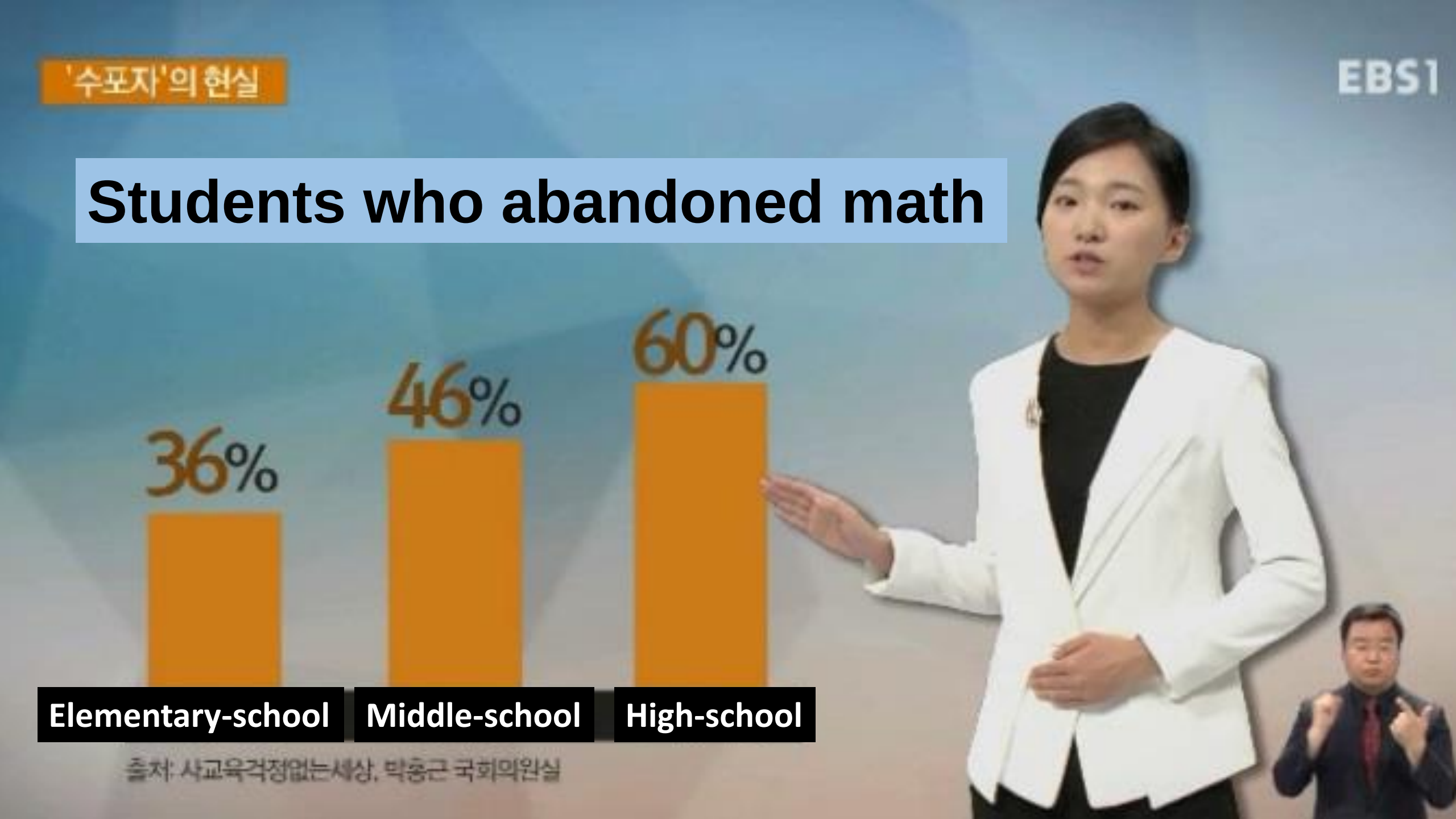
Innovation in mathematics education through AI technology

