

# EdTech Mindset

your must-have educational guide to the future

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**2016**

EDUCATIONAL  
CHALLENGES

**Nicholas Negroponte's  
STRONG WORDS**

about the future  
of education

Tonee Ndungu,  
Kenya-based entrepreneur,  
wins the Global EdTech  
Startup Awards 2015 →

**2015**

WITNESSES  
the **TECH  
GIANTS'  
ASSAULT**  
on education

STUDENTS'  
**INTERNET  
CULTURE**  
*CREATING WAVES*  
of **EDUCATIONAL  
DISRUPTION**



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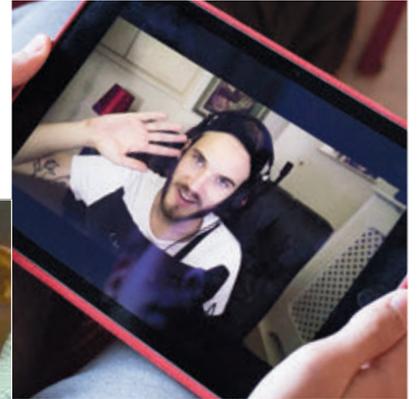
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# The Editorial

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The year 2015 has been a very exciting one for education, with the embracing of digital technology, internet culture and the unstoppable global entrepreneurial movement. Whether this is the result of an evolution, revolution, disruption or simply survival, it is a matter for a deeper debate (one that is, actually, floating around most educational forums). This issue brings a few examples through the voices of leading experts and leading companies that wonder about the challenges these rapid and uncontrolled changes bring to the future of education.

The tech giants have strongly bet on education, radically changing the market and provoking a severe "headache" within the publishing companies that have owned and controlled this market up to now. LinkedIn narrows the gap between learning and employment when it acquires Lynda.com. Facebook offers education software for K-12. Google finally shares its machine learning technology. Intel targets the gender imbalance in STEM subjects. These are only a few examples that indicate the significant entry of these powerful companies into the educational market, as a whole!

Students' loss of motivation has surfaced as the main problem for educators, especially when their motivation and interest sharply flourish as active internet users and active internet creators. The inability of the educational system to overcome this problem brings into question its role in preparing the next generation within a fast-moving society. The exploration of internet culture and of active learning strategies, such as YouTubers, Reddit or Maker Spaces, is guiding the way to new pedagogical approaches.

Finally, the power of connectivity is allowing for global EdTech alliances, showcasing entrepreneurial initiatives from different corners of the world, as well as helping strengthen local EdTech ecosystems. Hopefully, this will empower startups from regions not usually under the spotlight of advancement, such as the example pictured on our cover, an entrepreneur from Kenya who won the Global EdTech Startup Awards 2015!



I hope you enjoy and get inspired,

Dr. L. Cecilia Waismann



# Nicholas Negroponte

“Absent a student’s deeper understanding and general ability to learn, the educational system is veritably creating idiot savants”



**Professor Nicholas Negroponte** a visionary, founder of the MIT Media Lab and One Laptop per Child, among other initiatives, he pushed the edge of the information revolution as an inventor, thinker and angel investor.

What is the biggest challenge educational systems are facing today, from your point of view?

>> The biggest challenge for any educational system is to understand the difference between teaching and learning. Said differently: does knowing something mean you understand it and, by extension, have also learned to learn? Absent a student’s deeper understanding and general ability to learn, the educational system is veritably creating idiot savants.

To me, the root of educational problems can be found in the concept of competition and its operational companion, testing. An education system without testing would be a supreme step forward. The best measure of accomplishment is self-evidence.

Did any specific event or trend, in 2015, strike you as a game changer to the future of education?

>> Sadly, I saw more steps backwards than forward in 2015, particularly because the venture capital community has discovered “ed tech” as a commercial opportunity, which furthers the dog-eat-dog atmosphere that has pervaded many countries (like the USA) to such an extreme that capitalism is confused with democracy (people start to use the words interchangeably and others consider socialism to be unpatriotic). Go figure.

In the USA, the biggest problem with public education is private education, as it sucks out the very forces that could otherwise change it. That said, we have an even bigger problem in the USA. That is that public education is primarily funded by local real estate taxes, which



is a really stupid form of inequity and has also created 13,500 independent school systems.

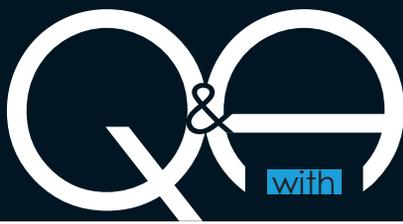
So far educational technology did not succeed in revolutionizing the educational system. Do you think this is about to be changed? Do you think the educational system is ready to prepare the professionals of the 21st century?

>> Educational technology has not revolutionized the educational system, but sure has changed how we learn out of school.

