

THE DOCUMENTARY

# THE BIGGEST STORY PROBLEM

WHY AMERICA'S STUDENTS ARE FAILING AT MATH



## Co-Director/Co-Producer

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## FILM DESCRIPTION

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An independent documentary film exploring the middle school math crises in the United States, from the perspective of one math teacher-turned-game designer, 15 teachers willing to try something new and hundreds of middle school students from across the country.

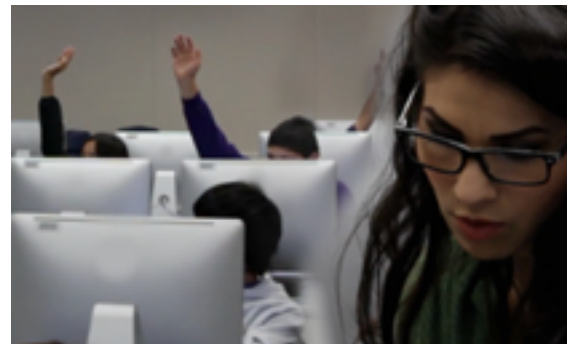
## SHORT SYNOPSIS

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*The Biggest Story Problem* is an independent documentary film that explores a previously unexplained phenomenon: why students in the United States perform well in math in their elementary years, score above average until 8<sup>th</sup> grade, and then precipitously drop to the bottom tier in the world by 10<sup>th</sup> grade.

With highlights from top-scoring Finland to an exploration of the largest textbooks in the world and how they affect students in our country, this is not a story of failure, but one of hope.

From the perspective of one teacher-turned-game designer, Scott Laidlaw, you will meet the teachers, students and schools on the frontlines, taking charge in changing our nation's story of math education.



## EXHIBITION AND CREDITS

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Exhibition Format: DVD and Blu-ray | 78 minutes

Sound Format: Dolby Stereo

Premiere: TBD

Written & Directed by.....Scott Laidlaw & Jennifer Lightwood

Cinematography by.....Alex Usatine, David Aubrey & Hagoth Aiono

Editing by.....David Aubrey & Alex Usatine

Art.....Larry Finn & Elizabeth Haidle

Animations.....Artatom

Music.....Kirry Nelson, Ed Dillon & Artatom

Assistant Production by.....Kate Martin

Co-produced by.....Martha Riecks

Produced by.....Jennifer Lightwood & Scott Laidlaw

An Imagine Education Production

### DIRECTORS' STATEMENTS

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I've watched many educational documentary films over the years, and have always been impressed by the truths brought out by this medium. I never expected to do a documentary myself, but coming from deep within the system as a middle school math teacher, a story kept emerging with my students that seemed to present an issue bigger than any that have been tackled before. At the heart of the story is a central idea, that "*The biggest problem in education is the giving of answers to questions that have not yet been asked*<sup>1</sup>". And that our natural curiosity to learn about the world around us has faded away, buried beneath a box filled with textbooks, standards and tests.

*The Biggest Story Problem* was made with the intent to understand why American students are failing at math. It looks at the tools that have been handed to this generation of teachers, from traditional stand and deliver techniques to the drill-and-repeat techniques underlying even the shiniest new technology devices. It ultimately sheds light on the underlying thoughts behind our teaching tools.

While this documentary highlights the work I have done to help math make sense to my students through story-based games, I think the larger feeling is that it creates awareness of just how important it is for educators and parents to reflect on their practices, while exploring how deeply our beliefs and assumptions influence learning. The negative aspects we've created through our culture of rewards, like memorizing facts for candy bars, is part of that, but so are the inspiring hope of solutions, like pretend play, narrative and manipulative environments that can actually teach the way the brain learns. It is my hope that the film serves as a catalyst to make a difference in the lives of our children.