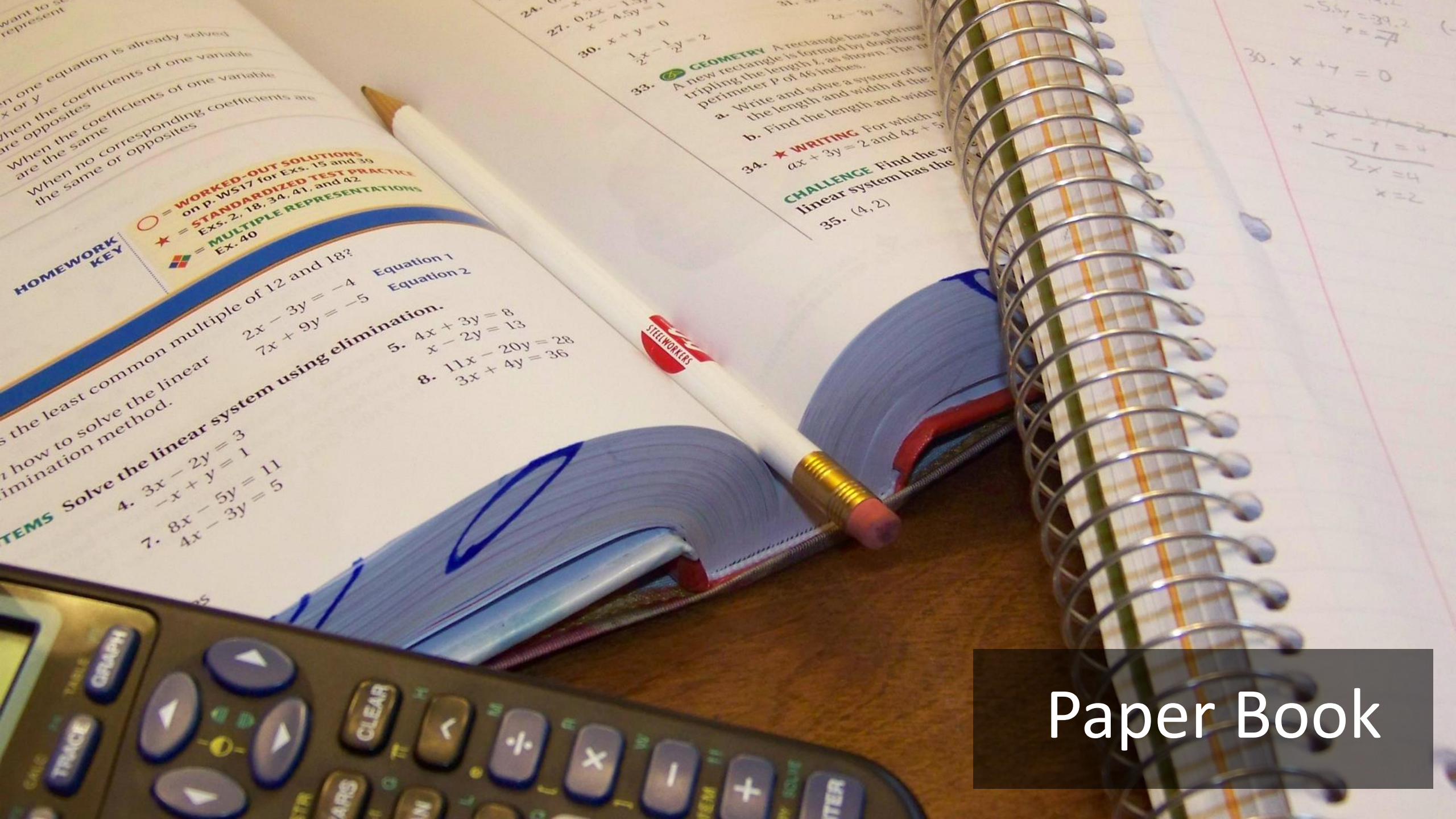
Knowre CEO, YJ Kim

NATIONAL
MATH + SCIENCE
INITIATIVE

Of the 20 fastest growing careers, 15 of them require a background in math or science.

