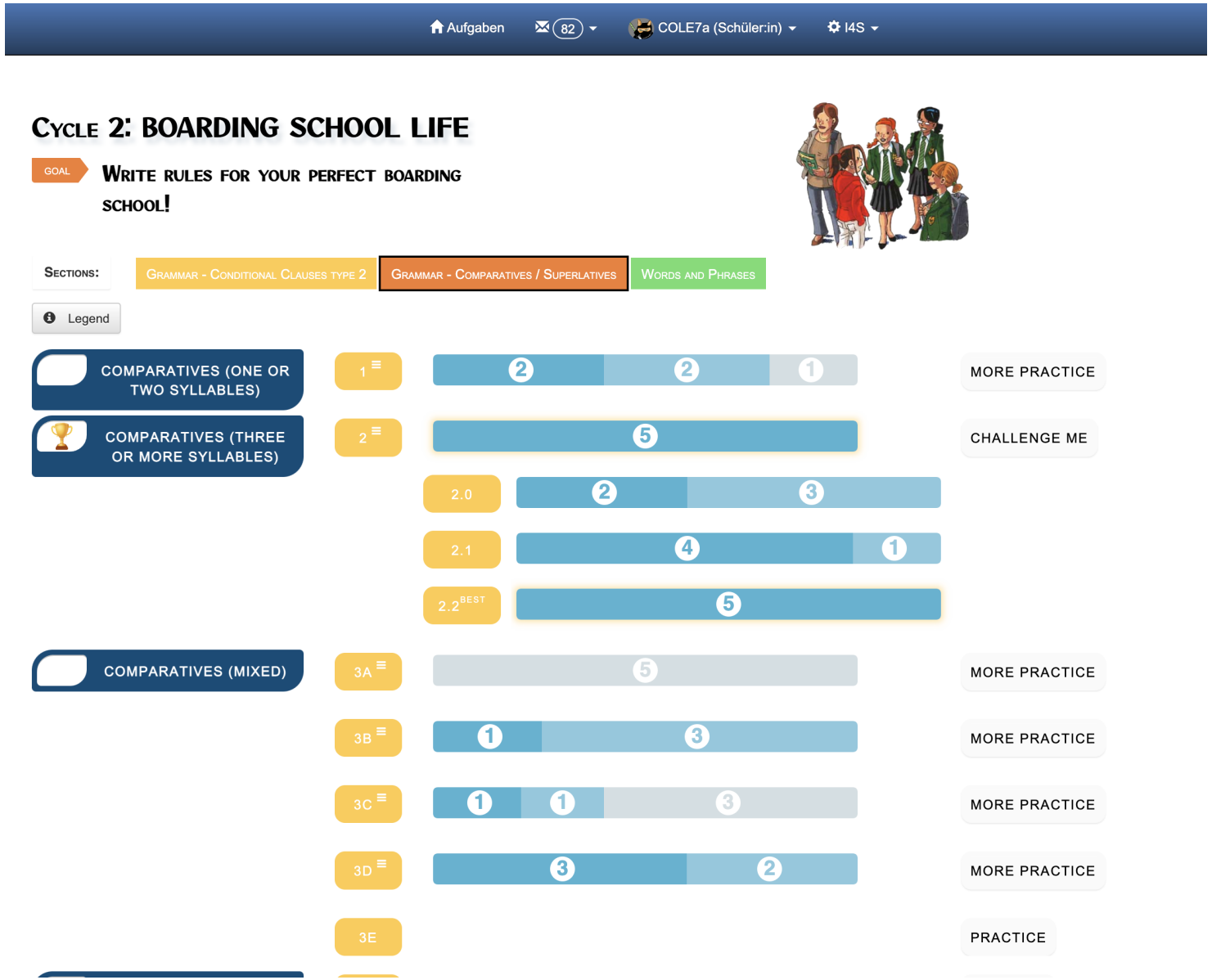
# 5. Kriteriale Erfolgsmeldungen (“acquisition criterion”)



