

# Grasple

from Grapple = *struggle*  
to Grasp = *understand*

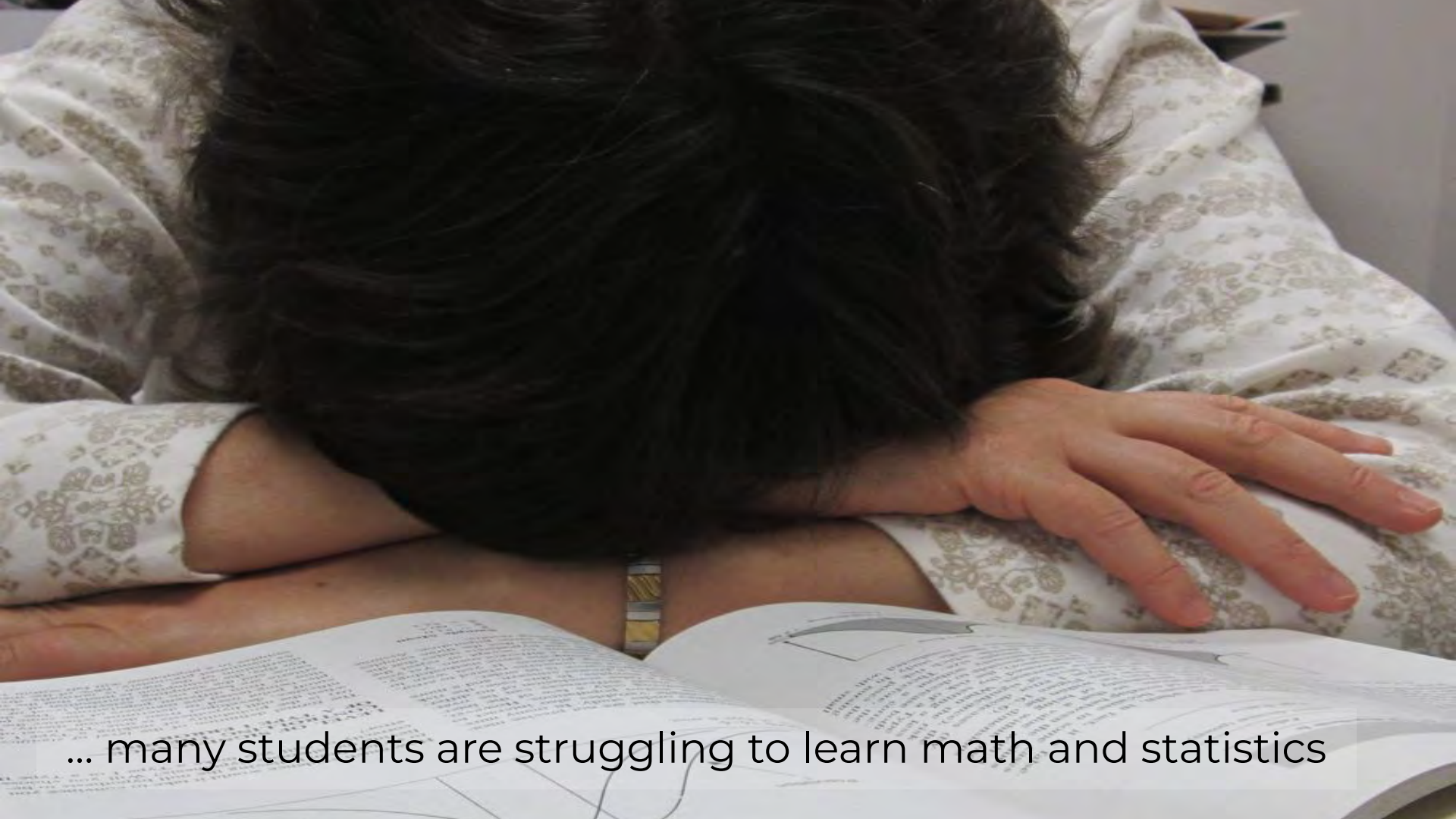


[www.Grasple.com](http://www.Grasple.com)



understanding **numbers** and **data** is vital ...

