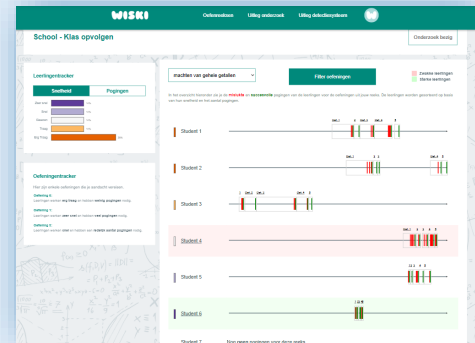


Transparency and Control for AI Systems in Education



Jeroen Ooge
jeroenooge.be



Geijkardigheid Afdelers
Miami
New York
Los Angeles
Limburg
Noorwegen
Zuidpool

Maak een aangeraden oefening van hetzelfde hoofdstuk

Aangeraden
Oefening 37
Oefening 26
Oefening 21

Waarom deze oefening? Wiski denkt dat jouw huidige niveau past bij dat van deze oefening!
Wiski verwacht dat je 1 of 2 pogingen nodig gaat hebben om oefening 21 juist te maken, gebaseerd op de resultaten van jou en je medeleerlingen.

Aantal pogingen medeleerlingen nodig hadden om oefening 21 juist op te lossen

Maak oefening 21

... of kies zelf je volgende oefening
Naar het oefeningenoverzicht

How is your new level determined?

Wiski estimates your level and the difficulty of exercises. Both change when solving exercises. Your level remained similar after solving the exercise series. Then, it increased even further because of your feedback.

Expert
Proficient
Competent
Advanced beginner
Novice

Before series After series

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Proficient
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Your level after completion
Your level now

Start exercises

Pick a reward and exercise:
Next time you will get 4 new exercises

$8 + X = 25$ Level: 10000 Reward: 1

$X - 1 = -14$ Level: 10000 Reward: 1

$12 + X = 5$ Level: 10000 Reward: 1

$-8 + X = -24$ Level: 10000 Reward: 1

About Me

*Human-centred explainable AI,
particularly in education*

My short career

MSc fundamental mathematics
MSc applied informatics
2012-2019

Private tutor, educational author

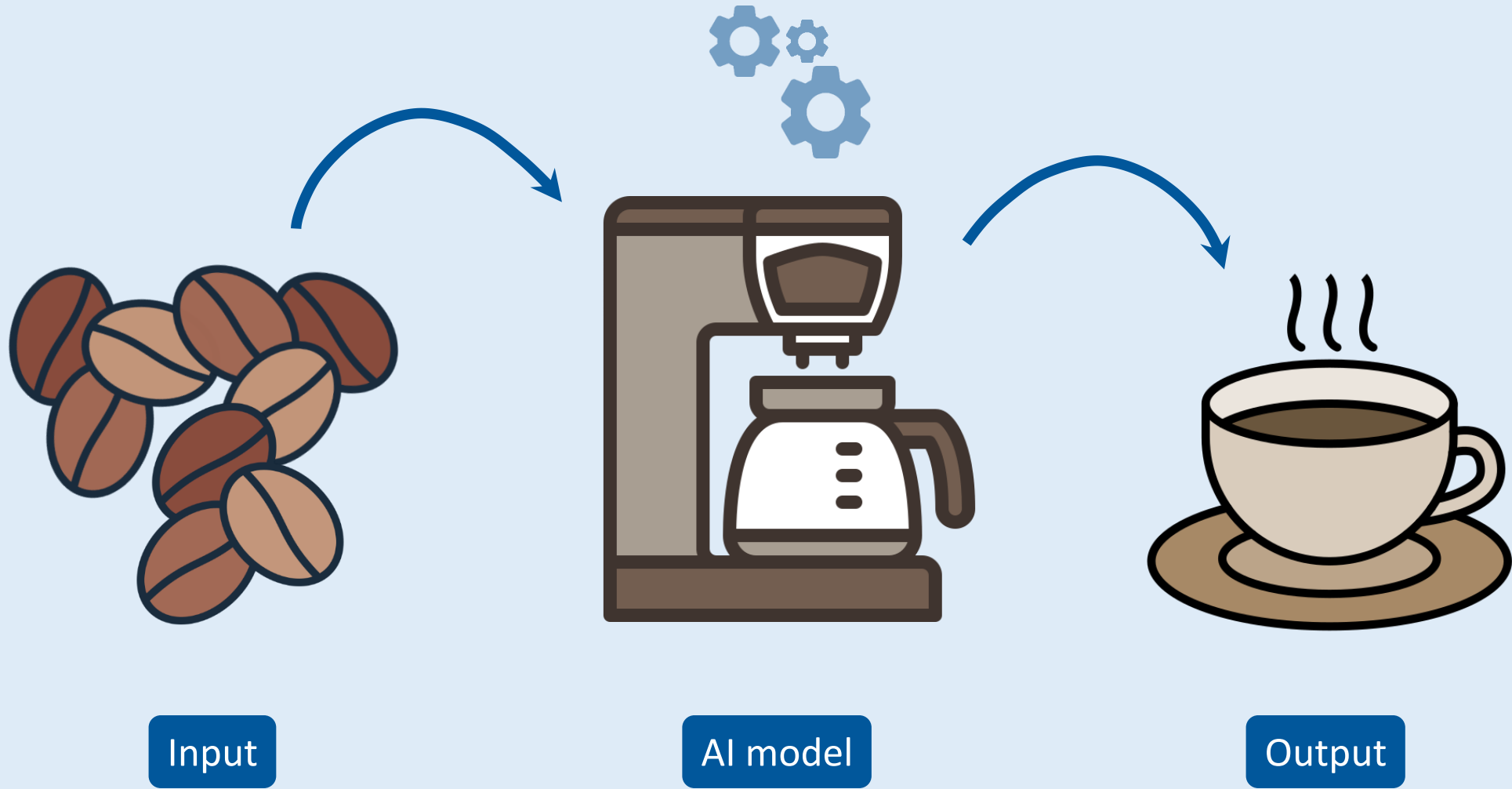
KU LEUVEN

PhD in computer science
2019-2023

Assistant professor
in computer science
2023-now



Jeroen Ooge
jeroenooge.be





Available exercises



Recommended exercise



Learner profile



Predicted progress/risk



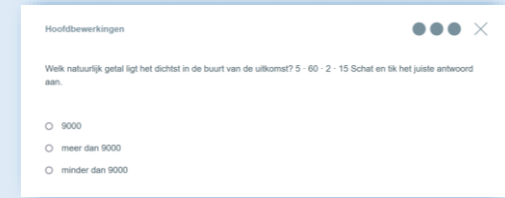
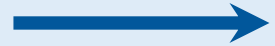
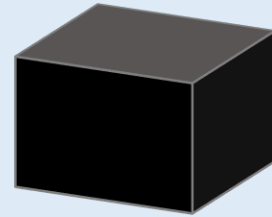
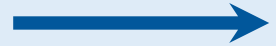
Textual prompt



Exam question



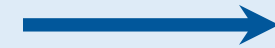
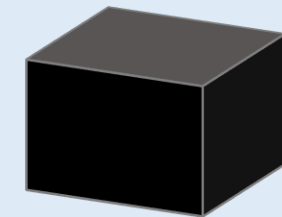
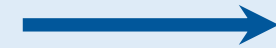
Available exercises