<sup>1</sup>Dr. Arthur W. Combs, 1999

--Scott Laidlaw

There was a gem found during the making of *The Biggest Story Problem*. As a CPA, I have always been fascinated about our relationship between math and money, but to actually uncover a specific link between math proficiency and global economics was almost shocking. In the past few years, financial analysts have been particularly concerned about five countries (defined as the PIIGS - Portugal, Italy, Ireland, Greece and Spain) that are all facing national economic crisis with global impact. These same five countries happen to be at the bottom of the 2009 OECD rankings in math proficiency (listed #26-30 out of 34 countries). Most alarming is that the United States is hovering just above them at #25 with only 1 out of 4 students testing proficient in math.

This find is striking because it undoubtedly informs us that math and numbers are consequential in our lives. This understanding goes beyond wrong answers on a math test. When we have a meaningless relationship with numbers, our language of financial literacy and the lifeblood that keeps us alive each day, we have a disconnect to the larger world around us. A shortcoming in U.S. math education today is that the subject is often taught in a way that reinforces that numbers hold no meaning in the mind of a student. Basic middle school math is a necessary tool, and the driving force that our next generations must use to change our collective financial story. This film is dedicated to that possibility of change.

--Jennifer Lightwood

### LONG SYNOPSIS

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*The Biggest Story Problem* is an independent documentary film examining the sudden drop in math scores and competency seen as students in the U.S. transition from primary to secondary schools. From a global perspective, American students typically score above average in elementary school, yet the United States ranks in the bottom tier of math scores for 15 year-old students. This dramatic drop in competency has been attributed to a “crowded curriculum” that’s “a mile wide and an inch deep.” Yet, despite these concerns, middle school math curriculum has yet to truly change.

The documentary interweaves the story of New Mexico’s teacher-turned-game designer, Scott Laidlaw, creator of *Ko’s Journey*, an innovative online story-based math game; the stories of teachers and schools taking part in a pilot program using *Ko’s Journey* to increase student engagement in math; and the broad-based story of math education in the United States, contrasting it to countries, such as Finland, that consistently score in the top tier of the OECD.

The central message to the story is that our country is failing in math, and that may come down to a simple lack of meaning and purpose. *The Biggest Story Problem* looks at a variety of factors that are influencing math education and scores in the United States, from textbooks, with more pages than there are days in the school year, to the drill-reward-repeat structure embraced in math classrooms throughout the country and most game-based interventions, that might actually be making the problem worse due by emphasizing that math is a subject that must be memorized to be mastered, rather than a subject with meaning, purpose and relevance that is waiting to be explored.

The film features interviews with a number of noted education experts, reformers and researchers, including NPR’s Math Guy, Keith Devlin, Ph.D., a Stanford University researcher looking at the use of media technology to teach and communicate mathematics; Marilyn Burns, leading author, math educator and founder of *Math Solutions*; Ann Shannon, mathematics consultant for the Gates Foundation; and Alfie Kohn, author and lecturer on human behavior and education, exploring the impact of rewards, assessment and learning.



*The Biggest Story Problem* also goes into classrooms and homes, as students and teachers alike grapple with the challenges of math – and the challenges that arise with pioneering innovative technological interventions. The film offers a refreshing and uplifting perspective on the role of math teachers in school and society, providing personal stories and insights into what brings teachers into the math classroom, day after day, year after year.

The documentary film was undertaken as part of a Wave II Next Generation Learning Challenges (NGLC) Grant received by Imagine Education to conduct an in-school pilot program and efficacy study of *Ko’s Journey* during the 2011-2012 school year. With film production supported by the NGLC, Imagine Education is now looking to secure additional underwriting to distribute professional development copies as an effort to reach every public middle school in the United States.

### FEATURED INTERVIEWS (IN ORDER OF APPEARANCE)

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#### **Dan Goldstein**, Research Analyst & Equity Portfolio Manager, Columbia Partners

Dan Goldstein, CFA is a member of the equity management team and serves as an equity portfolio manager and analyst for Columbia Partners in Washington D.C. He also manages the quantitative research effort for the firm.