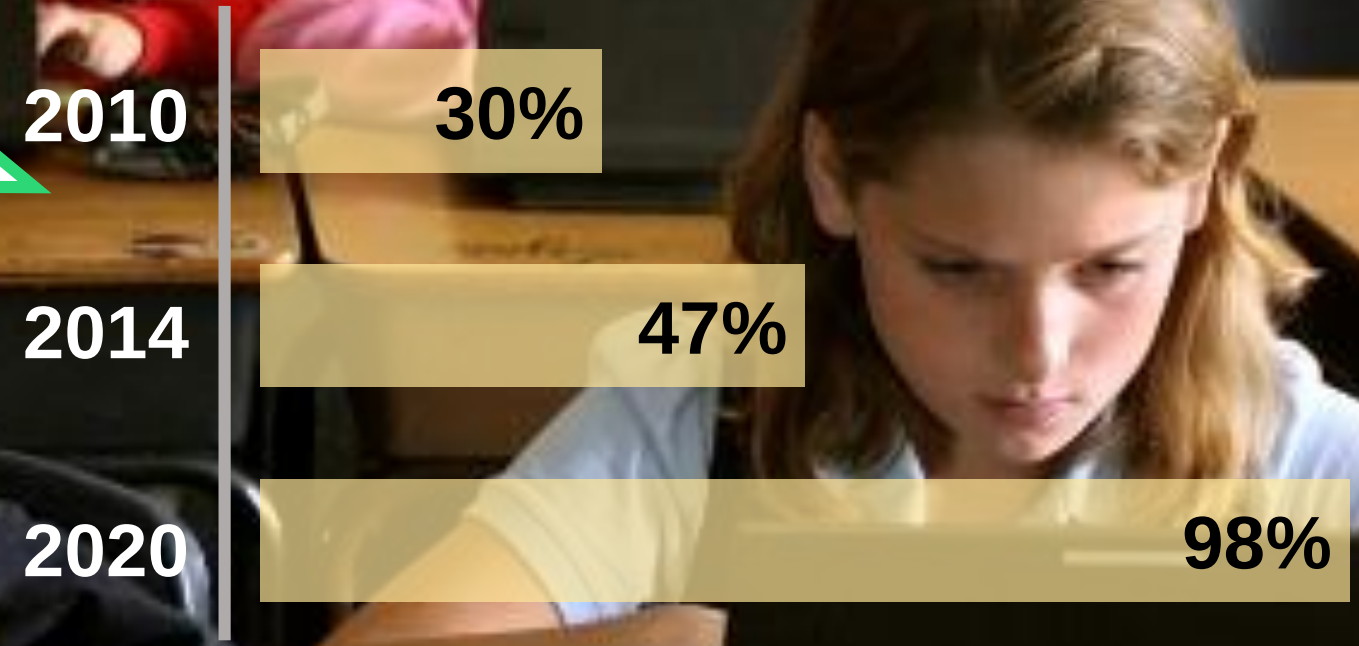

'수포자'의 현실
EBS1
Students who abandoned math
36%
46%
60%
Elementary-school
Middle-school
High-school
출처: 사교육걱정없는세상, 박홍근 국회의원실


Classroom:
One Size Fits All


HOMEWORK KEY
WORKED-OUT SOLUTIONS on p. WS17 for Exs. 15 and 39
STANDARDIZED TEST PRACTICE Exs. 2, 18, 34, 41, and 42
MULTIPLE REPRESENTATIONS Ex. 40
GEOMETRY
WRITING
CHALLENGE
Solve the linear system using elimination.
Paper Book