Recommended exercise



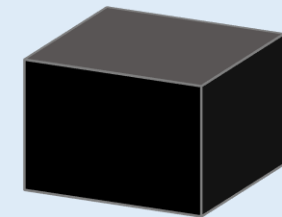
Learner profile



Predicted progress/risk

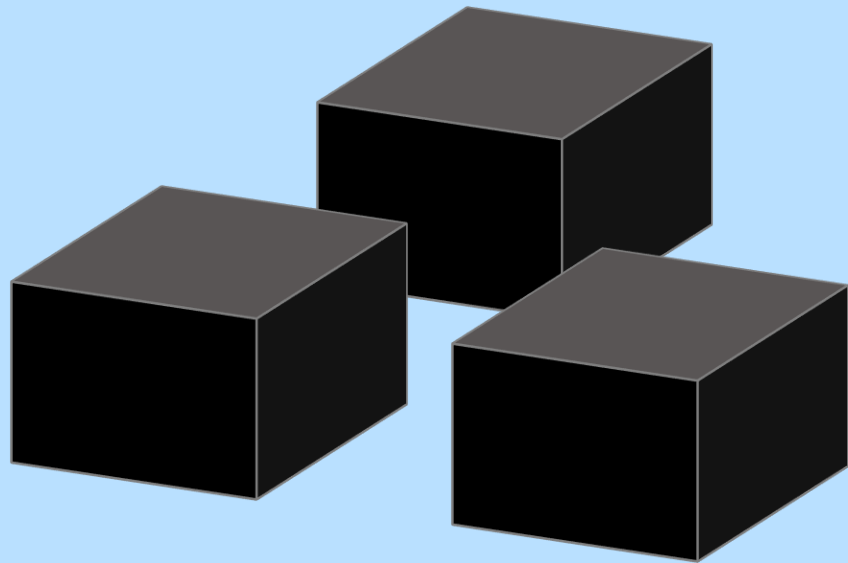


Textual prompt



Exam question

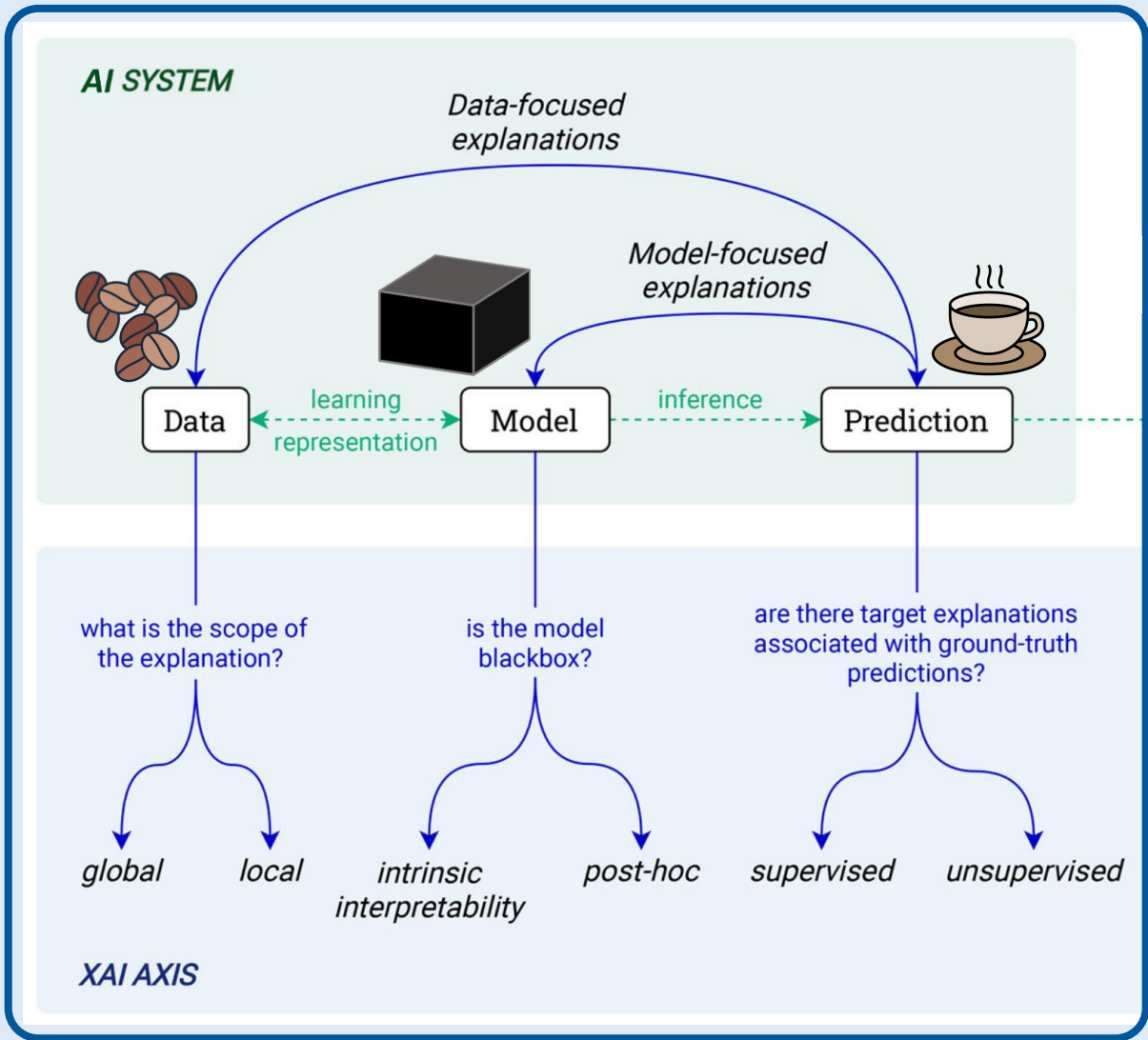
Explanations



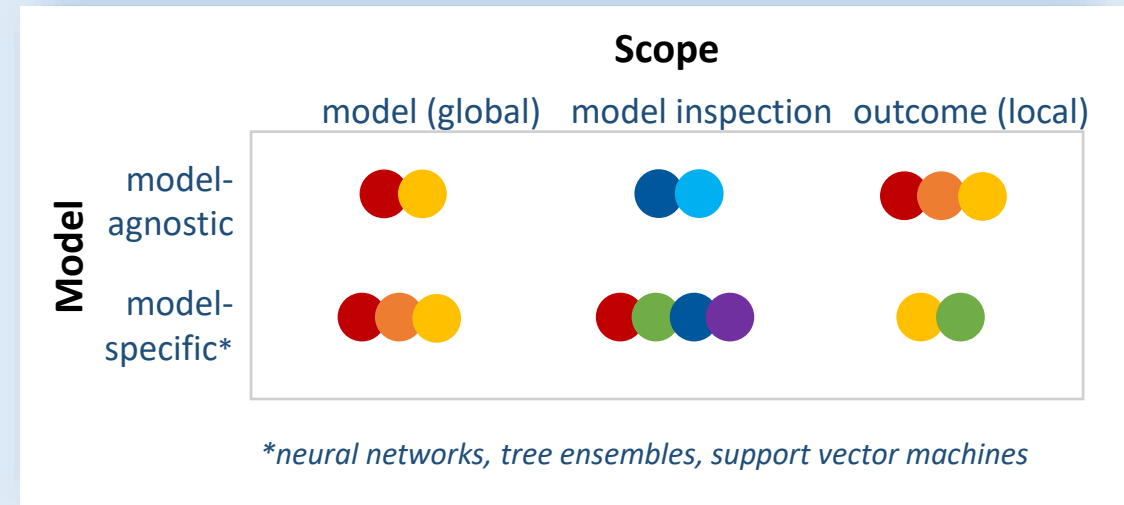
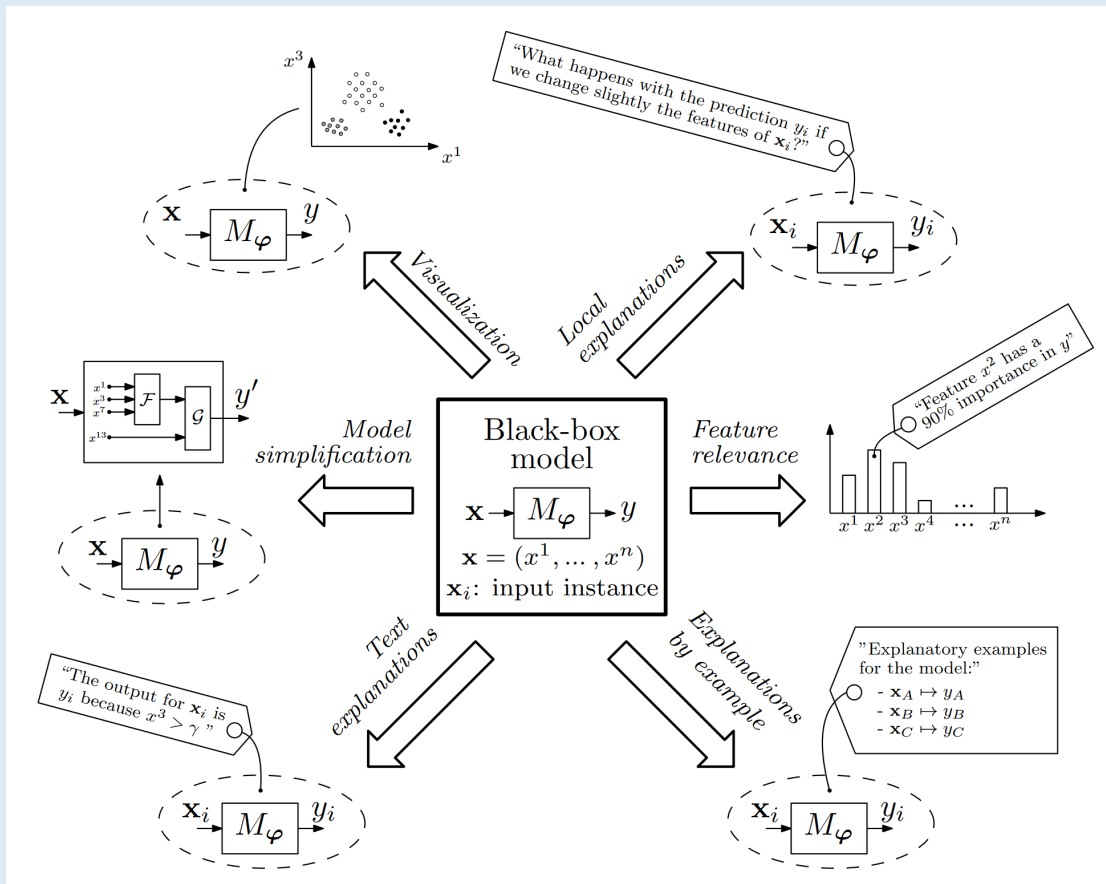
How can we explain these black boxes?



Algorithmic Explainability



Algorithmic Explainability

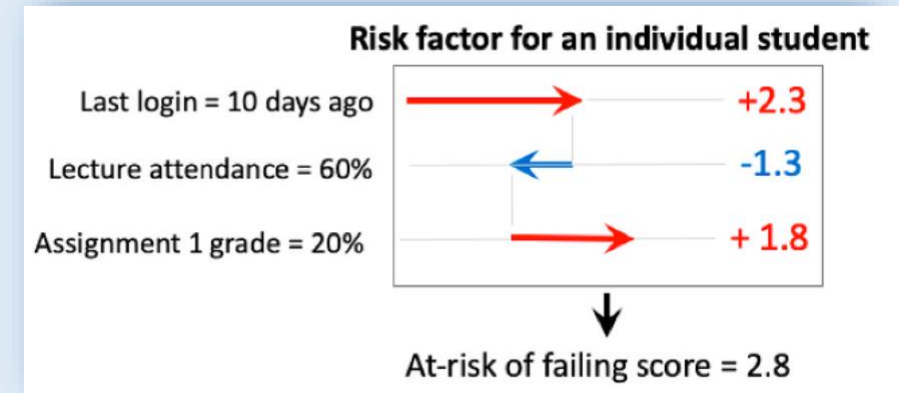
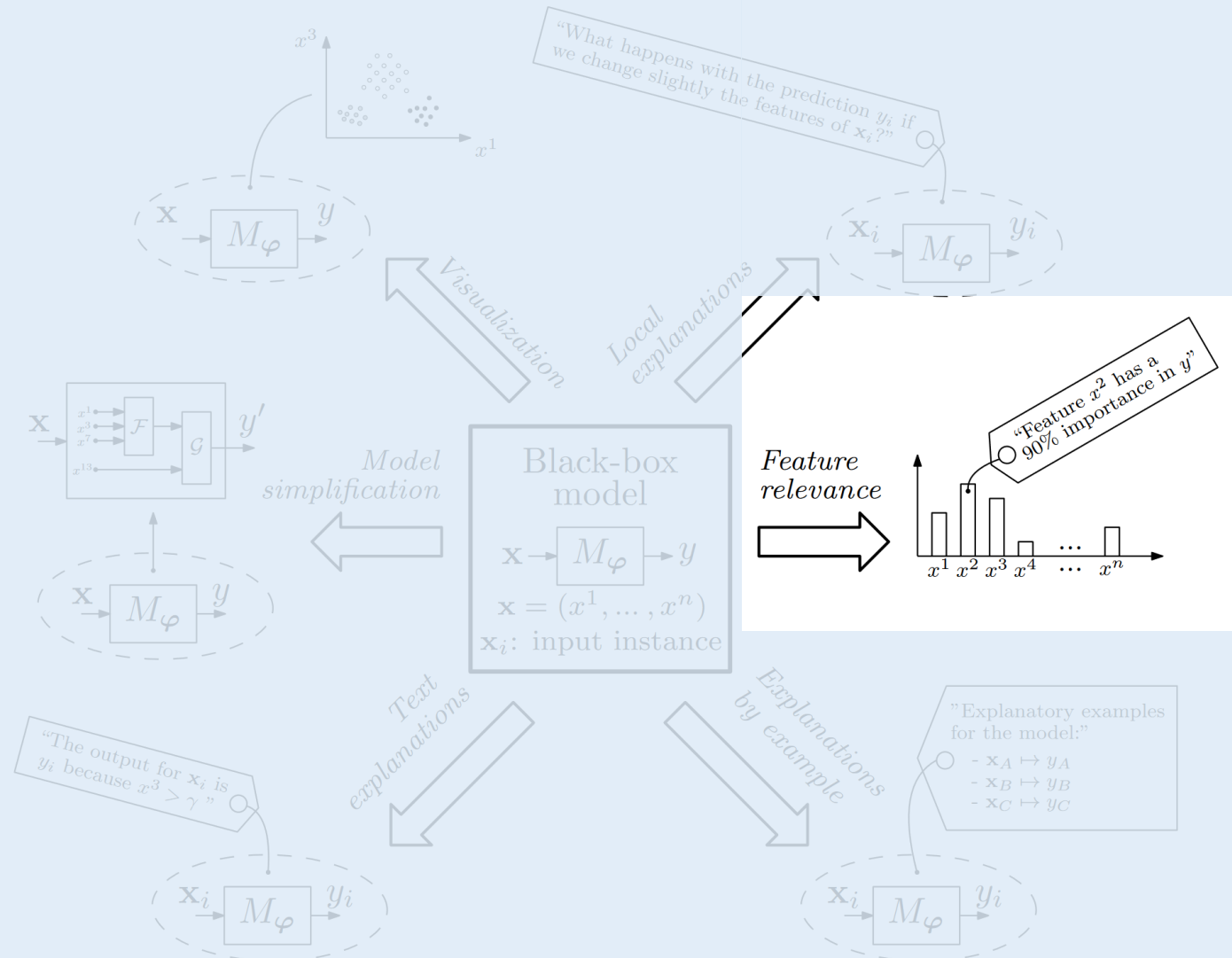