Imagine the world 20 years from now when today's 2-year-olds are 22-years old. They will have only known a world with which they can interact and control. They will expect the tight feedback loops that come from asking questions and getting answers. They will have never been told the answer: "Because that's the way it is."

Lastly, let me say that I think the least important question about an educational system is about its preparation of professionals. This is partly true because there will be professions (if the word exists) that engage students subjects and fields about which we know nothing today. Work twenty years from now will be different. Jobs may be fewer in the sense of capital J, because a) robots do them, and b) the line between work and play becomes porous (not just for the rich and well educated).

A little red flag goes up in my head when I think of professional preparation. This is not to say skills don't matter. But for at least the first ten years of education they play an insignificant role by comparison to such simple things as passion, curiosity and perseverance.



Alan Lesgold

# Preparing a generation to cope with complexity and rapid changes

Is the educational system ready to prepare the professionals of the 21st century?

>> Universities around the world are moving slowly but in the right direction. We probably need to move more quickly. For a long time, education was something that occurred within coherent communities and did not change substantially from one generation to the next. As a result, most people considered themselves to be experts, since we all went to school and the school we went to was very much like that our parents attended.

Now, we live in a period of rapid change. Not only do schools need to teach different skills and content than before but they also need to prepare students for a very different life, one where change is continual and sometimes unpredictable, where we are swamped with information that has not been filtered in any way, where information comes continually in smaller pieces than the books and other print media of earlier times, and where life is complex because of the number and geographical distribution of participants in many activities: manufacture of goods, generation of environmental problems, altering extant patterns of human migration, etc.

Because we get information instantly, we often see unexpected results of



Professor Alan Lesgold | Educational psychologist, Professor of Psychology and Dean of the University of Pittsburgh School of Education

our complex world long before we can understand why they happened. As a result, people often mistrust leaders and governments – bad things happen and we need to blame someone. Preparing a generation to cope with complexity and rapid change and to receive information with care and analysis is a huge challenge, but that is what we must do if we are to maintain societies where everyone participates in making things work out well.

Currently, we see increased economic gaps between rich and poor. The number of wealthy people tends to be small, and that allows the privileged to work together to make simpler decisions about activities and procedures that affect everyone – without the less wealthy being involved in deciding. Today, in reality, we deal with the complexity of large scale society by limiting influence and access to a small elite. The paralysis of the Congress in the U.S. represents a recurring situation. The frustrated elect representatives who end up in conflict because each represents only a narrow and incomplete viewpoint. To change this so that all can participate in social decision making and in a decent life will require huge changes in our education system.

We have barely begun to change how we prepare education leaders, and as we prepare them for a more complex society, they will need continually to experiment with changes in schooling that can prepare all children for a decent life. That is the real educational challenge of our times.

Which technology holds the strongest potential to impact education significantly?

>> We do know a little bit about

complexity. For example, Dietrich Dörner wrote a great book describing how people fail to adapt well to complexity (Dörner, D., 1996. *The logic of failure: Recognizing and Avoiding Error in Complex Situations*). Largely, this is because they get no practice in handling it. But, the very method Dörner used to demonstrate human weaknesses in handling complexity also contains the key to better education for modern life. He used simulations in all of his studies. Those simulations were very simple in a sense. They did not have fancy graphics or realistic visual imagery. But, they worked for their purpose.

Today, visually compelling simulations are quite readily created. Each summer in the U.S. and some other countries, high school students attend “camps” in which they are taught how to design extremely intriguing games. So, by the time they enter college, they are quite able to design simulation environments that are very compelling. While currently they channel their energies to production of fantasy games, they could as easily be producing simulation environments in which students can experiment with ways to deal with social complexity or learn how to isolate the likely causes of disastrous outcomes in complex systems, skills that will be needed in the future. If all students got experience dealing with complexity in such games, they might be better equipped to deal with modern life in ways other than ignoring everything except for one simple idea they happen to understand.

So, at least when we consider the talents of young people in the gaming world, we have the resources to produce many simulation environments in which students can practice dealing with complexities. One kind of complexity involves actions in the physical world. An example is the collection of causes related to global warming, for example, as well as the incentive and belief models that prompt some of the behaviors that

result in climate change. When simply learning all of this through didactic, students tend to pick one or another simple principle and to ignore all of the social complexities of a world in which those who are rich got that way partly by warming the globe and those who are poor see no reason why they can't do the same thing.

School has always been, in part, a rehearsal for life. In the middle of the 20th century, students rehearsed following instructions and producing work on demand. Today, they also need to rehearse digging deeper to understand situations that are not as simple as the unprepared mind would like them to be.