New Paradigm in Education

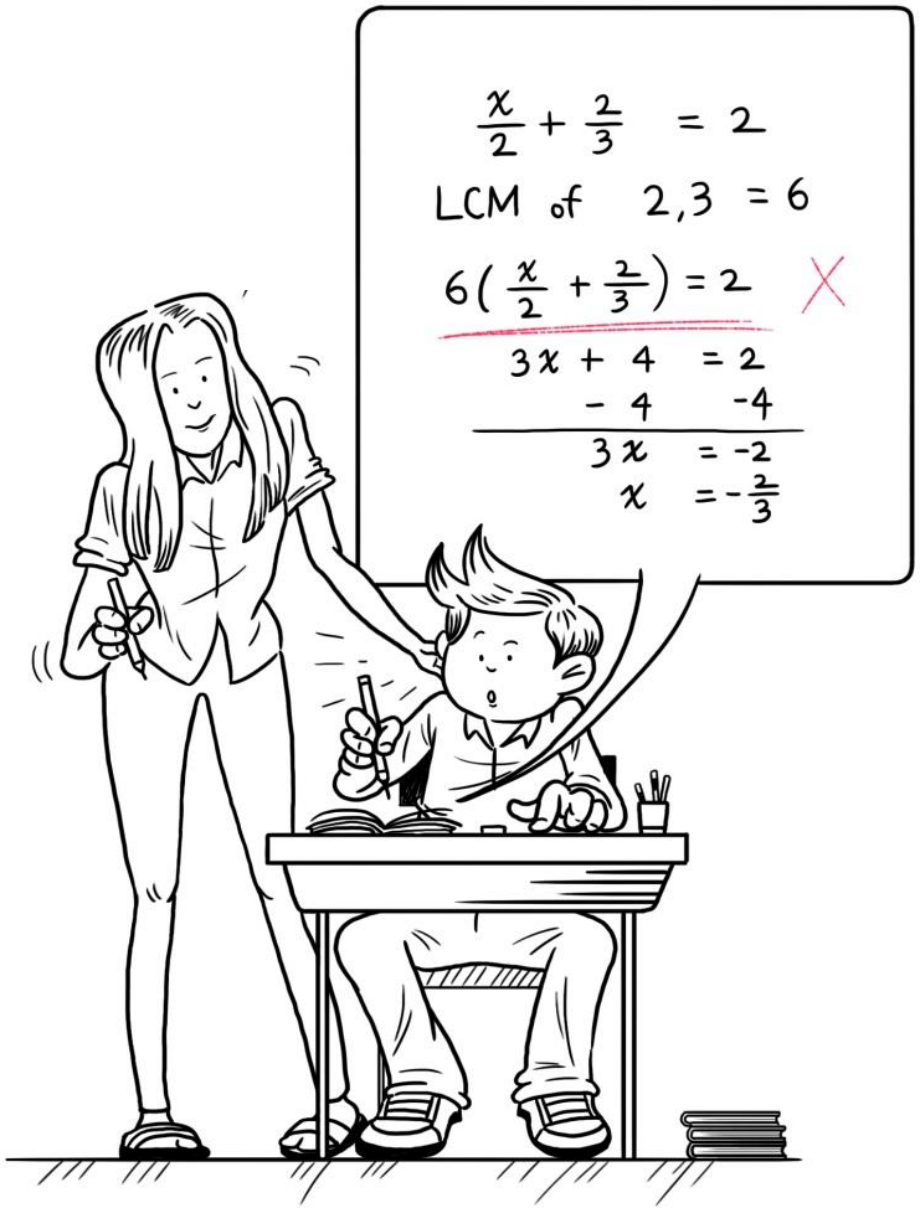
The emergence of new low priced devices and software technology



Blended learning penetration in the US


What has changed in mathematics education through new technology?