- Decision tree
- Partial dependence plot
- Decision rules
- Sensitivity analysis
- Feature importance
- Activation maximisation
- Saliency mask

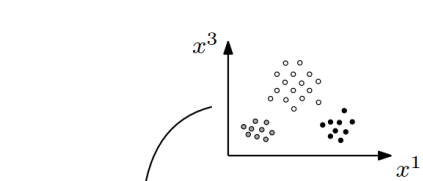
Alejandro Barredo Arrieta et al. 2020. Explainable Artificial Intelligence (XAI): Concepts, taxonomies, opportunities and challenges toward responsible AI. Information Fusion 58: 82–115. <https://doi.org/10.1016/j.inffus.2019.12.012>

Riccardo Guidotti, Anna Monreale, Salvatore Ruggieri, Franco Turini, Fosca Giannotti, and Dino Pedreschi. 2019. A Survey of Methods for Explaining Black Box Models. ACM Computing Surveys 51, 5: 1–42. <https://doi.org/10.1145/3236009>

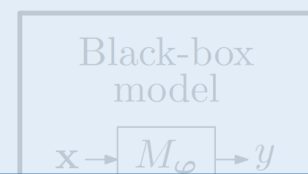
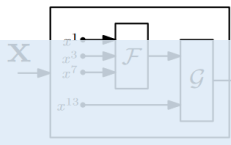
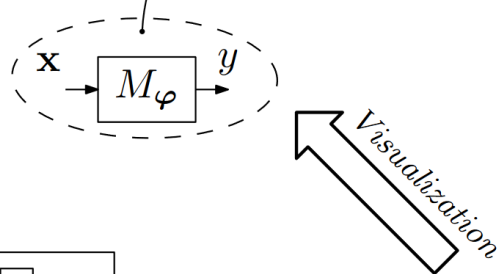
Algorithmic Explainability



Algorithmic Explainability



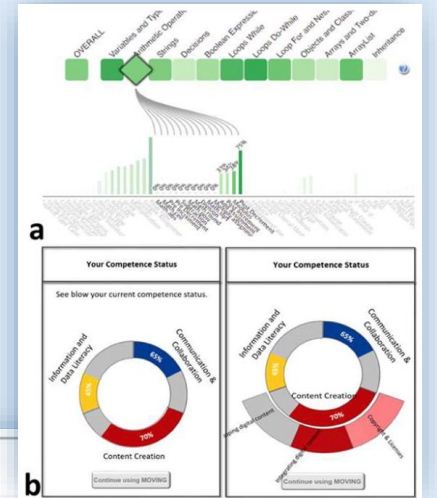
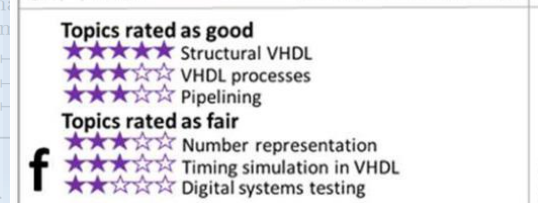
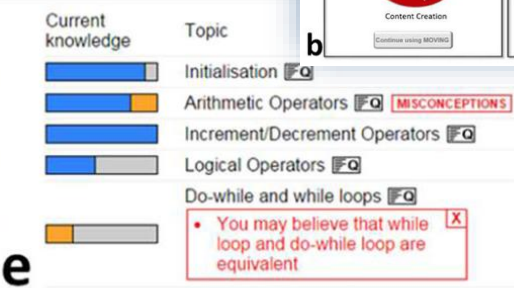
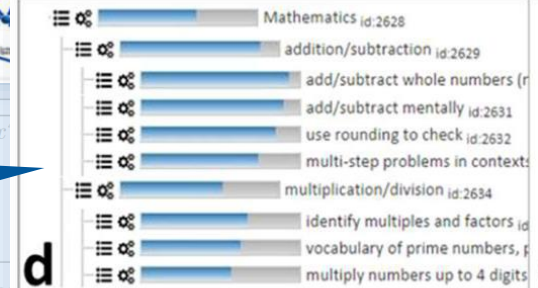
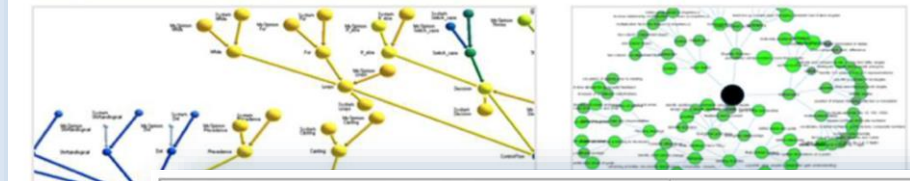
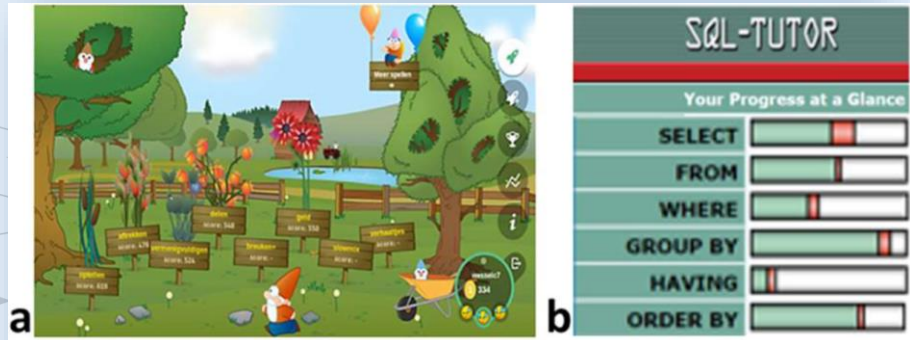
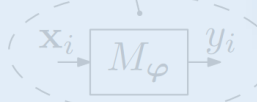
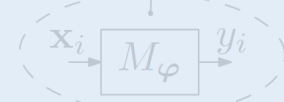
“What happens with the prediction y_i we change slightly the features of x_i ?”