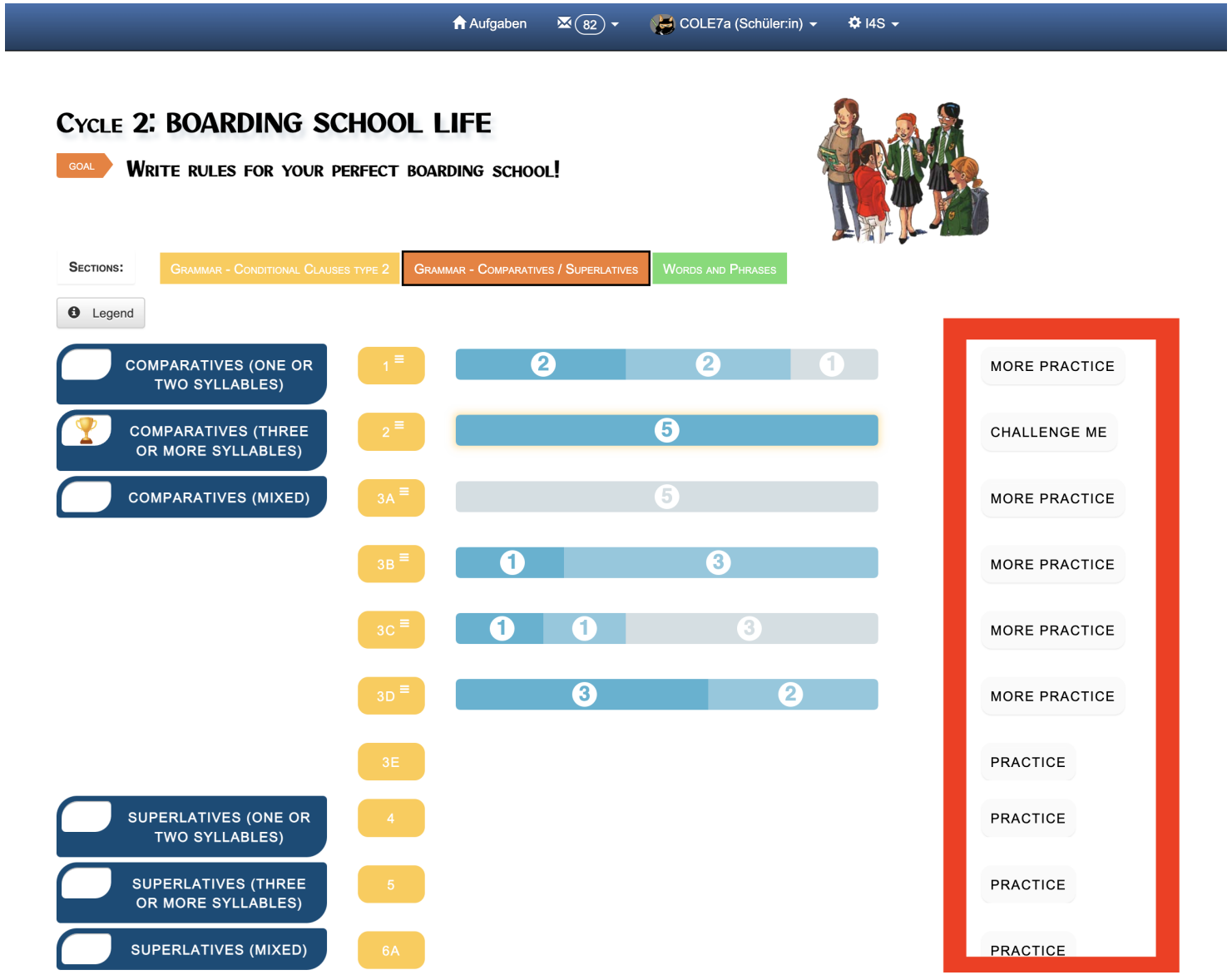

”Mastery” für ein sprachliches Mittel:

- Alle Schwierigkeitsstufen bearbeitet
- 60% „correct at first try“ bei komplexesten Aufgabe