#### **Todd Wynward & Margaret Bartlett**, Co-Founders of Roots & Wings Community School

Todd Wynward & Margaret Bartlett co-founded Roots & Wings, a K-8 public charter school in rural New Mexico based upon the Expeditionary Learning school model. They are dedicated to social reform through education and building community.

#### **Stephanie Owens**, K-12 Teacher & Educational Psychologist

Stephanie Owens, Ph.D. is researcher in the evolution of the human imagination (co-author of *Evolution's Pedagogy: An Adaptationist Model of Pretense and Entertainment (2001)*). Owens is dedicated to designing school curricula based on the educational reform model, Expeditionary Learning.

#### **Kevin Simpson**, Global Education Consultant & Founder of KDSL

Kevin Simpson founded Know.Do.Serve.Learn (KDSL) which partners with education organizations worldwide with a focus on global learning, innovation and collaboration. Simpson was a National Consultant with the U.S. Department of Education's Teacher-to-Teacher Initiative provided effective, research-based practices to educators across the country.

#### **Keith Devlin**, Executive Director at Stanford University & NPR's "Math Guy"

Dr. Keith Devlin is co-founder and Executive Director of the university's H-STAR Institute, a co-founder of the Stanford Media X research network, and a Senior Researcher at CSI. His current research is focused on the use of different media to teach and communicate mathematics to diverse audiences. He has written 31 books and over 80 published research articles. Devlin is 'the Math Guy' on National Public Radio.

#### **Marilyn Burns**, Best Selling Author & Founder of Math Solutions

Marilyn Burns, founder of Math Solutions, is one of today's most highly respected mathematics educators. For more than 40 years, Burns has taught children, led professional development sessions, spoken at educational conferences nationwide and created mathematics resources for teachers and administrators including 22 professional books. Burns received the Louise Hay Award for Contributions to Mathematics Education in 1997.

#### **Alfie Kohn**, Author of *Punishment by Rewards*

Alfie Kohn writes and speaks widely on human behavior, education and parenting. The author of twelve books and scores of articles, he lectures at education conferences and universities as well as to parent groups and corporations. Kohn's criticisms of competition and rewards have been widely discussed and debated, and he has been described in *Time* magazine as "perhaps the country's most outspoken critic of education's fixation on grades [and] test scores."

#### **Madlon Laster**, Author of *Teach the Way the Brain Learns*

Dr. Madlon Laster is a veteran teacher of 42 years. She specializes in brain-based learning and is a "teacher of teachers" through methods courses. She leads conferences and workshops worldwide and is dedicated to establishing to children's libraries in underdeveloped countries.

#### **Ann Shannon**, U.S. National Mathematics Consultant

Dr. Ann Shannon is a mathematics educator with decades of experience specializing in assessment and urban education. She works as consultant helping states, districts, and schools to better serve the needs of diverse learners of mathematics.

#### **Julie Young**, President & CEO of Florida Virtual School

Julie Young pioneered the launch of Florida Virtual School with the goal of providing high quality, online courses to in-state students. That vision has resulted in Florida Virtual School becoming the largest provider of Internet-based courseware and instruction for middle and high school students in Florida and around the globe.

#### **Jukka Gustafsson**, Minister of Education, Finland

Jukka Gustafsson has served as the Minister of Education and Science for the country of Finland for the past year. Gustafsson brings more than 40 years experience in the Finnish educational system from planning to Headmaster as well as leading countless Boards and Committees in education management and training.