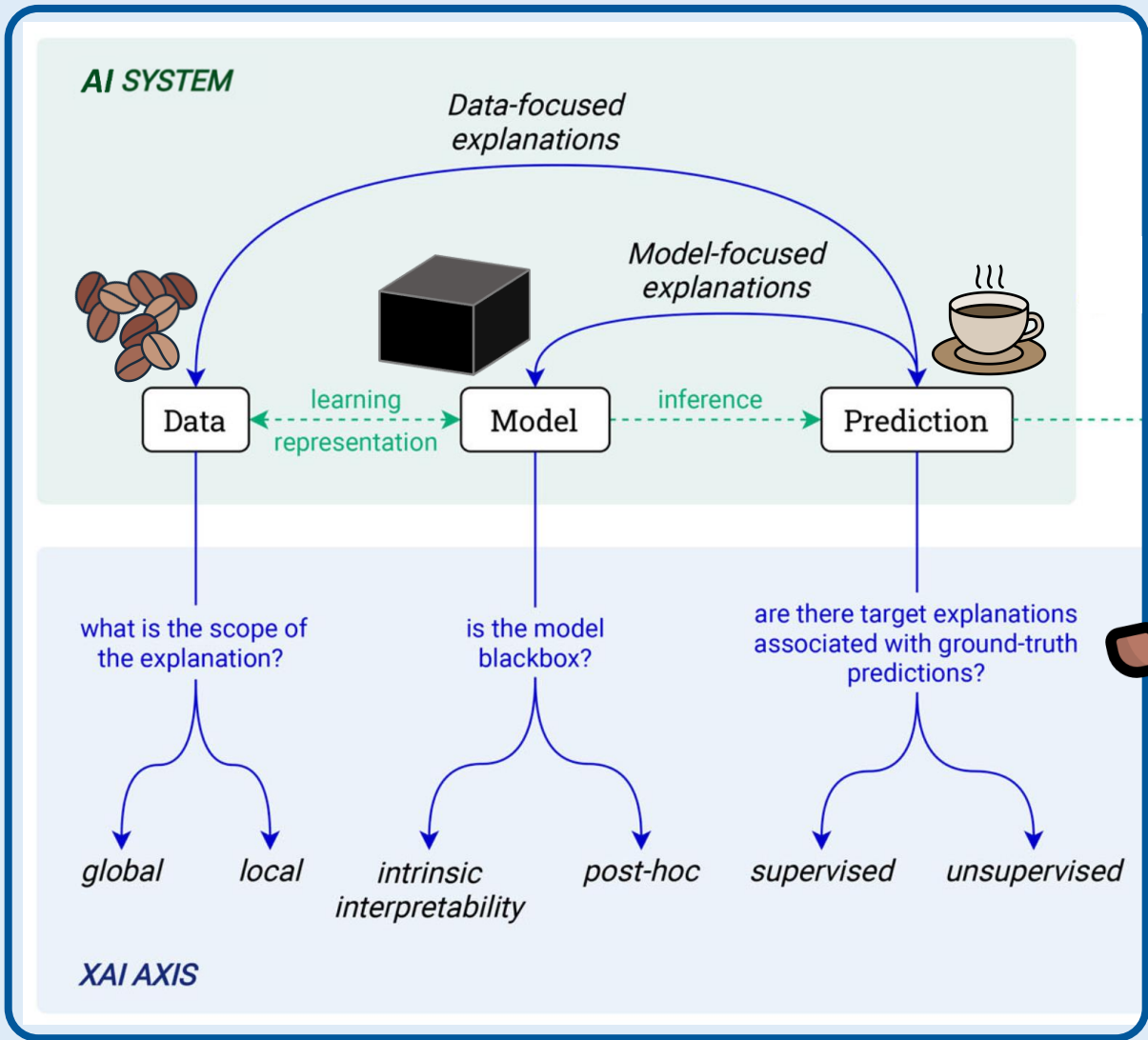
Feature relevance

Open learner models often require algorithmic skill estimation

“The output for x_i is y_i because $x^3 > \gamma$ ”



Algorithmic Explainability



Which explanation do we use?

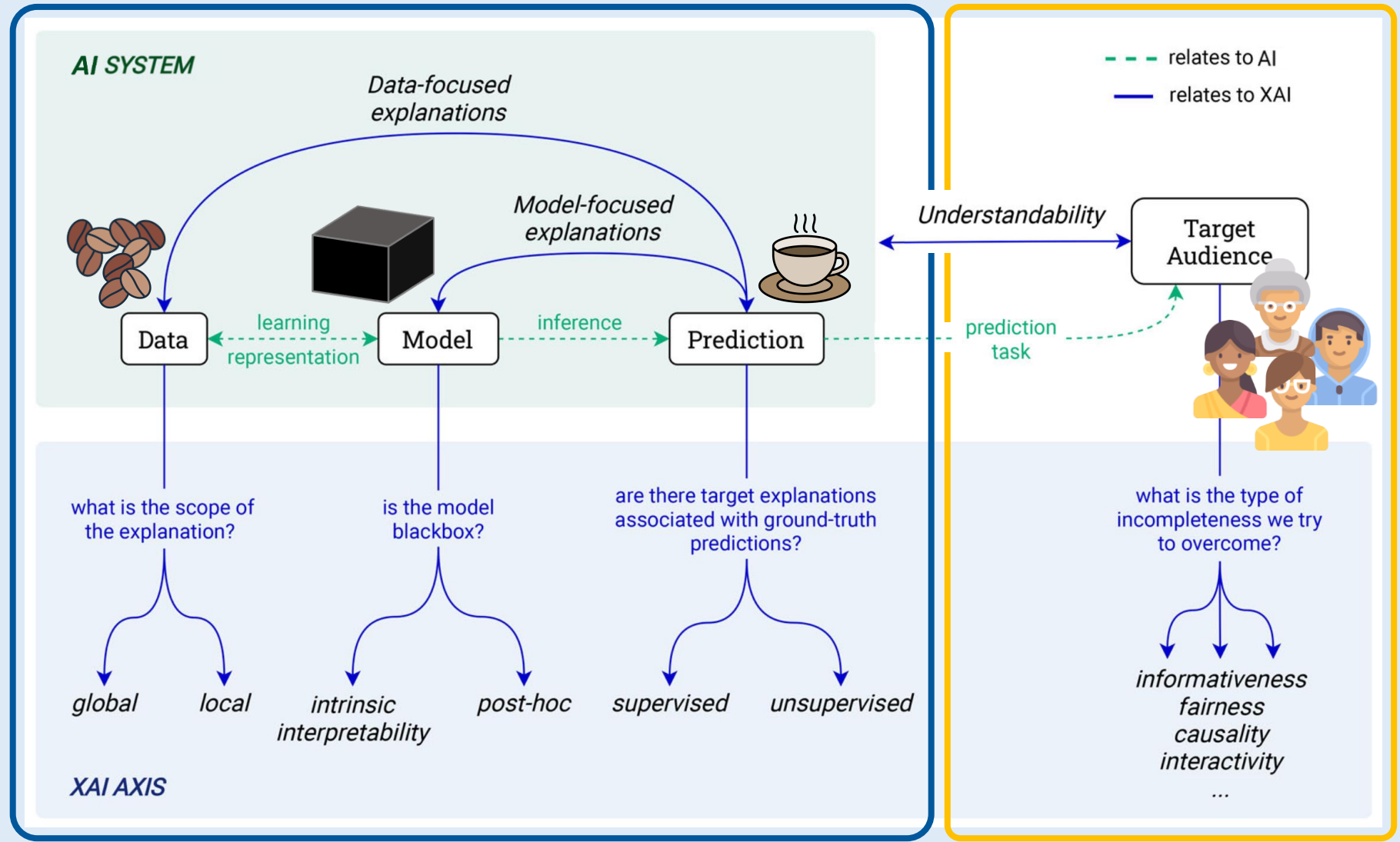
Who is the audience?

What is their context?



Algorithmic Explainability

Human-Centred Explainability



Human-Centred Explainability

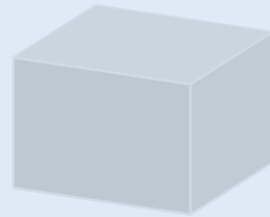
Different people and contexts
need different explainability solutions

Research goal: Design tailored explanations and
evaluate how they affect people's behaviour
(e.g., trust, understanding, motivation, learning)





Available exercises



Recommended exercise

How can we control model outputs?



Learner p



Predicted progress/risk

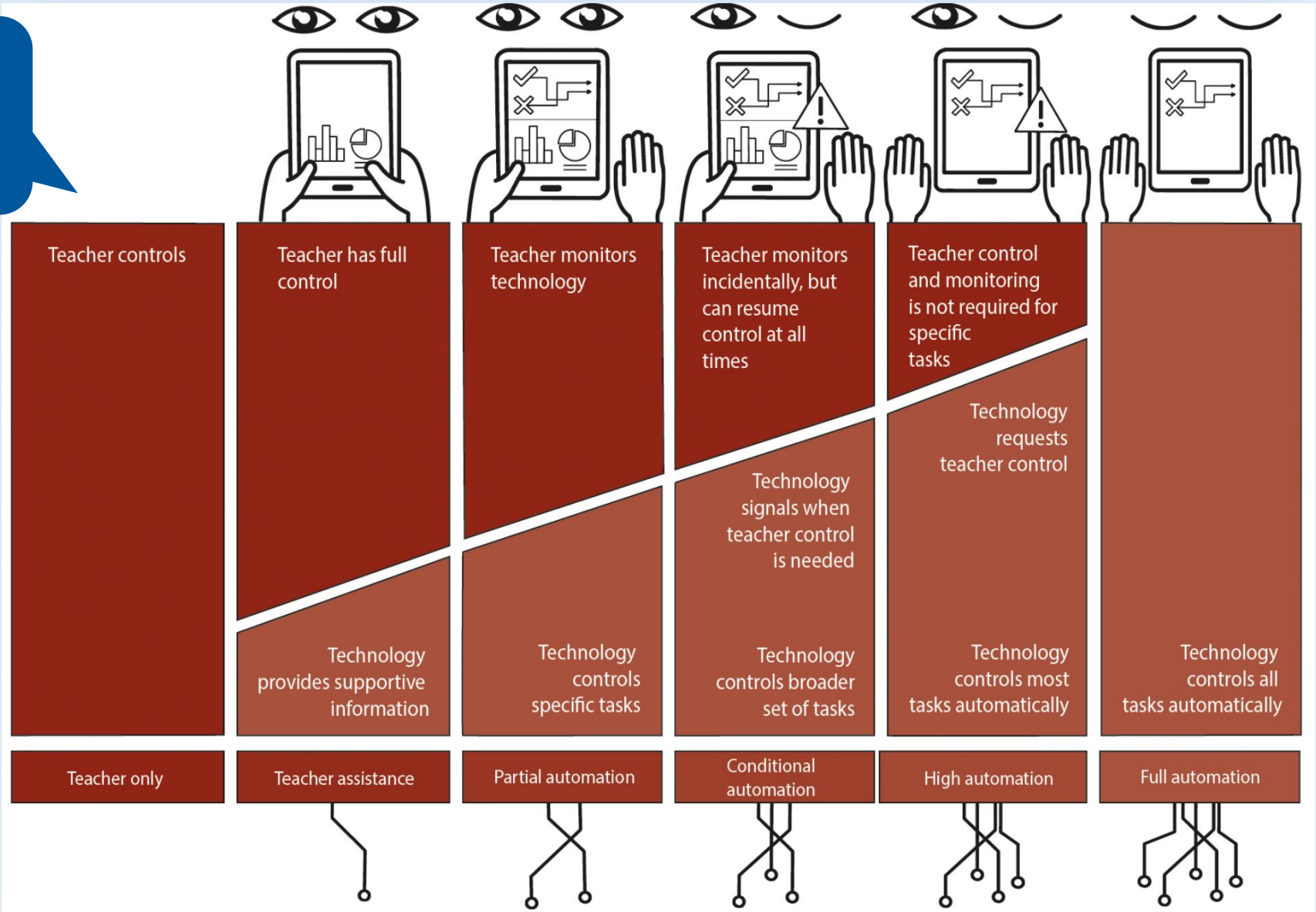
Aa



Exam question

Textual prompt

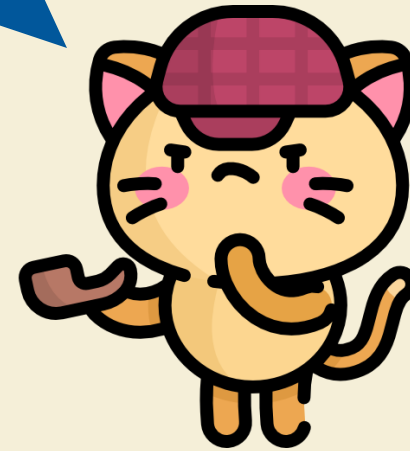
Also applies to other educational stakeholders



Explanations

Control

What are suitable
control mechanisms?