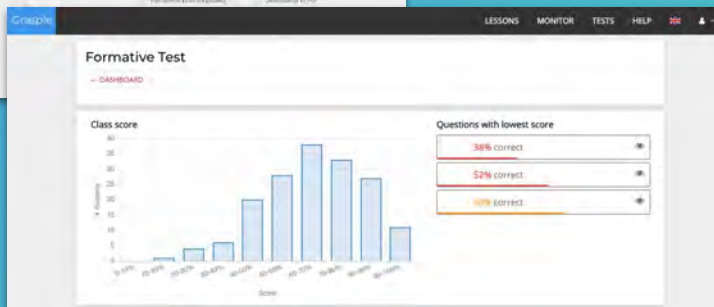
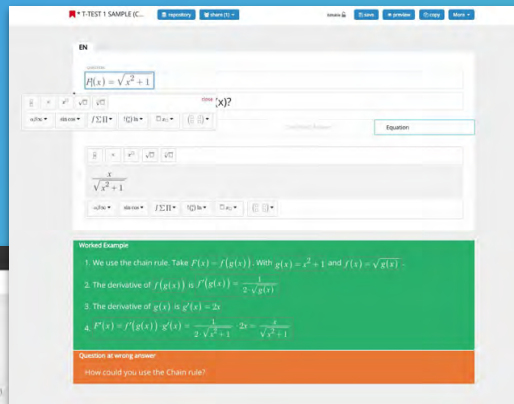
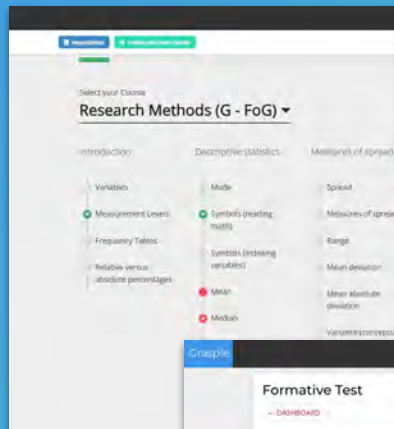




... many students are struggling to learn math and statistics

Making **knowledge** about math and statistics **openly accessible and understandable** for everyone