### SELECT EXCERPTS

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*"To the extent that American kids, especially in the older grades, seem to be faltering in terms of math proficiency and interest by the way which I think is not measured on international or national standardized tests but is the key to understanding proficiency. Do kids enjoy doing it? Do they feel engaged and excited by it? The answer increasingly is no, we take the kids who love playing with numbers and letters and words and ideas and turn them into kids who can't wait for school to be over. That's not a natural developmental process. That's a function of bad schooling."* – Alfie Kohn, Author of *The Schools Our Children Deserve*

*"We chop up mathematics into tiny little pieces and we serve those pieces up to students and we turn it into scree. And what we are actually doing is attempting to make it so easy and research shows that when mathematics is made so easy that it's actually un-learnable."* – Ann Shannon, National Math Consultant

*"When I started teaching middle school students, what fascinated me was the fact that in third grade math was still play. In middle school, math became pain. And, in third grade, when kids were learning math, they actually understood what they were doing – they were manipulating, they were drawing pictures, they were understanding what those numbers meant and how they combined. And then I realized based on how the instruction was designed in middle school, that oftentimes kids could get the right answer but they absolutely had no idea why."* – Julie Young, President & CEO of Florida Virtual School

*"So we are shifting to asking questions, where yes, I still know the answer to  $99+17$ , but what I'm listening to is how the students thinks not listening for the right answer. I'm listening to get inside the kids head."* – Marilyn Burns, Founder of Math Solutions

*"Mathematics is really about thinking. So if I want to distinguish between writing symbols, which is what people think is doing mathematics, from what I mean by doing mathematics, I'm going to call it mathematical thinking. In other words, it's got nothing to do with paper and pencils and symbols and blackboards and whiteboards. It's all about thinking a certain way, and ultimately that's what mathematics is. It's a way human beings have developed to think about the world that's proved incredibly useful to the way we live our lives today."* – Keith Devlin, NPR's "Math Guy"

*"If you have these patterns that are visual patterns for the concepts you are teaching and then you teach in a way that integrates the subject matter because when you are learning in life things overlap."* -Madlon Laster, Author of *Teach the Way the Brain Learns*

*"So if choice making and narrative and adventure can be part of math, or a project that has mathematical steps to come to an outcome, that's what matters, so math will actually matter to a child"* – Todd Wynward, Co-founder of Roots & Wings Charter School

*"You don't have to have toys and Legos and props to have a virtual environment. You need a good story that has characters and plot and a setting and dialog, all the things you expect your students to have when you ask your students to write a creative essay. All the things that suck you into a novel, when you're reading – you need to have in your math."* – Dr. Stephanie Owens, School Designer Consultant

*"If we're going to affect any change in society, it's going to come in education. It's going to come from the teacher. Teachers are the only profession where you actually touch the lives and souls of kids."* – Miriam Kim, Principal of Tesis Math and Science Academy.



### THE FILM TEAM

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#### **Scott Laidlaw, Writer, Director & Producer**

Dr. Scott Laidlaw developed story-based, math games that became the focal point of his middle school curriculum. As CEO and Co-Founder of Imagine Education, Laidlaw is bringing his games forward to new technologies with an underlying pedagogy based on human learning and imagination. While new to documentary filmmaking, Laidlaw is a natural storyteller.

#### **Jennifer Lightwood, Writer, Director & Producer**

Jennifer Lightwood, CPA, CMA, Executive Producer and Co-Founder of Imagine Education, brings over 18 years of diversified management experience in finance and business in high tech companies. She is dedicated to transforming educational thought and programs through multi-media technologies and believes film is one of the most powerful mediums to create change.

#### **Alex Usatine, Cinematographer & Editor**

Alex Usatine is the owner of High Desert Digital, a high quality video production company. Usatine specializes in professional videography, dynamic editing and industry-level color correction.

#### **David Aubrey, Cinematographer & Editor**

David Aubrey, owner of Lightningwood Pictures, brings 28 years of experience in features, television, documentary, educational, commercial, promotional, art and interactive film and video. Aubrey received an American Cinema Editors Nomination for Best Edited Documentary for *Baraka*.

#### **Hagoth Aiono, Cinematographer**

Hagoth Aiono is a freelance artist, musician and filmmaker. He is also the Creative Director at Royce Entertainment Group.

#### **Larry Finn, Lead Artist**

Larry Finn is a well-experienced web developer supporting *Ko's Journey* and co-owner of Cube 2 Media. Finn provides full scope consultation from design to programming in a multitude of technologies.