Explanations

Maak een aangeraden oefening van hetzelfde hoofdstuk

Aangeraden

- Oefening 37
- Oefening 26
- Oefening 21

Maak oefening 21

... of Kies zelf je volgende oefening

Naar het oefeningenoverzicht

Novice I believe this is your level now for the following subject: *Coordinates in space.*

What difficulty level would you like for the next exercise series?

Very easy Easy Novice Difficult Very difficult

If you finish all exercises correctly, your level will increase:

- Expert
- Proficient
- Competent
- Advanced beginner
- Novice

Your level after completion

Your level now

Start exercises

Control

How is your new level determined?

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Before series After series After feedback

Expert

Proficient

Competent

Advanced beginner

Novice

Solve more exercises on this topic **Return to exercise page**

WISKI

School - Klas opvolgen

Leertijdschema

Deelresultaten

Student 1

Student 2

Student 3

Student 4

Student 5

Student 6

Student 7

Vraag

Wat is de hoofdstad van de staat Florida?

Antwoord

Tallahassee

Kwaliteit afleiders

Goed

Laag Gemiddeld Hoog

Gelijkwaardigheid

Afleidingsvragen

- Miami
- New York
- Los Angeles
- Limburg
- Noorwegen
- Zuidpool

Pick a reward and exercise: Next time you will get 4 new exercises

$8 + X = 25$ Level: Reward: 1

$X - 1 = -14$ Level: Reward: 2

$12 + X = 5$ Level: Reward: 1

$-8 + X = -24$ Level: Reward: 2

Explanations

Maak een aangeraden oefening van hetzelfde hoofdstuk

Aangeraden

- Oefening 37
- Oefening 26
- Oefening 21

Maak oefening 21

... of Kies zelf je volgende oefening

Naar het oefeningenoverzicht

Waarom deze oefening? Wiski denkt dat jouw huidige niveau past bij dat van deze oefening!

Wiski verwacht dat je **1 of 2 pogingen** nodig gaat hebben om oefening 21 juist te maken, gebaseerd op de resultaten van jou en je medeleerlingen.

Aantal pogingen medeleerlingen nodig hadden om oefening 21 juist op te lossen

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Proficient

Competent

Advanced beginner

Novice

Before series After series After feedback

Solve more exercises on this topic **Return to exercise page**

WISKI

School - Klas opvolgen

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Pick a reward and exercise:

Next time you will get 4 new exercises

$8 + X = 25$ Level: **Goed** Reward: 1

$X - 1 = -14$ Level: **Goed** Reward: 2

$12 + X = 5$ Level: **Goed** Reward: 1

$-8 + X = -24$ Level: **Goed** Reward: 2

WISKI

personalised maths practice with AI

Goed gewerkt!

Maak een aangeraden oefening van hetzelfde hoofdstuk

Aangeraden

- Oefening 32
- Oefening 42
- Oefening 3

Waarom deze oefening? Wiski denkt dat jouw huidige niveau past bij dat van deze oefening!
Wiski verwacht dat je 1 of 2 pogingen nodig gaat hebben om oefening 32 juist te maken, gebaseerd op de resultaten van jou en je medeleerlingen.

Aantal pogingen medeleerlingen nodig hadden om oefening 32 juist te maken

Maak oefening 32

... of kies zelf je volgende oefening

Naar het oefeningenoverzicht

WISKI

Oefenen Helpen Oefeningen overzicht

Selecteer een Badge om te tonen aan jouw klasgenoten

1/5
2/5
2/5
1/5

gevorderde beginner Volg ons mee is dit nu je level voor het onderwerp Hoofdbewerkingen

Welke moeilijkheidsgraad wil je voor de volgende oefeningreeks?

Heet makkelijk Makkijk Gewoon Moelijk Heet moeilijk

Als je alle oefeningen in de reeks juist oplost, dan stijgt je level:

- Expert
- Bedreven
- Competent
- Gevorderde beginner
- Beginner

Start de reeks

Op volgorde van Hoog naar laag

Oefening	Verwachte moeilijkheidsgraad voor jou
Oefening 43	Makkijk
Oefening 42	Makkijk
Oefening 41	Makkijk
Oefening 40	Makkijk
Oefening 39	Makkijk
Oefening 38	Makkijk
Oefening 37	Makkijk
Oefening 36	Makkijk
Oefening 35	Makkijk
Oefening 34	Makkijk

WISKI

Schakel hier technieken in die jou motiveren om Wiski te gebruiken. Schakel de andere uit.

Punten

Verdien punten voor juist opgeloste oefeningen en verlies punten voor fout opgeloste oefeningen. Jij en anderen zien je puntentotaal op je profiel.

Puntenklassering

Vergelijk je puntentotaal met dat van anderen op een klasseringpagina. Er zijn twee klasseringen: 'deze week' en 'aller tijden'.

Oefeningenklassering

Vergelijk je aantal juist opgeloste oefeningen met dat van anderen op een klasseringpagina. Er zijn twee klasseringen: 'deze week' en 'aller tijden'.

Day streak

How good do you think you are at mathematics?

There is no right or wrong answer. Wiski uses your answer to find suitable exercises for you.

- Expert: mathematics holds no secrets for you.
- Proficient: you score better than average on mathematics.
- Competent: you score average on mathematics.
- Advanced beginner: basic exercises are not a problem for you.
- Novice: you often have a hard time understanding mathematics.

Submit

Hoofdbewerkingen

Gefeliciteerd Pri(s)ma resultaat!

Maak een oefening correct en ontgrendel een nieuwe badge!

Volg de reeks

WISKI

Oefenen

Kies het onderwerp waarvoor je wilt oefenen. Er start dan een reeks met 3 oefeningen over dat onderwerp.

- Natuurlijke getallen
- Gehele getallen
- Basisbegrippen meetkunde

WISKI

Oefenen Helpen Oefeningen overzicht

Badge Vooruitgang

Challenge Badges

Badge Overzicht

Delen van oplossingen (2/4)

Mededestudenten helpen (1/2)

Hang in behouden badges

Reeds behaalde badges

How is your new level determined?

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Expert

Proficient

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Advanced beginner

Novice



expert

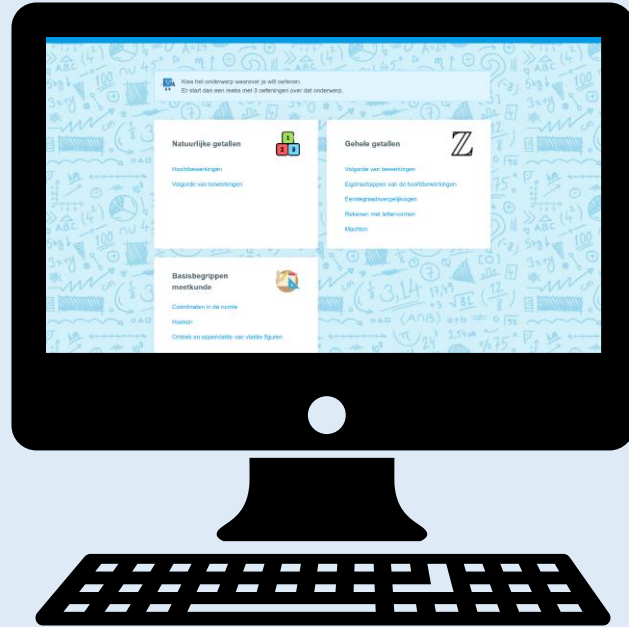


competent

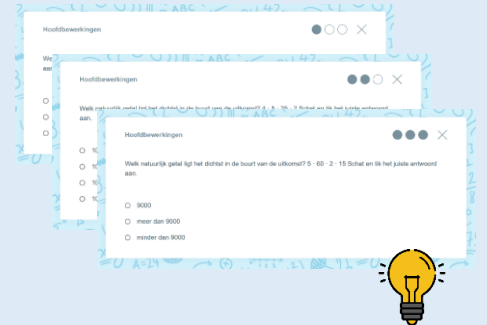


beginner

$$\sqrt{x} + \int dx + \pi$$



Recommender system



Explanations

Solve a recommended exercise of the same chapter

Why this exercise? Wiski thinks your current level aligns with that of the exercise!
Wiski expects you will need **1 or 2 attempts** to solve exercise 21, based on your results and those of your fellow students.

Recommended

- Exercise 37
- Exercise 26
- Exercise 21

Number of attempts fellow students needed to solve exercise 21

Solve exercise 21

... or pick your next exercise yourself

Go to the exercise overview

Novice | I believe this is your level now for the following subject: **Coordinates in space**

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Your level after completion

Start exercises

Control

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Solve more exercises on this topic | Return to exercise page

WISKI

School - Klas opvolgen

Leertagelijnen

Antwoord

Tallahassee

Kwaliteit afleiders

Goed

Laag | Gemiddeld | Hoog

Vraag

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Level: ■■■■	Level: ■■■■
Reward: 1	Reward: 2
$12 + X = 5$	$-8 + X = -24$
Level: ■■■■	Level: ■■■■
Reward: 1	Reward: 2

Solve a recommended exercise of the same chapter

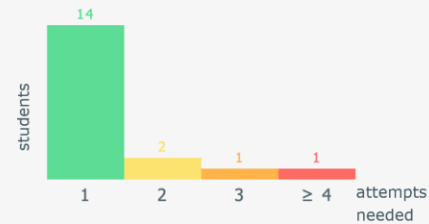
Recommended

-  Exercise 37
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Number of attempts fellow students needed to solve exercise 21



Solve exercise 21

... or pick your next exercise yourself




Go to the exercise overview

Textual explanation


Visual explanation

Maak een aangeraden oefening van hetzelfde hoofdstuk

Aangeraden

-  Oefening 27
-  Oefening 40
-  Oefening 45

Waarom deze oefening?
Oefening 27 is aangeraden omdat het algoritme van Wiski dat zo heeft berekend.