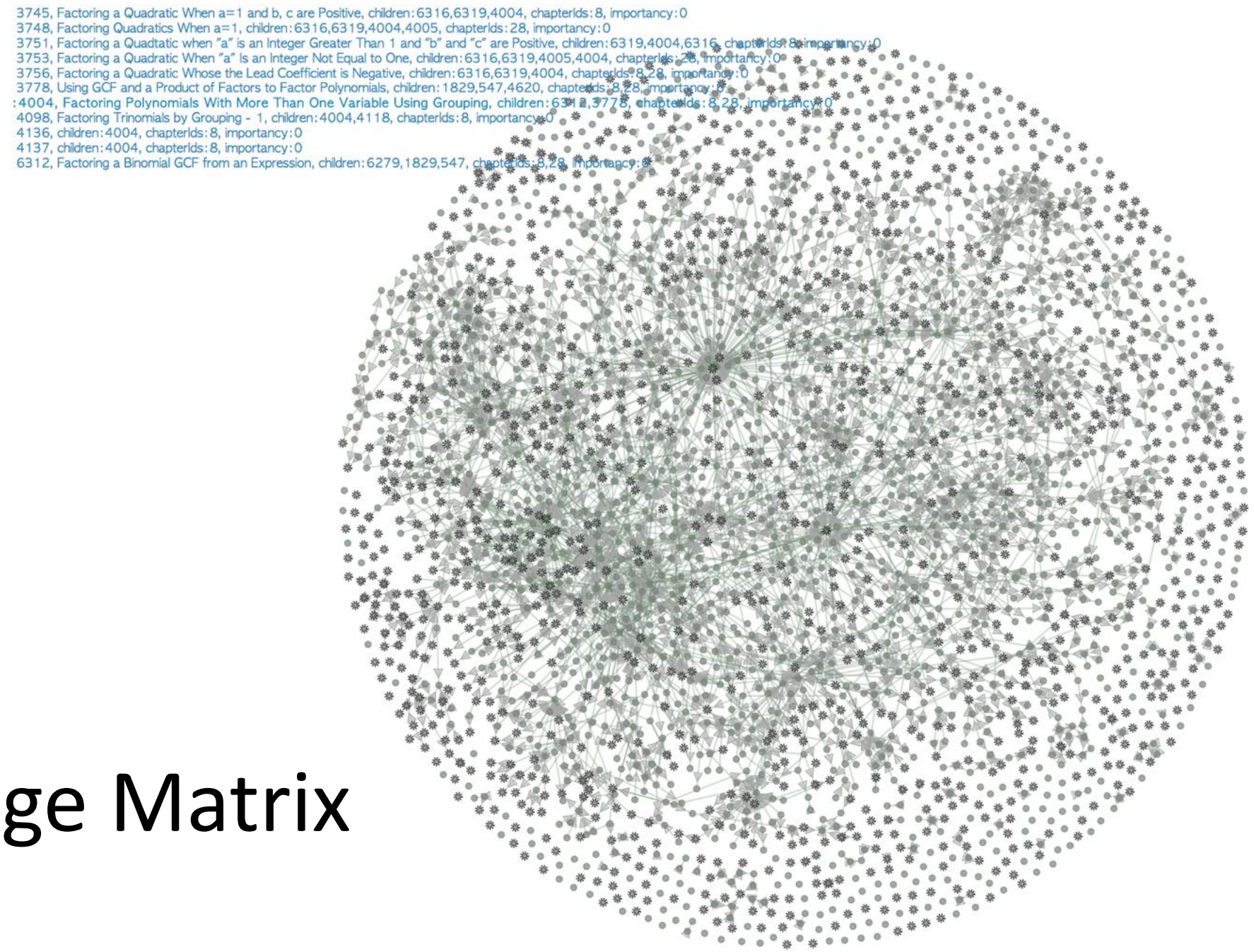
1. Analyze why it is wrong and prescribe exactly what you don't know