# 6. Abgabehistorie

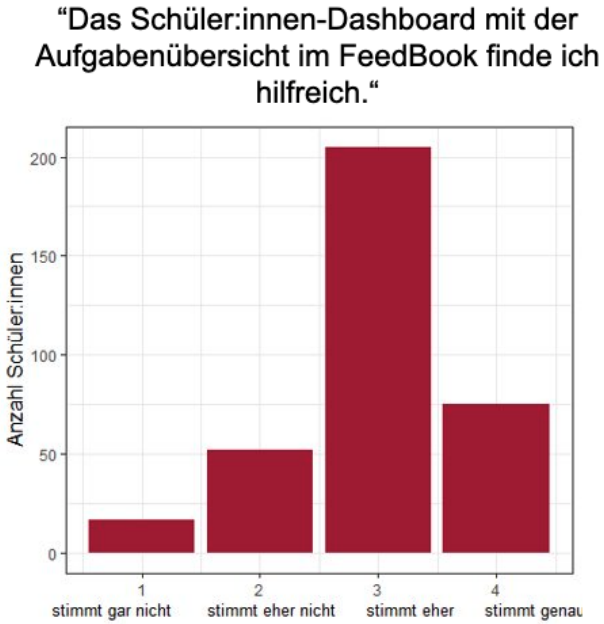


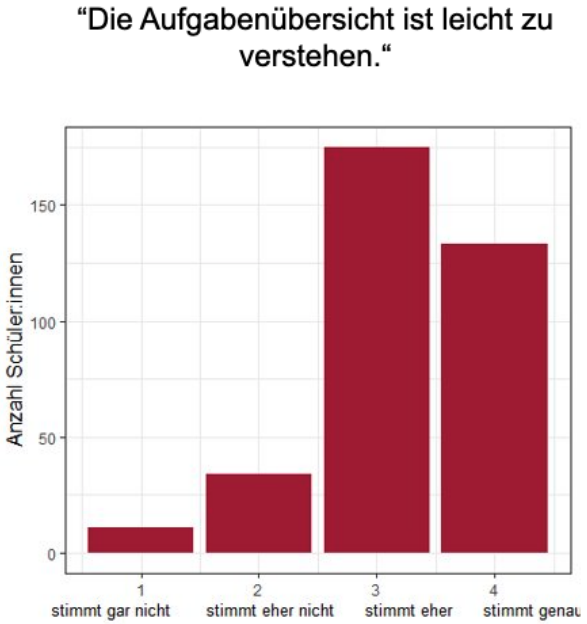
# 7. Auswahl der nächsten Übungen über die sprachlichen Mittel



# Erste Ergebnisse

- Ganzjährige randomisierte Feldstudie im Interact4School Projekt (Schuljahr 21/22)
  - 847 SchülerInnen aus 36 Klassen (Englisch 7. Klasse Gymnasium)
  - Analysen in Vorbereitung (inkl. Klassenzimmer-Videographie, Torben Schmidt et al., Univ. Lüneburg)
- Erste Analysen des Lernerfolgs (Pre-/Posttest) bei sprachlichen Mitteln des Curriculums
  - → signifikant höherer **Lernerfolg** (Original-FeedBook vs. mit Dashboard, Parrisius et al. in prep)
  - → Schüler**einschätzung**:



# Zusammenfassung

- Digitalisierung der Bildung und KI Methoden können nur da erfolgreich sein, wo sie auf Mechanismen des Fremdspracherwerbs aufbaut.
- Kernkonzepte und Mechanismen des Fremdspracherwerbs
  - entwicklungsproximaler Input und Noticing
  - Output, Interaktion und Feedback beim Üben
  - Aufgabenorientierung

  ermöglichen interaktive, adaptive digitale Unterstützung
  - adaptives Input Enhancement und Input Enrichment
  - intelligente Tutorsysteme zur adaptiven Unterstützung des Übens mit Feedback
  - eingebettet in input- und output-orientierte Aufgabenkontexte
- Solche individuelle Förderung benötigt KI Methoden für die
  - automatische Analyse von **Sprache** ($\rightarrow$ Feedback, sprachliche Komplexität)
  - Modellierung von individuellen **Lernenden** und **Lernmaterialien** ($\rightarrow$ Adaptivität)