Maak oefening 27

... of kies zelf je volgende oefening

Naar het oefeningenoverzicht

Placebo explanation

Maak een aangeraden oefening van hetzelfde hoofdstuk

Aangeraden

-  Oefening 27
-  Oefening 40
-  Oefening 45

Wiski raadt de volgende oefening aan

GOOD JOB 

Maak oefening 27

... of kies zelf je volgende oefening

Naar het oefeningenoverzicht

No explanation

Solve a recommended exercise of the same chapter

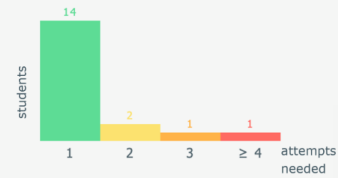
Recommended

- Exercise 37
- Exercise 26
- Exercise 21

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Wiski expects you will need **1 or 2 attempts** to solve exercise 21, based on your results and those of your fellow students.

Number of attempts fellow students needed to solve exercise 21



Solve exercise 21

Visual explanations can increase initial trust but may not be the most important factor for building it

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Aangeraden

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- Oefening 40
- Oefening 45

Waarom deze oefening?

Oefening 27 is aangeraden omdat het algoritme van Wiski dat zo heeft berekend.



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Naar het oefeningenoverzicht

Maak een aangeraden oefening van hetzelfde hoofdstuk

Aangeraden

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- Oefening 40
- Oefening 45

Wiski raadt de volgende oefening aan



Maak oefening 27

... of kies zelf je volgende oefening

Naar het oefeningenoverzicht

for next exercise yourself

exercise overview

Explanations

Solve a recommended exercise of the same chapter

Why this exercise? Wiski thinks your current level aligns with that of the exercise!
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Recommended

- Exercise 37
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- Exercise 21

Number of attempts fellow students needed to solve exercise 21

Solve exercise 21

... or pick your next exercise yourself

Go to the exercise overview

Novice | I believe Wiski is your level now for the following subject: **Coordinates in space**

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Your level after completion

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Control

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Then, it increased even further because of your feedback.

Expert

Proficient

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Advanced beginner

Novice

Solve more exercises on this topic

Return to exercise page

WISKI

School - Klas opvolgen

Leertijdschema

Antwoord

Stapel 1

Stapel 2

Stapel 3

Stapel 4

Stapel 5

Stapel 6

Stapel 7

Vraag

Wat is de hoofdstad van de staat Florida?

Antwoord

Tallahassee

Kwaliteit afleiders

Goed

Laag

Gemiddeld

Hoog

Gelijkwaardigheid

Afleidings

- Miami
- New York
- Los Angeles
- Limburg
- Noorwegen
- Zuidpool

← Pick a reward and exercise: Next time you will get 4 new exercises

$8 + X = 25$

Level:

Reward: 1

$X - 1 = -14$

Level:

Reward: 2

$12 + X = 5$

Level:

Reward: 1

$-8 + X = -24$

Level:

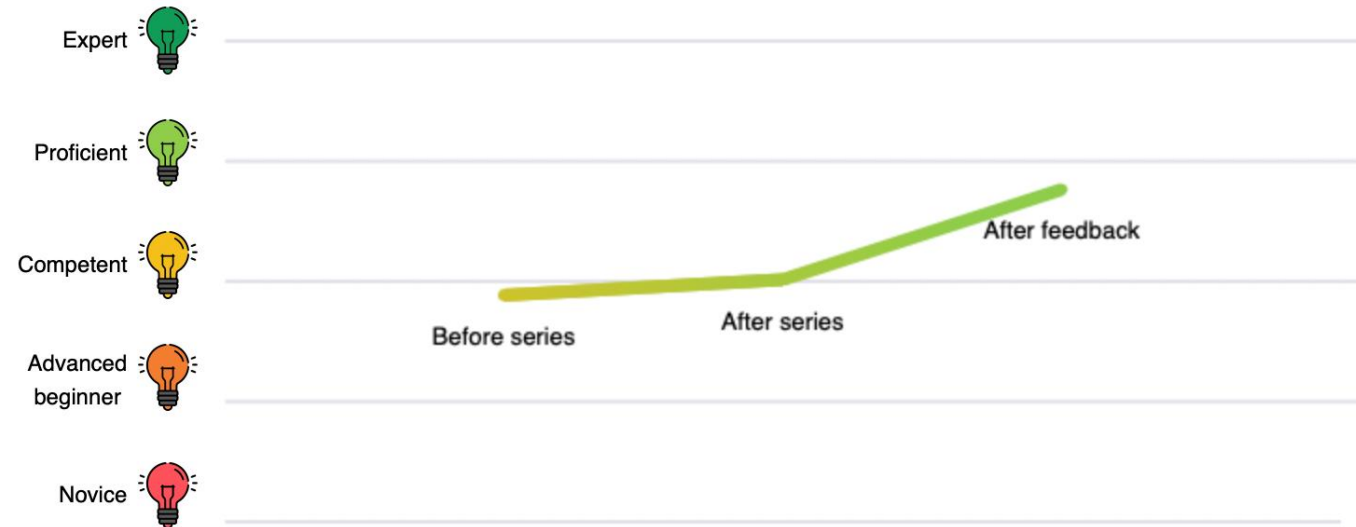
Reward: 2

How is your new level determined?

Wiski estimates your level and the difficulty of exercises. Both change when solving exercises.

Your level remained similar after solving the exercise series.

Then, it increased even further because of your feedback.




Solve more exercises on this topic


Return to exercise page


Hoe is je nieuw niveau bepaald?


Wiski schat jouw niveau en de moeilijkheid van oefeningen in. Beide veranderen bij het oplossen van oefeningen.


Je niveau is gestegen na het maken van de reeks oefeningen.
Daarna is het nog extra gestegen door je feedback.

Expert 

Bedreven 

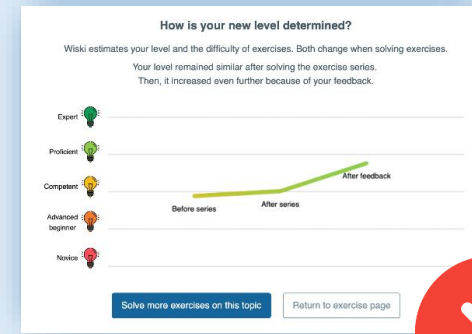
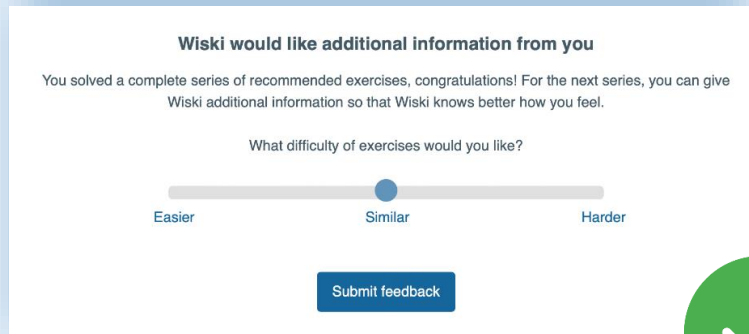
Competent 

Gevorderde beginner 

Beginner 

Voor reeks Na reeks Na feedback

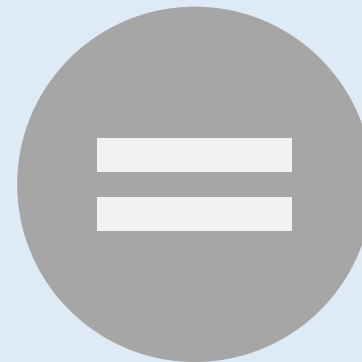
Maak meer oefeningen over dit onderwerp Ga terug naar oefenpagina

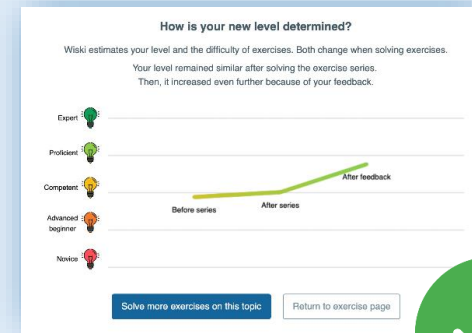
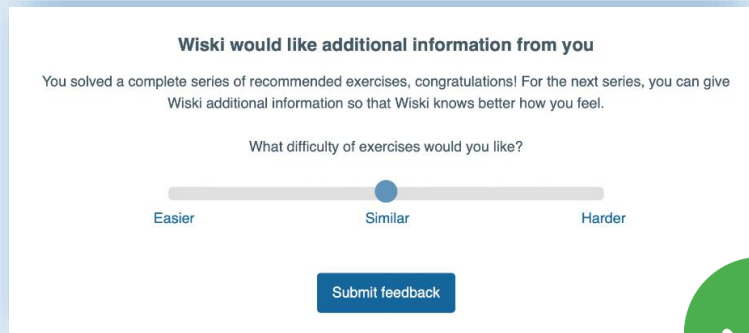


Reflection on own mastery and recommendations



Trust in the platform





Reflection on own mastery
and recommendations



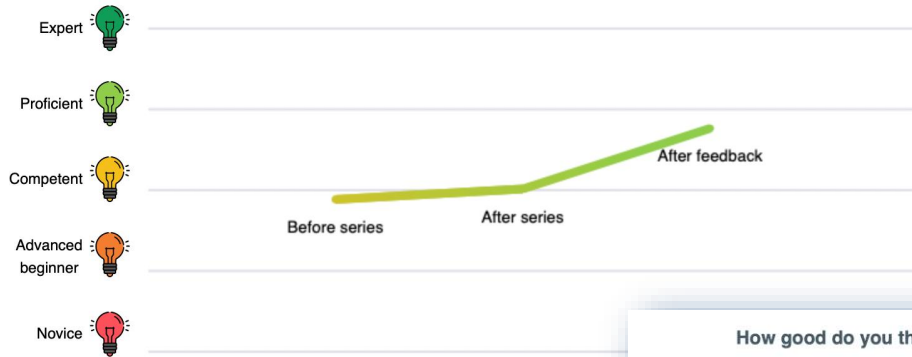
Trust in the platform due to
more perceived transparency



How is your new level determined?

Wiski estimates your level and the difficulty of exercises. Both change when solving exercises.

Your level remained similar after solving the exercise series.
Then, it increased even further because of your feedback.



Solve more exercises on this topic

Return to

How good do you think you are at mathematics?

There is no right or wrong answer. Wiski uses your answer to find suitable exercises for you.

- Expert: mathematics holds no secrets for you.
- Proficient: you score better than average on mathematics.
- Competent: you score average on mathematics.
- Advanced beginner: basic exercises are not a problem for you.
- Novice: you often have a hard time understanding mathematics.

Submit

Wiski would like additional information from you

You solved a complete series of recommended exercises, congratulations! For the next series, you can give Wiski additional information so that Wiski knows better how you feel.