#### **Elizabeth Haidle, Concept Artist**

Elizabeth Haidle is a professional artist bringing a vintage modern and elaborate minimalism style to complex thought designs.

#### **Artatom, Animations & Music**

Artatom is a multi-media production company specializing in psychologically based designs through focused storytelling.

#### **Kirry Nelson, Music**

Kirry Nelson is a professional songwriter, singer and guitarist. She created "Ooh Ah Ooh," in her first album, *Storybook*, and offered it as the title track song in *The Biggest Story Problem*.

#### **Ed Dillon, Music**

Ed Dillon is a guitarist of many compositional styles, active music transcriber and music educator. He composed the entire score for *Ko's Journey* as well as contributed music to *The Biggest Story Problem*.

#### **Kate Martin, Assistant Producer**

Kate Martin is the Production & Support Coordinator for Imagine Education. Kate is also a film student and professional actress. She stars in *Ko's Journey's* unprecedented bridge curriculum videos that transfer game learning to standardized tests.

#### **Martha Riecks, Co-Producer**

Martha Riecks is a grant writing consultant and Director of Communication & Outreach for Imagine Education. She has spent over a decade in the nonprofit sector, developing a strong background in environmental outreach, experiential education and STEM programming for girls, in diverse roles within a range of organizations.

## PRODUCTION NOTES

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Much of Scott Laidlaw's career has been dedicated to finding a way to teach math in a way that reaches his students and guides them to proficiency. As a natural storyteller, he developed story-based games that became the centerpiece of semester-long math curriculums. His efforts were compelling. Scott found that his students who were engaged in game experiences over a four-year period informal review were 82% more likely to score in the proficient category on state tests compared to their peers. More captivating was the response from his students best told in a true story from Rio Gallinas, a New Mexico public middle school, during a pilot test of one of Scott's games:

*"A student **broke** his arm on the playground – I don't mean a small break – it was **a compound fracture**. It was just kind of hanging there, so we had him **call his parents** to meet him at the hospital and he got on the phone...I was standing there, and he said, "Can you wait to go there at 10AM... **after math class?**"* – Sean McLean, 7<sup>th</sup> Grade Math Teacher

Five years later, with Scott's former students still recalling how they learned math, the deeper understanding of teaching math through story was realized. Scott teamed with Jennifer Lightwood to co-found Imagine Education and build a first-of-its-kind online story-based game called *Ko's Journey*. Jennifer took the leap of faith to leave the corporate world as Vice President of Finance to follow her passion to make a difference in education. Without knowing, it would lead to her following another lifelong dream of making a documentary film about a subject close to her heart: looking at how our relationship with math affects our relationship with money, which may be a major cause of the financial global crisis today.

Soon after, Martha Riecks joined the small team to not only help co-author a winning grant with Next Generation Learning Challenges, but stayed on to meet the grant's milestones including a documentary of the pilot program of the *Ko's Journey* program in 10 low proficiency schools across the nation. To build the film, the internal team sought the expertise of New Mexico filmmakers, David Aubrey and Alex Usatine. With David and Alex on board, Imagine Education recruited several of the talents behind the making of *Ko's Journey* including seasoned artists Elizabeth Haidle, Larry Finn and Artatom.

The initial scope of the film was to document the progress of two pilot schools along with an exploration of the U.S. math crisis. The project quickly grew to include all 10 pilot schools without knowing whether they would have successful pilot implementations. Inquiries to interview national educational experts and reformers were met with incredible enthusiasm and support. The film also expanded beyond the borders of the U.S. to send Scott and Alex to Finland to find out why this country is continually outperforming other students from around the world in math.