# Übersicht zu Systemen & Projektseiten (Links jeweils unter System-/Projektname)

- DiDi.schule und FeedBook.schule: Englisch Tutorsystem (7. Klasse)
- Prosodiya.de: Intelligentes Tutorsystem zur Förderung der Lese- und Rechtschreibleistung
- FLAIR.schule: Sprachaffine Suchmaschine für Englisch und Deutsch Lehrkräfte
- KANSAS-Suche.de: Sprachaffine Suchmaschine für Lehrkräfte Alphabetisierung/Grundbildung
- CTAP: Webbasiertes Interface zur Analyse sprachlicher Komplexität für Deutsch, Englisch & bald mehr

- FeedBook Projekt: Entwicklung eines interaktiven Workbooks für den englischen Fremdsprachenunterricht
- DigBinDiff.de Projekt: Digitale Binnendifferenzierung – Integration sprachlicher & kognitiver Maße zur adaptiven Förderung
- Interact4School.de Projekt: Außerschulisches individuelles Lernen und die Schnittstellen zum Schulunterricht
- AI2Teach Projekt: Individuelle Förderung auf der Basis eines erweiterten digitalen Lehr-Lern-Konzepts für den Fremdsprachenunterricht
- Aisla Projekt: An intelligent agent for second language English learning in real-life contexts
- KANSAS Projekt: Entwicklung einer kompetenzadaptiven, nutzerorientierten Suchmaschine für authentische Sprachlerntexte
- CoMiC Projekt: Comparing Meaning in Context (SFB 833/A4)
- ISAAC Projekt: Interactive Short Answer Assessment Component

- Weitere Informationen:
  - ICALL-Research Group: http://icall-research.de
  - LEAD Forschungsnetzwerk: http://www.lead.uni-tuebingen.de

# Zitierte Arbeiten

Alexopoulou, T., J. Geertzen, A. Korhonen & D. Meurers (2015). Exploring big educational learner corpora for SLA research: perspectives on relative clauses. *International Journal of Learner Corpus Research* 1(1), 96–129.

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Hattie, J. & H. Timperley (2007). The Power of Feedback. *Review of Educational Research* 77(1), 81–112.