# Practice & Assess - Math/STEM courses



search



edit



integrate

Collaborate on exercises



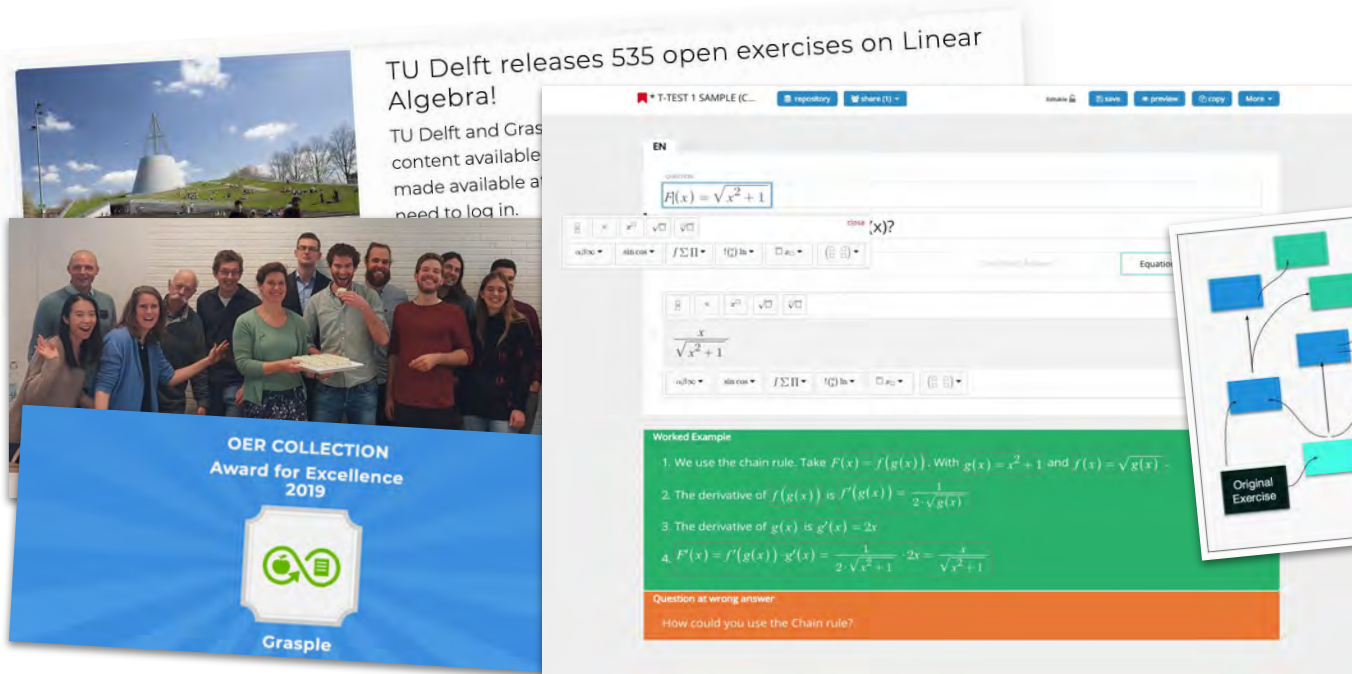
practice

Active and personal studying for students



Useful insights for teachers

# Unique: Open Collaboration



International  
**Community**

Easy to use  
**Editor**

Innovative  
**Version Control**

68 million answers  
by 94.000+ students



UNIVERSITY  
OF TWENTE.



DE HAAGSE  
HOGESCHOOL



UNIVERSITEIT VAN AMSTERDAM



Why **adaptive learning**  
in Grasple?



## Why adaptive learning in Grasple?

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Accessibility to knowledge:

**help learners** to find their  
**personal learning path**

# Adaptive learning in Grasple

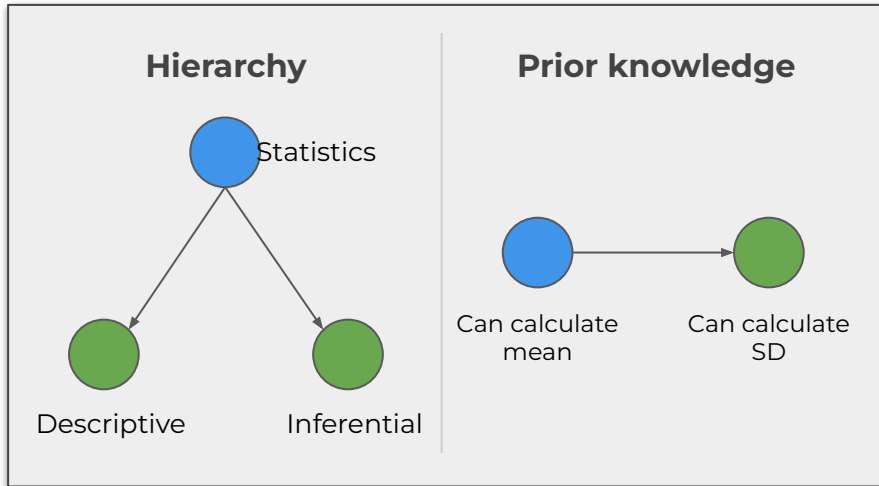
**Insights and advices** by estimating a users **mastery on knowledge components**