Solve: $x^2 + 5x - 35 = 3x$

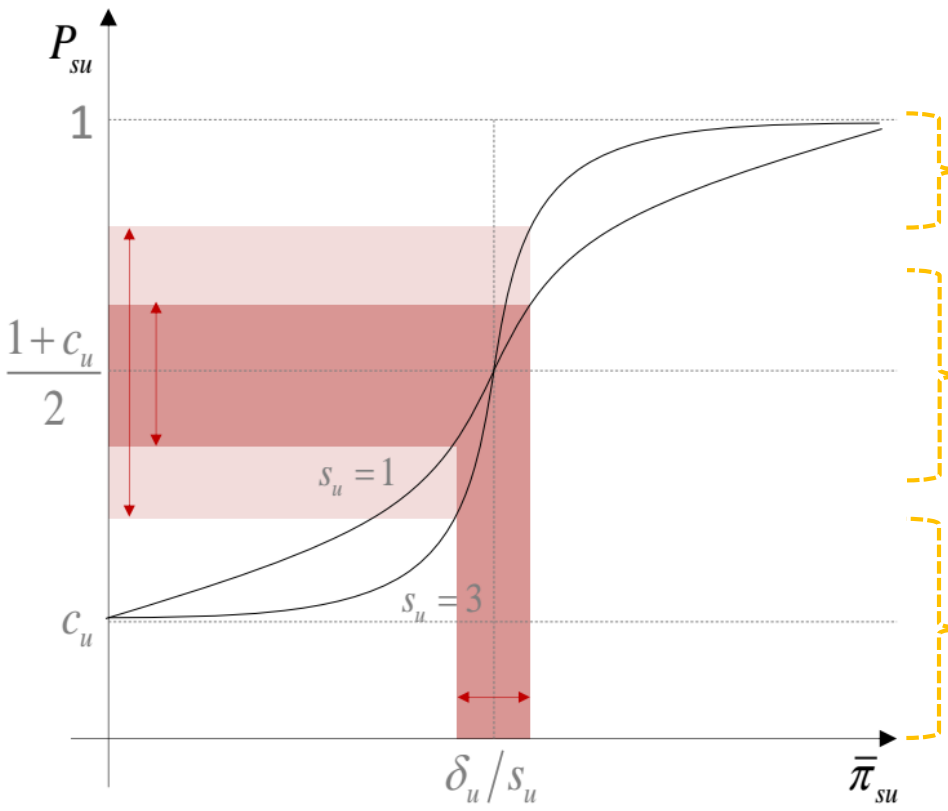
Knowledge Unit	Concept	Expression
Subtraction property of equality	When both sides of an equation have the same number subtracted from them, the remaining are equal	$x^2 + 2x - 35 = 0$
Factoring trinomials	Factor into two binomials	$(x-5)(x+7) = 0$
Zero product property	If AB = 0, then either A = 0 or B = 0 (or both)	$x - 5 = 0$ or $x + 7 = 0$
Solving the equation	If Ax – B = 0, then x = B / A	$x = 5, -7$

$$x = 5,\ -7$$



Knowledge Matrix

Deep learning-based predictive technology



π_{su}: Proficiency of a student's understanding of a specific concept/skill

P_{su}: Probability that student will get specific concept/skill correct

Concept/Skill that student is highly likely to answer correctly

Not recommended

Working on this problem is not a good use of the student's time

Concept/Skill that student is neither likely nor unlikely to answer correctly

Recommended

Appropriate for the student's level of proficiency. If student gets wrong, further asses and recommend