Interestingly, many of the findings in Finland aligned with the pedagogy that Scott reveals is behind *Ko's Journey* and perhaps behind the biggest problem in education itself: ***"The biggest problem in education is the giving of answers to questions that have not yet been asked."*** – Arthur W. Combs

A wonderful gift during post-production was locating footage of Dr. Arthur W. Combs. Dr. Combs was Scott's doctoral professor from the University of Northern Colorado. Dr. Combs' observations of the issues in the U.S. education system from well over 20 years ago are still incredibly relevant today.



### ABOUT IMAGINE EDUCATION

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Imagine Education is founded on the idea that pretend play and storytelling, perhaps the oldest architectures of human learning, can transform student attitudes, improve test scores and establish a solid foundation for future learning. Through immersive environments, from multi-media platforms to live forums, Imagine Education uses the power of story to create dialogue and experience to facilitate a paradigm shift, resulting in systematic change. Scott Laidlaw, Ed.D. and Jennifer Lightwood, CPA, blended the worlds of education and business in 2009 to establish a dynamic organization that is capturing, and sharing, the big stories in education.



[www.imagineeducation.org](http://www.imagineeducation.org)

### ABOUT KO'S JOURNEY

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*Ko's Journey* is a 12-hour middle school math game that gives purpose and meaning to the subject for life. Through a rite of passage approach, students experience math aligned with Common Core State Standards in a context that is relevant and meaningful to them. *Ko's Journey* was one of 19 projects chosen from a highly competitive field of finalists as part of the NGLC Wave II Challenge, named winning Academic Gaming Solution in the 2012 EdTech Digest Awards and received the People's Choice Award in the 2011 Joan Ganz Cooney Center's National STEM Video Game Challenge.



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

### PROJECT FUNDING

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Next Generation Learning Challenges (NGLC) is a collaborative, multi-year grant program aimed at dramatically increasing college readiness and completion through applied technology. The initiative brings together an active community of innovators and educators committed to driving next generation learning forward to dramatically improve college readiness and completion in the United States. The initiative is funded by the Bill and Melinda Gates and the William and Flora Hewlett Foundations.

[www.nextgenlearning.org](http://www.nextgenlearning.org)



### PILOT PROJECT SCHOOLS

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The nationwide *Ko's Journey* pilot program, supported by the Next Generation Learning Challenges Program, included the following schools which are featured throughout this film:

1. **Florida Virtual School** – Orlando, FL  
*Featuring Jeramy Gatza, Brian Greer, Alicia Slater, and Julie Young*
2. **Gila Vista Junior High School** – Yuma, AZ  
*Featuring Brian Azriel and Kourtnee Klupacs*
3. **Hollenbeck Middle School** – Los Angeles, CA  
*Featuring Emily Jaffe, Jorge Reyes and Ruben Escobar*
4. **IS 30 Mary White Ovington School** – Brooklyn, NY  
*Featuring Robert Agoglia, Sharline Bryan and Thiessen Charles*
5. **Kirtland Middle School** – Kirtland, NM  
*Featuring Cherlynn Lee and Shawna Yager*
6. **Questa Junior High** – Questa, NM  
*Featuring Bill MacDonald*
7. **St. Andrews Middle School** – Columbia, SC  
*Featuring Kathy Haupt*
8. **Telesis Academy of Math & Science** – West Covina, CA  
*Featuring Cynthia Alvarez, Cristina Canales, Janet Chong, Miriam Kim and student Salma Diaz*
9. **Thurgood Marshall Middle School** – Los Angeles, CA  
*Featuring Asmara Ogbai and student Chloe Owens*
10. **Tse 'Bit' Ai Middle School** – Shiprock, NM  
*Featuring Marjorie Hulsey and Doroteo Amora*



### DISTRIBUTION

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The film will be completed in July 2012. Initial distribution efforts will be directed to schools and educational professionals, alongside screenings and dispersal at national and regional educator conferences. While math teachers and administrators represent the primary target market, *The Biggest Story Problem* has a general audience appeal to all teachers and parents of students of any age as well as documentary enthusiasts concerned with educational issues.