# Leveraging a KC Graph

## Subjects and learning goals

connected in a graph via two relations

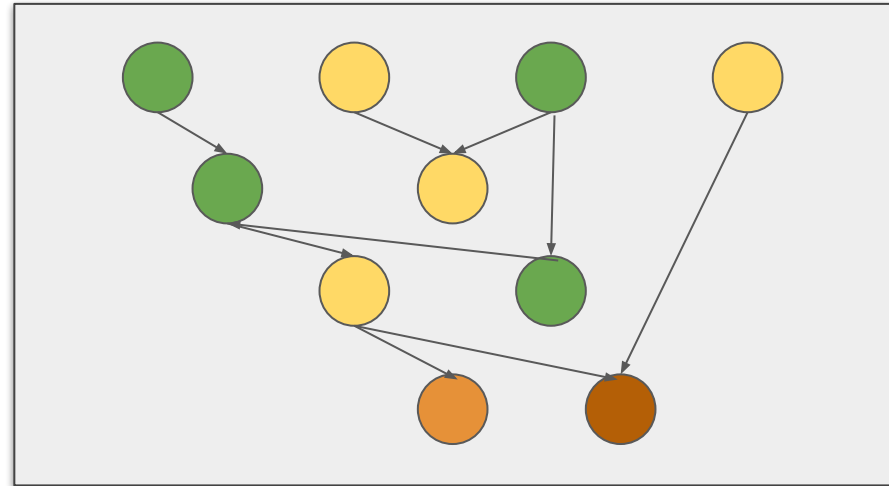
**hierarchy and prior knowledge.**



## Estimating mastery per KC

by using the relationships to

**find the knowledge gap**



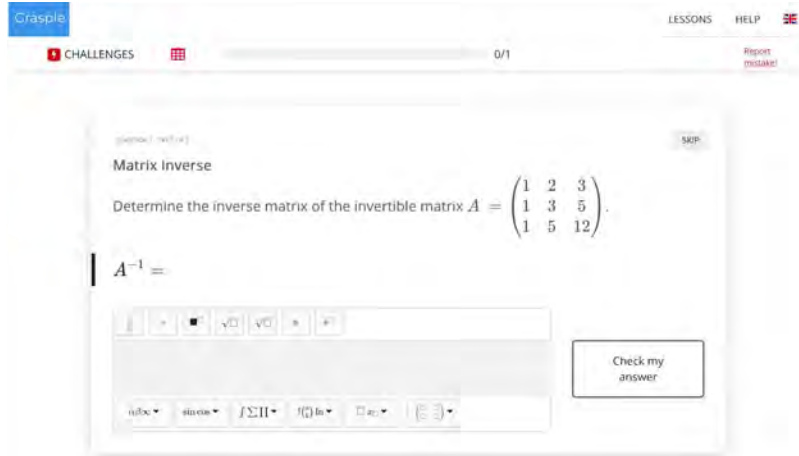


# Adaptive Assessment

## Use adaptive (intake) tests

with 20 - 30 questions

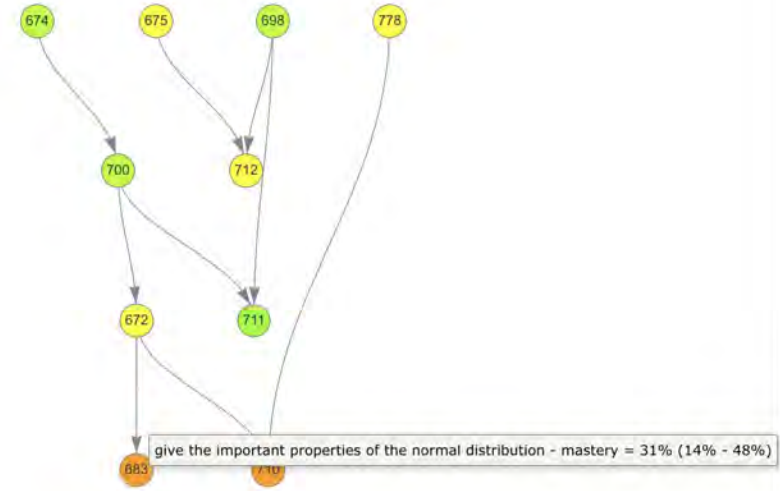
maximize insights in student's mastery



## Continuously update KC masteries

to use in

selecting next question

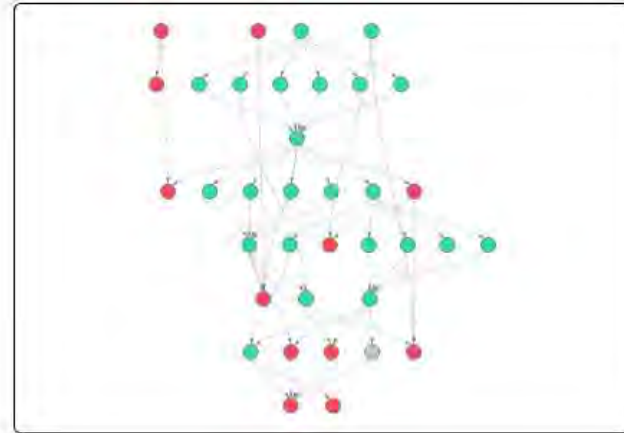


# Insights on mastery per KC

You have completed this test!