Concept/Skill that student is not likely to answer correctly

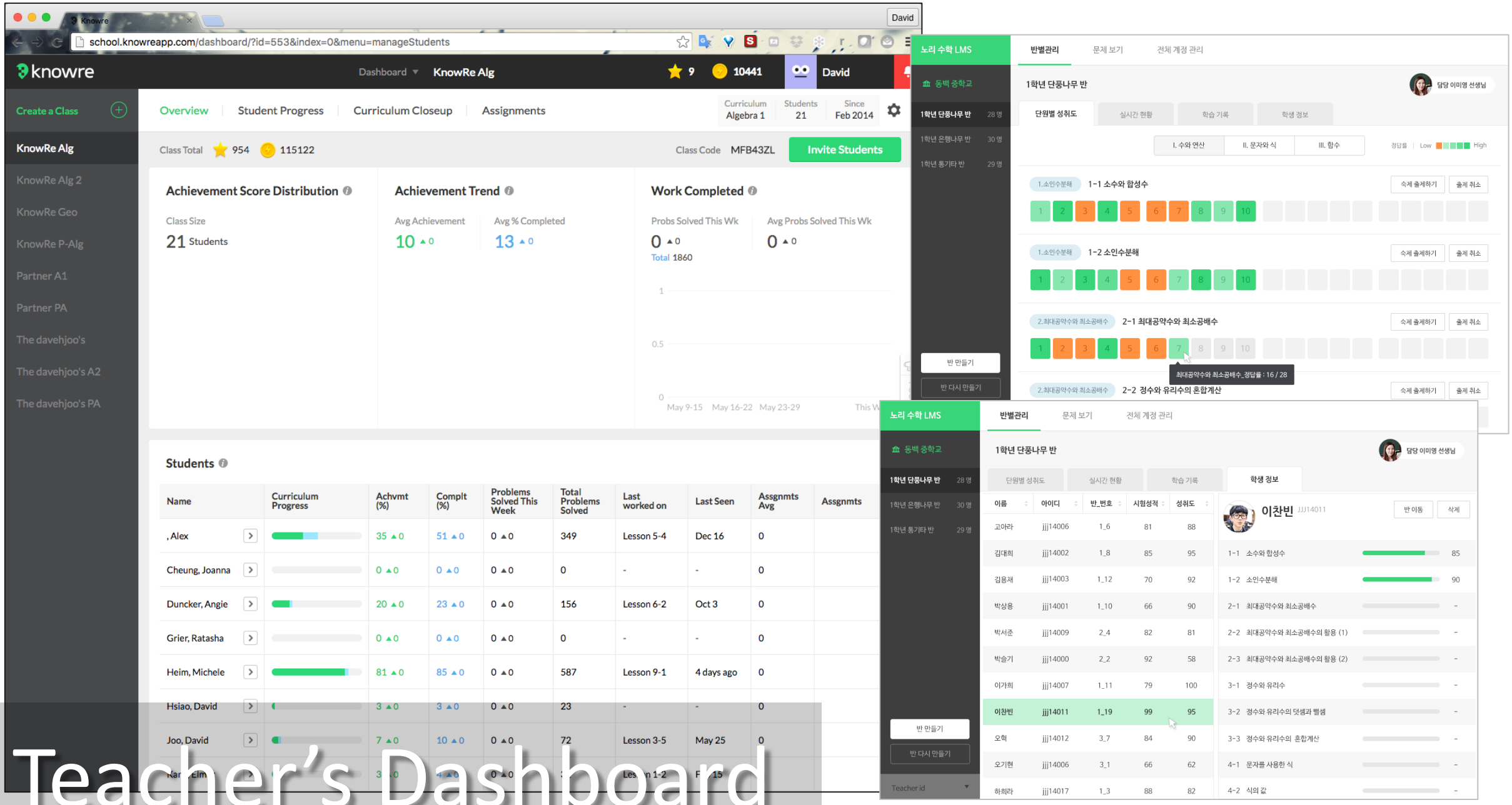
Not recommended

This problem is too difficult for the student. Better to start with an easier or prerequisite problem

2. The teacher's role evolves from instruction to coaching


MONEYBALL
Win %
EXPECTED
ACTUAL
RECORD
EXPECTED
ACTUAL
OAK 2001
.6525
.6296
106 - 56
102 - 60
.6145
99 - 63
SEA 2001
.6861
.7160
111 - 51
.6097
99 - 63
.5597
.5864
91 - 71
.6178
100 - 62
New York Yankees
$114,457,768
vs
$39,722,689
Oakland Athletics