Imagine Education is seeking underwriting to help support our efforts to reach schools and educational professionals. With film production supported by the Next Generation Learning Challenges grant, we are now looking to distribute professional development copies as an effort to reach every public middle school in the United States.

To pledge support for this distribution initiative, go to [www.thebiggeststoryproblem](http://www.thebiggeststoryproblem) or see out project at Kickstarter: <http://www.kickstarter.com/projects/1923314699/1146234773?token=87f13f95>.

## EXTENDED CREDITS (FILM END CREDITS)

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Written & Directed by	Scott Laidlaw Jennifer Lightwood
Cinematography by	Alex Usatine David Aubrey Hagoth Aiono
Editing by	David Aubrey Alex Usatine
Narrated by	Scott Laidlaw
Art	Larry Finn Elizabeth Haidle
Animations	Artatom
Music	Kirry Nelson Ed Dillon Artatom
Assistant Production by	Kate Martin
Co-Producer	Martha Riecks
Produced by	Jennifer Lightwood Scott Laidlaw
Funding Awarded by	Next Generation Learning Challenges
Featured Interview (in order of appearance)	Dan Goldstein Todd Wynward Margaret Bartlett Stephanie Owens Kevin Simpson Gladys Graham Keith Devlin Marilyn Burns Alfie Kohn Madlon Laster Ann Shannon Julie Young Hannu Kosonen Meikku Kankaanpää Jukka Gustafsson
Ko's Journey Team	Scott Laidlaw Jennifer Lightwood Ken Moore Bob Hanson Larry Finn
Additional Cinematography	Christen Marquez, Paradocs Productions Scot Davis, Sage Film & Video Kevin Burroughs, KeyLight, Inc. Benjamin McElroy, McElroy Films

Aaron Johnson, Pretty Penny Productions  
Quenell Jones, The Right Eye, Inc.  
Adam McAllister, Adam McAllister Photography

Field Soundmixers      James Becker, Lightningwood Pictures  
Ashley Blewer, Pretty Penny Productions  
Brad Flick, Paradocs Productions  
Brian James, KeyLight, Inc.  
Alika Jade Miller, Sage Film & Video

Additional Editing      James Becker

Assistant Editing      Kate Martin

Story Consulting      Alex Usatine  
David Aubrey  
Larry Finn  
Kate Martin  
Christen Marquez  
Hagoth Aiono  
Martha Riecks

Colorist      Alex Usatine

Sound Design & Mix      David Aubrey

Voice for “Top Ten in Finland”      Alex Usatine

Voice For Finnish Translation      Kate Martin

HD Conversion &  
Mastering      Alex Usatine

Trailer      Kate Martin  
Alex Usatine

Poster & Graphic Design      Elizabeth Haidle  
Larry Finn

Website Design &  
Programming      Larry Finn  
Bob Hanson

Permissions &  
Clearances      Martha Riecks  
Kate Martin

## **Pilot Schools**

### **Florida Virtual School**

Orlando, Florida

*Featuring Jeramy Gatza, Brian Greer, Alicia Slater, and Julie Young*

### **Gila Vista Junior High School**

Yuma School District One, Yuma, Arizona

*Featuring Brian Azriel and Kourtnee Klupacs*

### **Hollenbeck Middle School**

Los Angeles Unified School District, Los Angeles, California

*Featuring Ruben Escobar, Emily Jaffe and Jorge Reyes*

**IS 30 Mary White Ovington School**

New York Department of Education, Brooklyn, New York

*Featuring Thiessen Charles, Sharline Bryan and Robert Agogli*

**Kirtland Middle School**

Central Consolidated School District, Kirtland, New Mexico

*Featuring Cherlynn Lee and Shawna Yager*

**Questa Junior High**

Questa Independent School District, Questa, New Mexico

*Featuring Bill MacDonald*

**St. Andrews Middle School**

Richland County School District 1, Columbia, South Carolina

*Featuring Kathy Haupt*

**Telesis Academy of Math & Science**

Rowland Unified School District, West Covina, California

*Featuring Cynthia Alverez, Cristina Canales, Janet Chong,*

*Miriam Kim and student Salma Diaz*

**Thurgood Marshall Middle School**

ICEF Charter Schools, Los Angeles, California

*Featuring Asmara Ogbai and student Chloe Owens*

**Tse'Bit'Ai Middle School**

Central Consolidated School District, Shiprock, New Mexico

*Featuring Doroteo Amora and Marjorie Hulsey*

**Animation References**OECD Math Scores and Global Rankings

Program for International Student Assessment (PISA)