What difficulty of exercises would you like?



Submit feedback

Seeing the impact of control can increase initial trust, but control mechanisms by themselves do not necessarily

Explanations

Maak een aangeraden oefening van hetzelfde hoofdstuk

Aangeraden

- Oefening 37
- Oefening 26
- Oefening 21

Waaronder deze oefening? Wiski denkt dat jouw huidige niveau past bij dat van deze oefening!

Wiski verwacht dat je **1 of 2 pogingen** nodig gaat hebben om oefening 21 juist te maken, gebaseerd op de resultaten van jou en je medeleerlingen.

Aantal pogingen medeleerlingen nodig hadden om oefening 21 juist op te lossen

Maak oefening 21

... of Kies zelf je volgende oefening

[Naar het oefeningenoverzicht](#)

Novice I believe this is your level now for the following subject: *Coordinates in space.*

What difficulty level would you like for the next exercise series?

Very easy Easy **Novice** Difficult Very difficult

If you finish all exercises correctly, your level will increase:

- Expert
- Proficient
- Competent
- Advanced beginner
- Novice

Your level after completion (points to Competent)

Your level now (points to Novice)

Start exercises

Control

How is your new level determined?

Wiski estimates your level and the difficulty of exercises. Both change when solving exercises. Your level remained similar after solving the exercise series. Then, it increased even further because of your feedback.

Solve more exercises on this topic [Return to exercise page](#)

WISKI

School - Klas opvolgen

Leertijdschema

Soort	Program
...	...

Antwoord

Tallahassee

Kwaliteit afleiders

Goed

Vraag: Wat is de hoofdstad van de staat Florida?

Antwoord: Tallahassee

Gelijkwaardigheid


Afleidings


- Miami
- New York
- Los Angeles
- Limburg
- Noorwegen
- Zuidpool

Pick a reward and exercise:

Next time you will get 4 new exercises

$8 + X = 25$	$X - 1 = -14$
Level:	Level:
Reward: 1	Reward: 2
$12 + X = 5$	$-8 + X = -24$
Level:	Level:
Reward: 1	Reward: 2






WISKI Oefenen 

 **gevorderde beginner** Volgens mij is dit nu je level voor het onderwerp *Volgorde van bewerkingen*

Welke moeilijkheidsgraad wil je voor de volgende oefeningensreeks?

Heel makkelijk Makkelijk Gewoon Moelijk Heel moeilijk

Als je alle oefeningen in de reeks juist oplost, dan stijgt je level:

- Expert 
- Bedreven 
- Competent 
- Gevorderde beginner**  **Je level na de reeks**
- Beginner  **Je level nu**

Start de reeks

Bronvermeldingen Contact

Impact on level if series is solved correctly

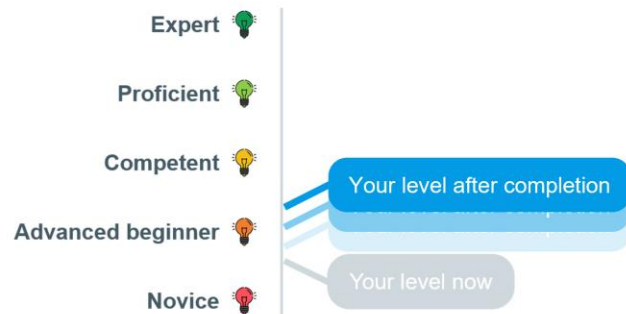


Novice I believe this is your level now for the following subject:
Coordinates in space.

What difficulty level would you like for the next exercise series?

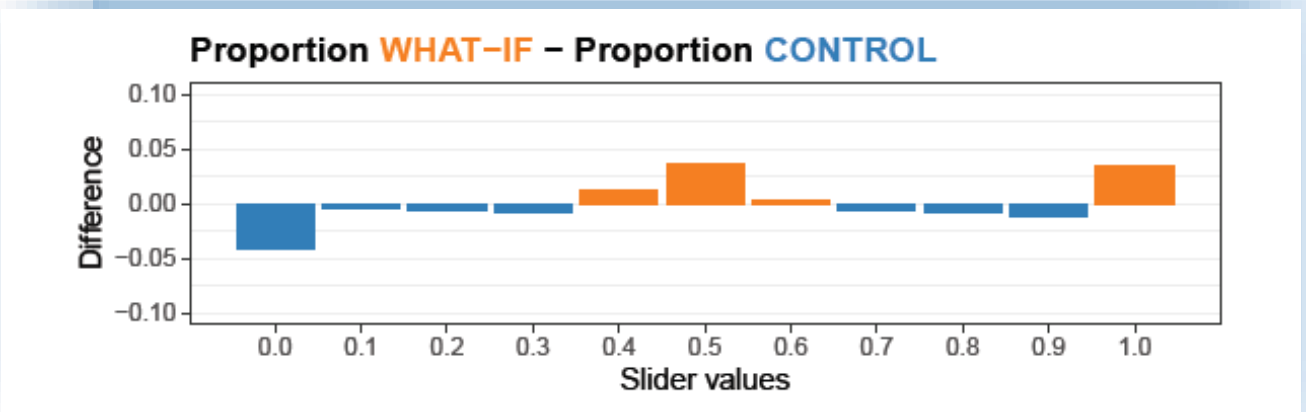


If you finish all exercises correctly, your level will increase:



Start exercises

What-if explanations can encourage teenagers to try harder exercises, but do not necessarily affect initial trust, metacognition, motivation, or performance



Explanations

Maak een aangeraden oefening van hetzelfde hoofdstuk

Aangeraden

- Oefening 37
- Oefening 26
- Oefening 21

Waarom deze oefening? Wiski denkt dat jouw huidige niveau past bij dat van deze oefening!

Wiski verwacht dat je **1 of 2 pogingen** nodig gaat hebben om oefening 21 juist te maken, gebaseerd op de resultaten van jou en je medeleerlingen.

Aantal pogingen medeleerlingen nodig hadden om oefening 21 juist op te lossen

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[Naar het oefeningenoverzicht](#)

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Very easy Easy **Novice** Difficult Very difficult

If you finish all exercises correctly, your level will increase:

- Expert
- Proficient
- Competent
- Advanced beginner
- Novice

Your level after completion

Start exercises

Control

How is your new level determined?

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[Solve more exercises on this topic](#) [Return to exercise page](#)

WISKI Oefeningen Uitvoerschema Uitvoerschema

School - Klas opvolgen

Leertijdschema

Student	Pogingen
Student 1	1
Student 2	2
Student 3	3
Student 4	4
Student 5	5
Student 6	6
Student 7	7

Oefeningsoverzicht

Wat is de hoofdstad van de staat Florida?

Antwoord: Tallahassee

Kwaliteit afleiders

Goed

Vraag

Wat is de hoofdstad van de staat Florida?

Antwoord

Tallahassee

Kwaliteit afleiders

Goed

Gelijkaardigheid

Afleidingsvragen

- Miami
- New York
- Los Angeles
- ...
- Limburg
- Noorwegen
- Zuidpool

Pick a reward and exercise:

Next time you will get 4 new exercises

$8 + X = 25$	$X - 1 = -14$
Level: ●●●○	Level: ●●●●
Reward: 1 ●	Reward: 2 ●●
$12 + X = 5$	$-8 + X = -24$
Level: ●●●○	Level: ●●●●
Reward: 1 ●	Reward: 2 ●●

Explanations

Maak een aangeraden oefening van hetzelfde hoofdstuk

Aangeraden

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Control

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[Solve more exercises on this topic](#) [Return to exercise page](#)

WISKI

School - Klas opvolgen

Leertijdschema

Week	Maandag	Dinsdag	Woensdag	Donnerdag	Vrijdag
Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Week 7

Vraag

Wat is de hoofdstad van de staat Florida?

Antwoord: Tallahassee

Kwaliteit afleiders: Goed

Afleidingsvragen

- Miami
- New York
- Los Angeles
- Limburg
- Noorwegen
- Zuidpool





Pick a reward and exercise:

Next time you will get 4 new exercises

$8 + X = 25$	$X - 1 = -14$
Level:	Level:
Reward: 1	Reward: 2
$12 + X = 5$	$-8 + X = -24$
Level:	Level:
Reward: 1	Reward: 2

← Pick a reward and exercise:
Next time you will get 4 new exercises

★ ● 📁 🐟 ?

$8 + X = 25$  Level: ●○○○ Reward: 1 ●	$X - 1 = -14$  Level: ●●●● Reward: 2 ●
$12 + X = 5$  Level: ●●○○ Reward: 1 ●	$-8 + X = -24$  Level: ●●●○ Reward: 2 ●

Learner control:
choose among
recommendations

AI control:
nudge towards most
recommended items

Explanations

Maak een aangeraden oefening van hetzelfde hoofdstuk

Aangeraden

- Oefening 37
- Oefening 26
- Oefening 21

Waarom deze oefening? Wiski denkt dat jouw huidige niveau past bij dat van deze oefening!

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Aantal pogingen medeleerlingen nodig hadden om oefening 21 juist op te lossen

Maak oefening 21

... of Kies zelf je volgende oefening

Naar het oefeningenoverzicht

Novice | I believe Wiski is your level now for the following subject: **Coordinates in space**

What difficulty level would you like for the next exercise series?

Very easy | Easy | **Normal** | Difficult | Very difficult

If you finish all exercises correctly, your level will increase:

- Expert
- Proficient
- Competent
- Advanced beginner
- Novice

Your level after completion

Start exercises

Control

How is your new level determined?

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Solve more exercises on this topic | Return to exercise page

WISKI | Oefeningen | Uitvoerschema | Uitvoerschema

School - Klas opvolgen

Leertijdschema

Student	Pogingen
Student 1	1
Student 2	2
Student 3	3
Student 4	4
Student 5	5
Student 6	6
Student 7	7

Oefeningsoverzicht

Wat is de hoofdstad van de staat Florida?

Antwoord: Tallahassee

Kwaliteit afleiders: Goed

Laag | Gemiddeld | Hoog

Vraag: Wat is de hoofdstad van de staat Florida?