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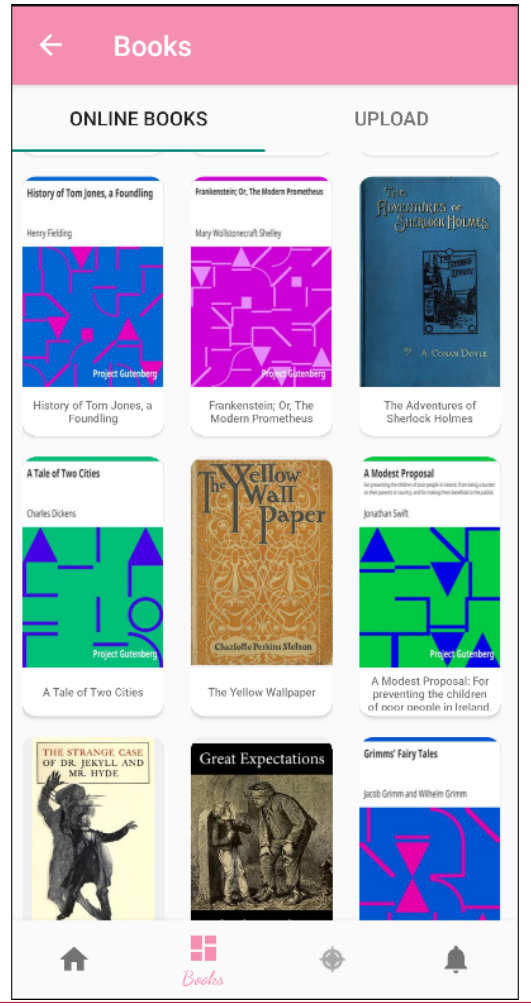
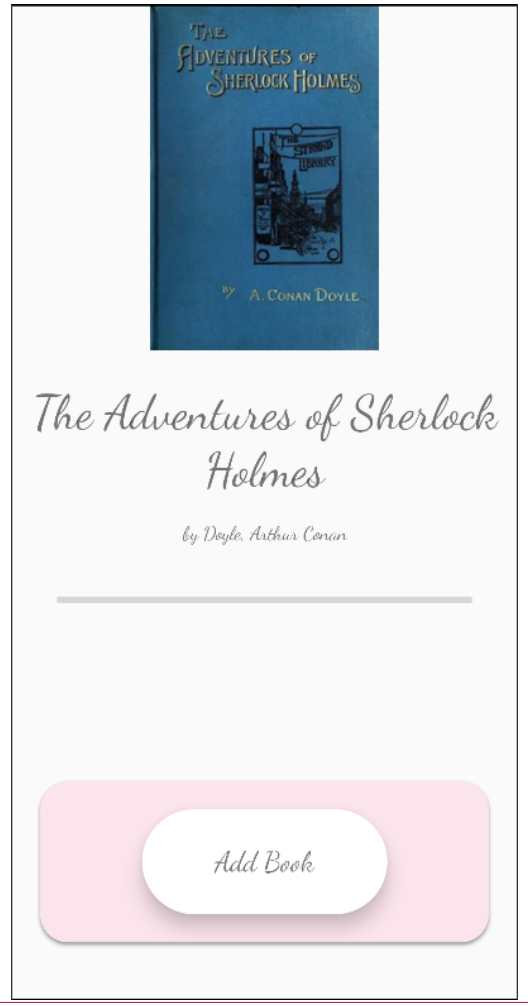
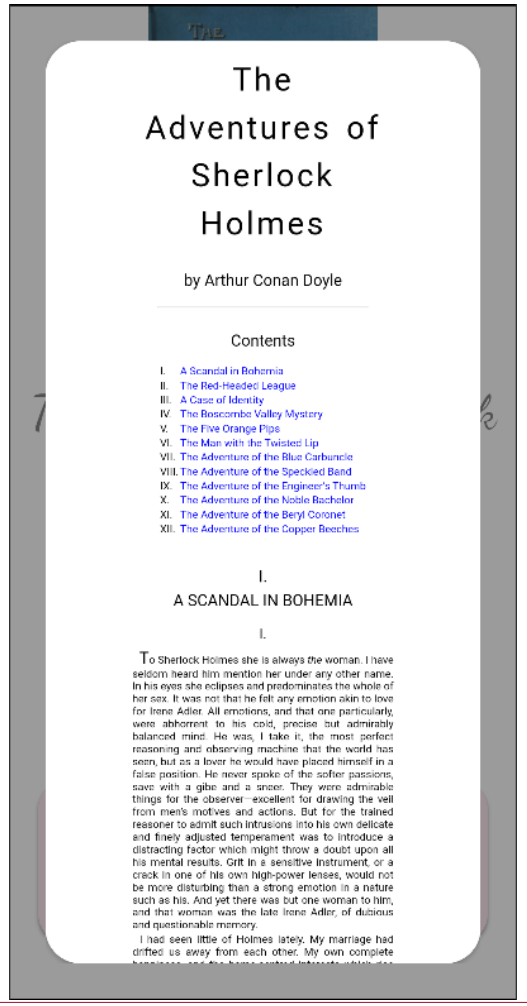
# Aufgabenorientierter Vokabelerwerb

- Vokabelerwerb traditionell nach Lehrwerk
  - aufbereitet nach Wortfeldern, etc.
  - mit Vokabeln annotierte spezielle Schülerausgaben von Texten
- Wie können wir Lernende in die Lage versetzen, eigenständig authentische Materialien auszuwählen und zu lesen?
  - automatische Organisation des zu lernenden lexikalischen Materials
  - → Generierung von Pre-task Activities, um Lerner zu befähigen, einen selbstgewählten Text zu lesen.