Organization for Economic Cooperation and Development (2001 to 2009)

Spending per Student in the OECD

Education at a Glance 2009: OECD Indicators

Organization for Economic Cooperation and Development (2009)

Textbook Length

Personal Observation

Scott Laidlaw, Martha Riecks and Nizhoni Betley (2012)

Rewards

*Motivation to Learn: From Theory to Practice*

Debra Stipek (1988)

*Extrinsic Reward Research*

Lepper, Greene & Nisbett (1973)

Spiderwebs

*Teach the Way the Brain Learns: Curriculum Themes Build Neuron Networks*

Madlon T. Laster (2010)

Memorization

*Learning Mathematics for Life: A Perspective from PISA*

Organization for Economic Cooperation and Development (2009)

## Archival Sources

ABC News

CBS News

NBC News

Blue Sky

Shutter Stock

Classroom stills, classroom footage and video from the original *Ko & Piracy*  
Courtesy of Roots and Wings Community School

*Ko's Journey* concept art by Elizabeth Haidle & Aaron Johnson

*Maintaining Classroom Discipline*, McGraw-Hill

Arne Duncan Interview, courtesy of NBC News

Math Class (A Silent Film), courtesy of Jordan LoNigro

Footage of Arthur W. Combs, © and courtesy of The Field Psych Trust

## Songs

*"A Kind of Distance"*

*"Olympia"*

*"Absolute Shadow"*

*"Mechanical Botanical"*

*"April Showers"*

*"Funky Groover"*

*"Leg Bones"*

*"Investigations"*

*"First Light"*

*"Kaleidoscope"*

*"Canine Capers"*

*"Exodus"*

*"The Great Journey"*

*"They Only Come Out At Night"*

*"Theory of Time"*

*"Dark Roads"*

*"Dreams on Spec"*

Written, Performed & Produced by Simon Wilkinson

thebluemask.com

Used With Permission

*"Mechanical Botanical"*

Written, Performed & Produced by Aaron Simon

Courtesy of Aaron Simon

Used With Permission

*"Education"*

Written & Performed by John Judd

audiosparx.com

Used With Permission



*"Why"*

Performed by Ben Selvin with Roof Garden Orchestra  
archive.org  
Used With Permission

*"Ko Begins"*

*"Derv"*

*"Compass Navigation"*

*"Excitement Edwin"*

*"Fear Edwin"*

Written & Performed by Ed Dillon  
Produced by Imagine Education

*"Flower"*

Written & Performed by Maryann & Michael Tedstone  
Courtesy of Music Beyond, LLC.  
Used With Permission

*"Crime Lab"*

*"Awareness"*

Courtesy of Associated Music Production  
Used With Permission

*"Where Did You See Me?"*

Written, Performed & Produced by Adrian Williams  
Used With Permission

*"Weather Vane"*

Written, Performed & Produced by Mark Thompson  
Used With Permission

*"Theme 1"*

*"Theme 2"*

Written & Produced by Artatom  
Used With Permission

*"Mechanics in Love"*

Courtesy of boomaga  
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*"Strum"*

*"Nylon"*

*"Inspiring Acoustic"*

*"Heat to Heart"*

Courtesy of Soundcloud  
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*"Ooh Ah Ooh"*

Written and Performed by Kirry Nelson and the Parlor Street Band  
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*In Memory of Dr. Arthur W. Combs (1912-1999)*

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