We estimate your mastery as follows:

- You master 64%
- You somewhat master 0%
- You don't master 33%
- We can't estimate your mastery for 3%



We recommend you to start with the following subject:

- **The Tangent Line and the Derivative (Video)** - your mastery is between 21% and 55%

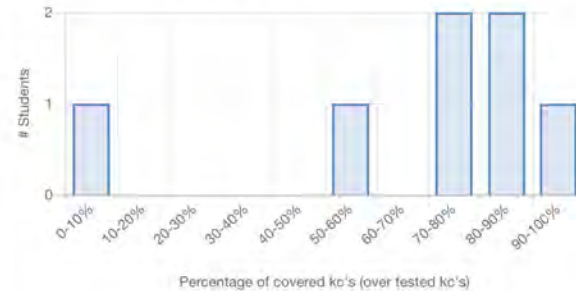
# Advice on focus areas in a Course

Differentiation Calculation Rules	Applications of Differentiation	Partial and Higher Order Differentiation	Integration
<ul style="list-style-type: none"> <li>Warming up with the sum rule</li> <li>Visualizing the chain rule and product rule (Video)</li> <li>Warming up with the chain rule</li> <li>Warming up with the product rule</li> <li>Warming up with the quotient rule</li> <li>Practice with Differentiation Calculation Rules</li> </ul>	<ul style="list-style-type: none"> <li>The Tangent Line and the Derivative (Video)</li> <li>Determining the tangent to a function through differentiation - Warming Up</li> <li>Determining the tangent to a function through differentiation - Practice</li> <li>Maxima and Minima (Video)</li> <li>Find a minimum or maximum of a function through differentiation</li> </ul>	<ul style="list-style-type: none"> <li>What is partial differentiation? (Video)</li> <li>Determining the partial derivative of a function</li> <li>What are higher order derivatives? (Video)</li> <li>Determining the second derivative of a function</li> <li>Convex versus concave (Video)</li> <li>Determining whether a function is convex or concave</li> </ul>	<ul style="list-style-type: none"> <li>What are antiderivatives? (Video)</li> <li>Antidifferentiation of elementary functions</li> <li>What is integration? (Video)</li> <li>Integration of elementary functions</li> <li>Integrating linear combinations of elementary functions</li> <li>Integration by substitution (Video)</li> </ul>

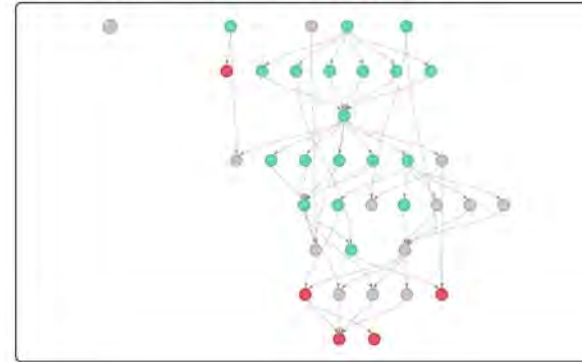
# Insights for teacher

## Class score

based on an average of 75% coverage of all knowledge components



## Aggregated Knowledge Component (KC) graph



☒ Show Individual Students ☐ Show Student Names

[Export results to csv](#)

#	Name ↑	mastered kc's	somewhat mastered kc's	non-mastered kc's	unestimated kc's
	Column average	49%	1%	25%	25%
1	<a href="#">show results</a>	0%	8%	86%	5%
2	<a href="#">show results</a>	62%	0%	14%	24%
3	<a href="#">show results</a>	76%	0%	0%	24%
4	<a href="#">show results</a>	51%	0%	35%	14%
5	<a href="#">show results</a>	46%	0%	19%	35%
6	<a href="#">show results</a>	57%	0%	11%	32%