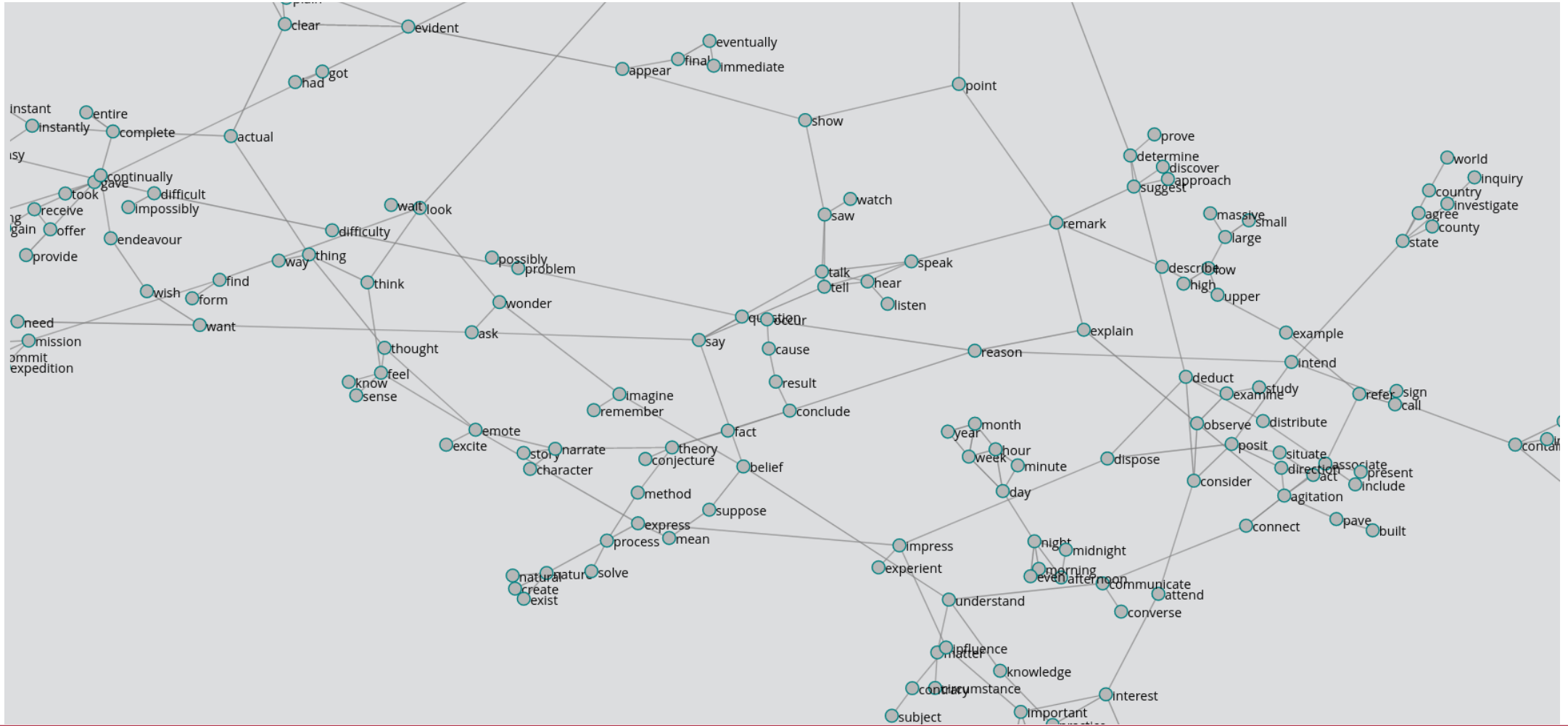
# VocabNet Prototyp: Buchauswahl



# VocabNet Prototyp: Automatische Wortfeldorganisation



# VocabNet Prototyp: Übungsaufgaben

Choose the word that fits all blanks

Fleet street was choked with red-headed folk, and pope's court _____ like a coster's orange barrow.

Holmes went to the bureau first and _____ hard at the lock.

"it is entirely a question of barometric pressure." lestrade _____ startled.

looked | thought | wonder | stared

Choose the word that fits all blanks

"i do not know that there is anything else for me to _____.

I just made up my mind to run away and _____ afterwards.