Antwoord: Tallahassee

Kwaliteit afleiders: Goed

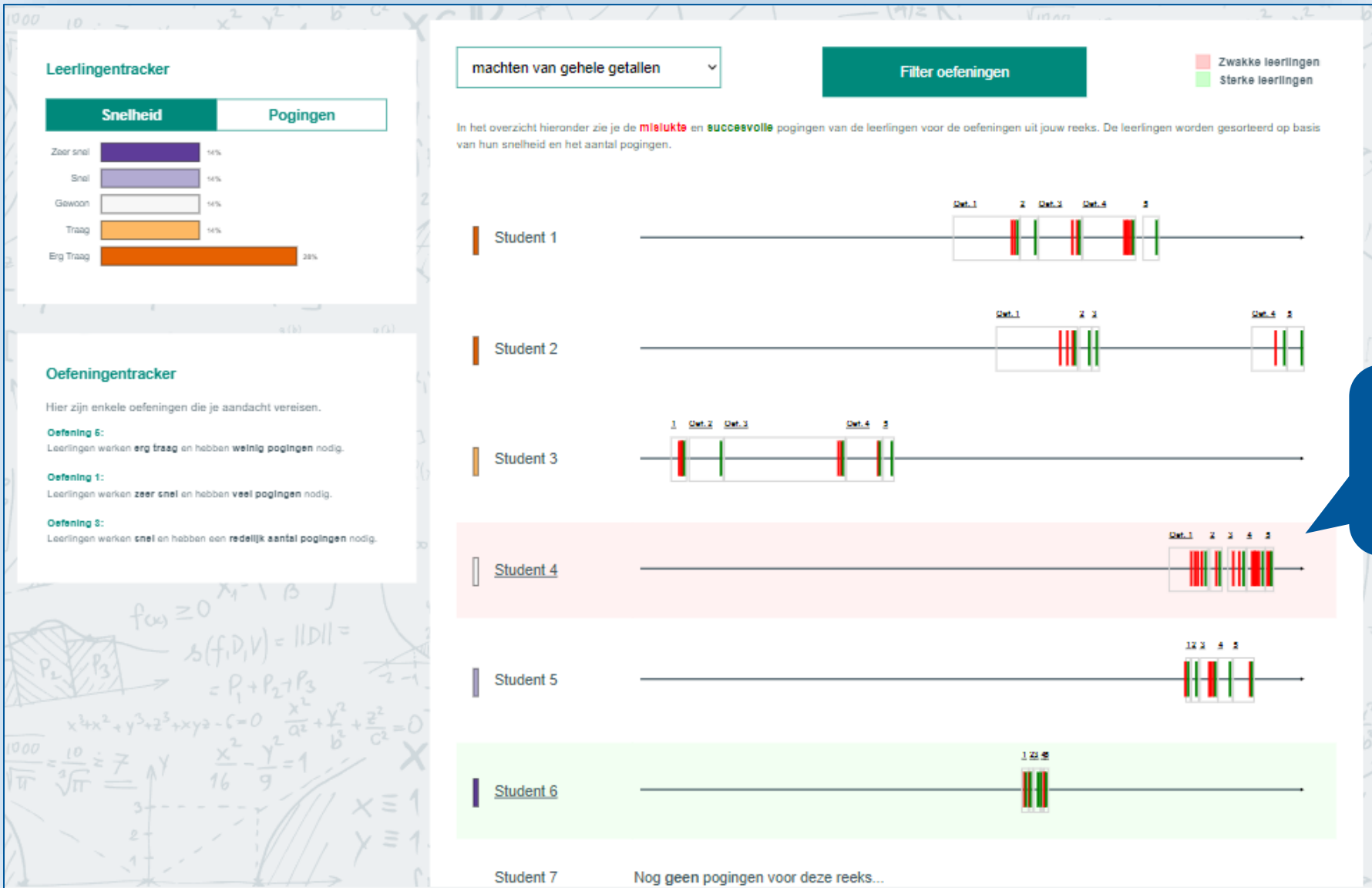
Laag | Gemiddeld | Hoog

Gelijkwaardigheid: Afleider | Vragen

Afleiders: Miami, New York, Los Angeles, Limburg, Noorwegen, Zuidpool

Pick a reward and exercise: Next time you will get 4 new exercises

$8 + X = 25$	$X - 1 = -14$
Level: ★★★★	Level: ★★★★
Reward: 1	Reward: 2
$12 + X = 5$	$-8 + X = -24$
Level: ★★★★	Level: ★★★★
Reward: 1	Reward: 2



Transparency:
visualise data used
for outlier detection

Explanations

Maak een aangeraden oefening van hetzelfde hoofdstuk

Aangeraden

- Oefening 37
- Oefening 26
- Oefening 21

Waarom deze oefening? Wiski denkt dat jouw huidige niveau past bij dat van deze oefening!

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... of Kies zelf je volgende oefening

[Naar het oefeningenoverzicht](#)

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What difficulty level would you like for the next exercise series?

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If you finish all exercises correctly, your level will increase:

- Expert
- Proficient
- Competent
- Advanced beginner
- Novice

Your level after completion

Start exercises

Control

How is your new level determined?

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Solve more exercises on this topic **Return to exercise page**

WISKI

School - Klas opvolgen

Leertijdschema

Antwoord

Tallahassee

Kwaliteit afleiders

Goed

Vraag

Wat is de hoofdstad van de staat Florida?

Antwoord

Tallahassee

Kwaliteit afleiders

Goed

Gelijkaardigheid

Afleidingsvragen

- Miami
- New York
- Los Angeles
- ...
- Limburg
- Noorwegen
- Zuidpool

Pick a reward and exercise:

Next time you will get 4 new exercises

$8 + X = 25$	$X - 1 = -14$
Level: ★★★★	Level: ★★★★
Reward: 1	Reward: 2
$12 + X = 5$	$-8 + X = -24$
Level: ★★★★	Level: ★★★★
Reward: 1	Reward: 2

Vraag
Wat is de hoofdstad van de staat Florida?

Antwoord
Tallahassee

Kwaliteit afleiders
Goed

Gelijkaardigheid
Afleider Vragen

Afleiders

- Miami
- New York
- Los Angeles

Visualising similarity scores used for recommendation

Control over model parameters

Vraag
Wat is de hoofdstad van de staat Florida?

Antwoord
Tallahassee

Kwaliteit antwoorden

Alles ————— Goed ————— Zeer goed

Gewicht afleider/gelijke vragen

Afleiders worden gesorteerd op basis van de kwaliteit van de afleider zelf, alsook de mate waarin de vraag waarin ze voorkomen lijkt op de input-vraag. Bij het sorteren van de resultaten kan je kan kiezen of de afleider zwaarder doorweegt, of de gelijkaardige vraag.

Afleider ————— Standaard ————— Gelijke vragen

- Miami
- Jaipur
- New York
- Limburg
- Noorwegen

Explanations

Maak een aangeraden oefening van hetzelfde hoofdstuk

Aangeraden

- Oefening 37
- Oefening 26
- Oefening 21

Maak oefening 21

... of Kies zelf je volgende oefening

Naar het oefeningenoverzicht

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- Proficient
- Competent
- Advanced beginner
- Novice

Your level after completion

Your level now

Start exercises

Control

How is your new level determined?

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Expert

Proficient

Competent

Advanced beginner

Novice

Before series After series After feedback

Solve more exercises on this topic **Return to exercise page**

WISKI

School - Klas opvolgen

Leertijdschaker

Deelresultaten

Deelresultaten

Vraag

Wat is de hoofdstad van de staat Florida?

Antwoord

Tallahassee

Kwaliteit afielders

Goed

Laag Gemiddeld Hoog

Gelijkaardigheid

Afielders

- Miami
- New York
- Los Angeles
- ...
- Limburg
- Noorwegen
- Zuidpool

Pick a reward and exercise:

Next time you will get 4 new exercises

$8 + X = 25$ Level: Reward: 1

$X - 1 = -14$ Level: Reward: 2

$12 + X = 5$ Level: Reward: 1

$-8 + X = -24$ Level: Reward: 2

Check out jeroenooge.be and reach out to collaborate*!



The collage includes several documents:

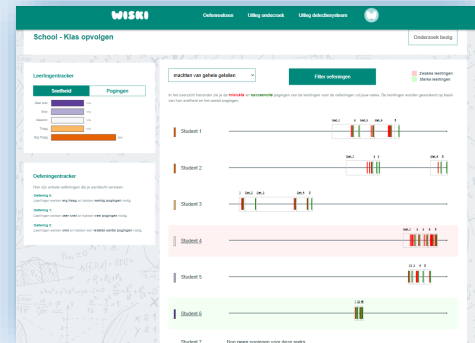
- Figure 2.1:** Abstract representation of the AI lifecycle. It shows a flow from 'Real-world data or knowledge' through 'AI algorithm' to 'AI model', which is then used by 'people' to produce an 'output'. A feedback loop labeled 'Human feedback' returns from the output to the AI model.
- Figure 2.2:** A neural network classifying an image by dot connections. It shows a network of nodes with weights connecting them, used for classification tasks.
- Figure 2.3:** A diagram titled 'Why We Need Explainable AI'. It discusses how AI models are often applied as 'black boxes' and the need for explainability to understand their decisions.
- Figure 2.4:** A diagram titled 'Algorithmic XAI approaches'. It shows a flow from 'AI Model' to 'XAI Approach' and then to 'Explainable Output'.
- Figure 2.5:** A diagram titled 'Explainability is Becoming a Legal Right'. It shows a Venn diagram with 'Performance' and 'Explainability' as overlapping circles, and 'Trust' as a central point.
- Figure 2.6:** A diagram titled 'XAI is linked to both algorithmic and human aspects'. It shows a flow from 'AI Model' to 'XAI Approach' and then to 'Human Interpretation'.

* *researchers*: involve me in projects
teachers: participate in studies, exchange ideas

Transparency and Control for AI Systems in Education



Jeroen Ooge
jeroenooge.be



Geijkardigheid

Afleidings Vragen

- Miami
- New York
- Los Angeles
- Limburg
- Noorwegen
- Zuidpool

Maak een aangeraden oefening van hetzelfde hoofdstuk

Aangeraden

- Oefening 37
- Oefening 26
- Oefening 21

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... of kies zelf je volgende oefening

Naar het oefeningenoverzicht

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Expert

Proficient

Competent

Advanced beginner

Novice

Before series After series

Novice: I believe this is your level now for the following subject: Coordinates in space.

What difficulty level would you like for the next exercise series?

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If you finish all exercises correctly, your level will increase:

Expert

Proficient

Competent

Advanced beginner

Novice

Your level after completion

Your level now

Start exercises

Pick a reward and exercise:

Next time you will get 4 new exercises

- $8 + X = 25$ Level: ■■■■ Reward: 1 ●
- $X - 1 = -14$ Level: ■■■■ Reward: 1 ●
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- $-8 + X = -24$ Level: ■■■■ Reward: 1 ●