# Autonomy

Autonomy

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**Teacher**

# Teacher's Autonomy

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1. Make things **easy**
2. Let the teacher be **in control**

Teacher's Autonomy

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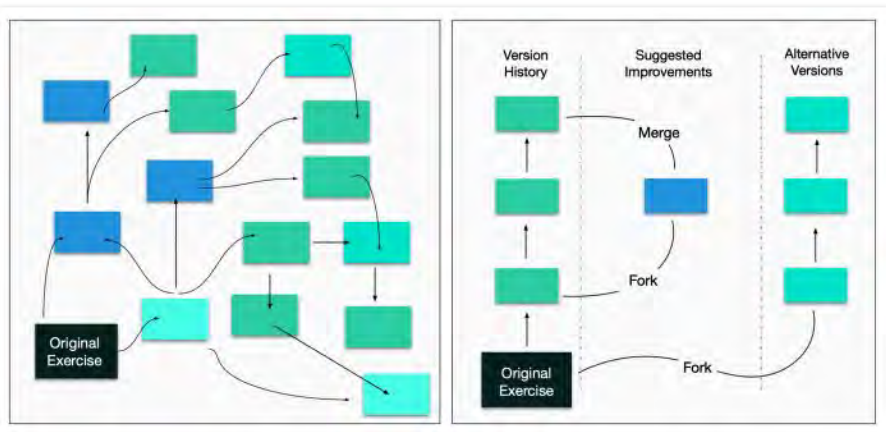
# **Adaptive Learning & Open Education**



# Autonomy & Open Education

Re-use **open educational resources**  
without fear of losing control using our  
**version control system**

**Edit everything**  
using the  
**user friendly content editor**



The screenshot shows a user-friendly content editor interface. At the top, there are navigation buttons: 'repository', 'share (1)', 'save', 'preview', 'copy', and 'More'. The main editing area has a text input field containing the equation  $F(x) = \sqrt{x^2 + 1}$ . Below this, there is a toolbar with various mathematical symbols and functions. The editor displays the equation  $\frac{x}{\sqrt{x^2 + 1}}$  and a 'Question' button. Below the editor, there is a 'Worked Example' section with a green background, containing a list of steps for using the chain rule. At the bottom, there is an orange section labeled 'Question at wrong answer' with the text 'How could you use the Chain rule?'.

Worked Example

1. We use the chain rule. Take  $F(x) = f(g(x))$ . With  $g(x) = x^2 + 1$  and  $f(x) = \sqrt{g(x)}$ .
2. The derivative of  $f(g(x))$  is  $f'(g(x)) = \frac{1}{2\sqrt{g(x)}}$ .
3. The derivative of  $g(x)$  is  $g'(x) = 2x$ .
4.  $F'(x) = f'(g(x)) \cdot g'(x) = \frac{1}{2\sqrt{x^2 + 1}} \cdot 2x = \frac{x}{\sqrt{x^2 + 1}}$

Question at wrong answer

How could you use the Chain rule?

Teacher's autonomy

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## **Open education**

facilitates teachers their autonomy  
(in adaptive learning)

## Teacher's Autonomy

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What is your **biggest fear** when using  
**adaptive learning?**

(concerning the teacher's autonomy)

Autonomy

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**Student**

## Student's Autonomy

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1. Give **transparent insights & advices**
2. Give the **student ownership**

# Student's Autonomy

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When should the **student** (not) have  
**autonomy?**

(when using adaptive learning)



## Adaptive learning & Open education

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What **benefits & challenges** do you see in using **open education** together with **adaptive learning**?

**Together we can!**

make **education**  
more **accessible**  
and more **personal**  
for **everyone**

# Student Autonomie

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Wanneer zou de **student** wel/niet  
**autonomie** moeten hebben?  
(tijdens het gebruik van adaptief leren)

## Docent Autonomie

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Wat is je **grootste zorg** bij het  
gebruiken van **adaptief leren**?

(met betrekking tot de autonomie van de docent)