No, it was more likely to be an attempt to _____ how he met his fate.

explain | reasoning | remark | observe

Choose the word that fits all blanks

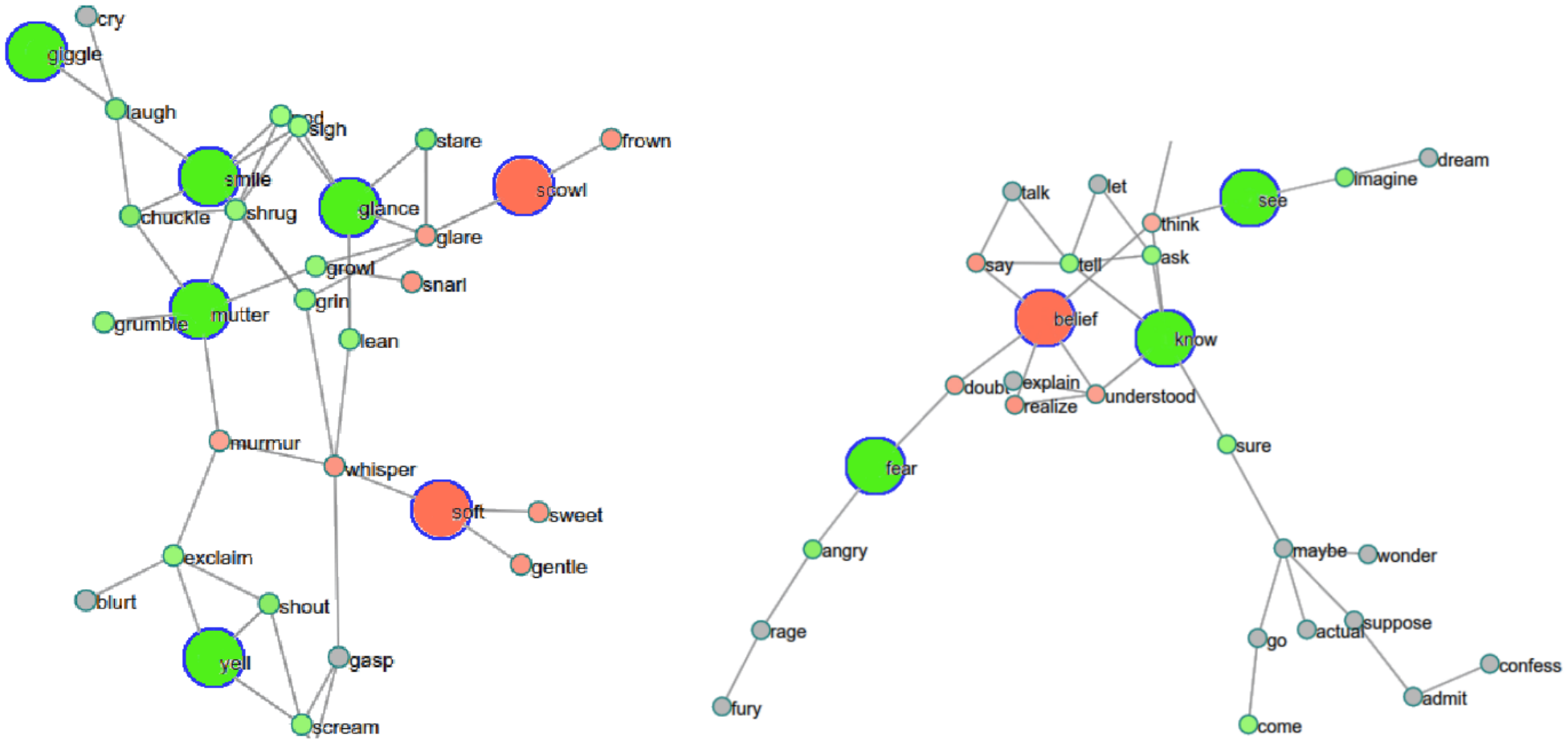
In the larger and older jewels every facet may _____ for a bloody deed.

Sir, i can _____ this strain no longer; i shall go mad if it continues.

I shall _____ behind this crate, and do you conceal yourselves behind those.

hold | point | sit | stand

# VocabNet Prototyp: Aktivierung im offenen Lernermodell



# VocabNet Prototyp: Zusammenfassung

- Aufgabenorientierter Vokabelerwerb: Lernende entscheiden frei, was sie lesen wollen
- automatische distributionell-semantische Organisation des Vokabulars in Wortfelder
- effiziente Exploration des Graphen mit Lernbeispielen aus dem ausgewählten Buch

$\Rightarrow$ Ermöglicht effizientes Lernen in lexikalisch semantischen Zusammenhängen