Overworked teacher



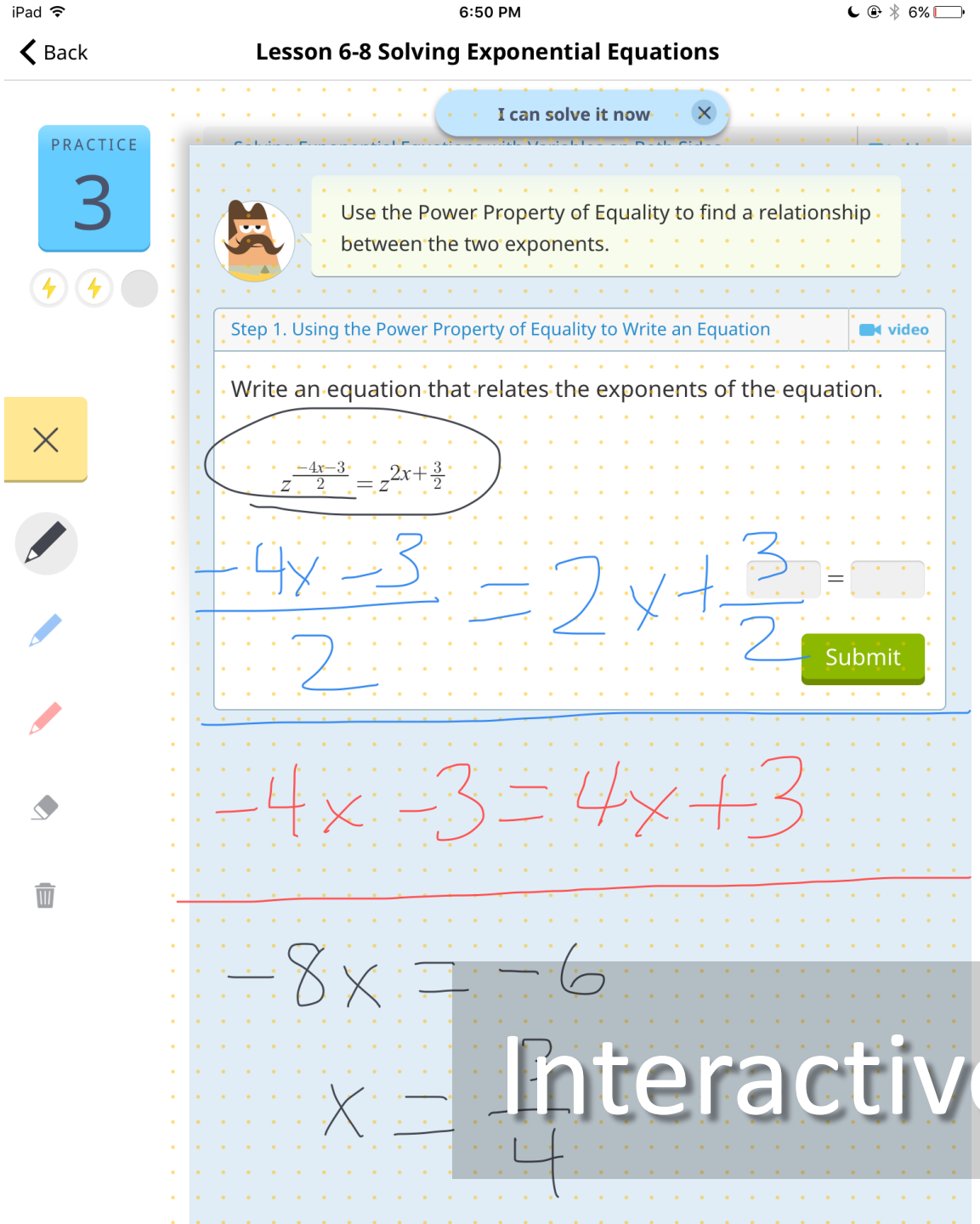
Teacher's Dashboard


Lecturer


Coach

3. Motivate students through enjoyable learning experiences

Motivation



Interactive

---------- Forwarded message ----------
From: **Lonny Cruff** <lonny_cruff@[redacted]>
Date: Tue, Sep 20, 2016 at 2:28 PM
Subject: How I know it's working
To: Bara Levitt <bara@knowre.com>

Good morning Bara,

Here's how I can tell a tactic or program is working: When kids don't want to leave at the end of a class period, what you're using is working! ;)

Thanx,

Lonny Cruff, Secondary Math
Anna Tobeluk Memorial School

"Kids don't want to leave at the end of a class period"

Until we get equality in education, we won't have an equal society.

— Sonia Sotomayor —

AZ QUOTES