[How do you see the future of instruction in educational settings?](#)

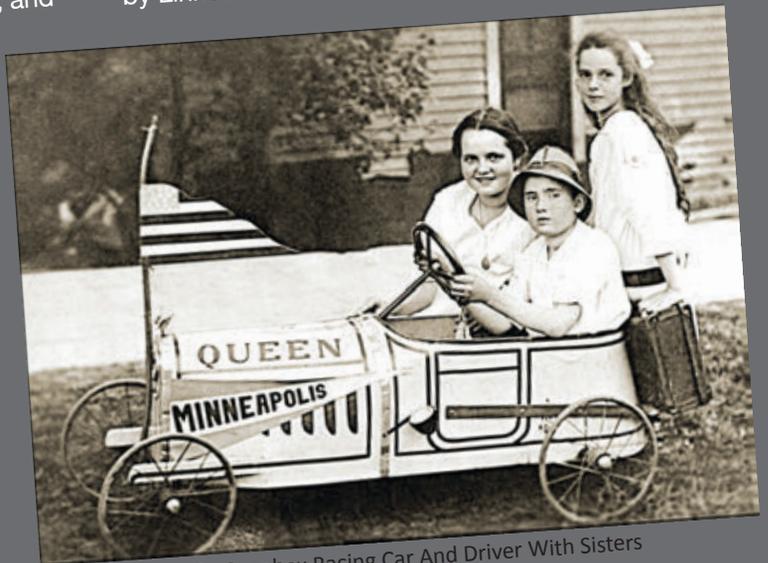
>> As I have suggested above, one possible future is to have more game-like simulations that allow students to explore complex relationships and complex social situations. Another piece of the future of education may involve efforts to help students evaluate the masses of information that they encounter. One could imagine learning environments, for example, in which students are asked to search out and evaluate information on everyday topics such as whether children should use calculators in math class or whether people should change their eating habits to consume less salt (both questions have answers that are not simple). Students need opportunities to learn that ignoring data one disagrees with or does not completely understand is not generally a good plan. They also need to learn that while journalists feel compelled to present all opinions they learn about, this does not mean that all opinions are of equal value. This too requires practice, but in a world rich in computational resources and information access, such practice certainly can – and should – be provided.

# Why might LinkedIn's acquisition of Lynda.com also be a seminal event for the K-12 world?

In January 2015, Lynda.com, a veteran player in the field of online courses, received an investment of 186 million US dollars. For Lynda, which had grown up as a family company, and had brought in its income in an organic manner, the entry of investors into the company was an extraordinary event. For the developing EdTech industry this was a major investment, yet it paled in light of an even more dramatic development that took place when, in April, LinkedIn announced the acquisition of Lynda.com for the incredible sum of 1.5 billion US dollars. There is no doubt that this was a dramatic event in the ecosystem of EdTech investments, and it is undoubtedly also a dramatic event in terms of platforms for employment training. What is harder to discern at first glance is that, apart from these two areas, it is also a seminal event for the K-12 field. To explain why, we first need to understand the considerations that, apparently, lay behind this acquisition.

One of the challenges that has been of concern to training organizations from time immemorial has been the gap between the world of training and the world of employment. We constantly hear of how universities are disconnected from the employment market, and how schools do not prepare us for the "outside world." The problem of the relevance of training becomes even more acute in our own age, in which the employment market in the "outside world" is

changing at a rapid pace. For schools to really be able to prepare us for such a market, they have to orient themselves toward a market in which many professions do not yet exist. Given this challenge, the connection between LinkedIn and Lynda offers an interesting potential: one could imagine how the connection between these two companies would create a kind of closed system in which there is no boundary between the world of training and the world of employment. Through the network offered by LinkedIn, a potential employee can aim at the



Vintage Photo of a Soapbox Racing Car And Driver With Sisters

specific employer for whom he wishes to work. Through Lynda, he can assemble for himself the exact training he requires in order to get himself hired. The employer, for his part, can obtain exact



by **Avi Warshavsky** | CEO of MindCET EdTech Innovation Center, writer, expert, founder and pioneer of various ground breaking education technology products/services as well as international cooperations

An opportunity opportunity to narrow the gap between learning and employment through the non-consumers of the educational system



data on what the candidate has learned: What did the course that he took actually cover? What was his final grade? And where did he rank in comparison with other students?

**In this unique LinkedIn-Lynda universe, there is no gap between learning and working.**

Such a shift poses a certain threat to academic training – there are employers who would prefer a software person who can point to completion of specific courses, such as PHP programming, over a general degree in software engineering which does not reveal exactly what the student was trained in. It may well be that the efficiencies offered by this union (as well as other developments in the field of online training) will, over time, lead to a transition by students from the institutionalized academic world to the world of LinkedIn.

However, we can potentially take this further: let's imagine that our potential employee is a high school student. What will convince such a student to remain in school when, only a click away, there is a domain that offers learning that is aimed directly at the world of employment?

Such a vision is not as unrealistic as it sounds. And unlike the celebratory tone of what we have written so far, this is not necessarily a positive scenario, for three important reasons:

1. School is not intended solely to prepare us for the "outside world." It has many other functions, with outcomes that we would find it difficult to obtain from Lynda courses.
2. There is also something problematic about too great an efficiency. An important part of the process of adolescence involves bewilderment, functioning inefficiently, and activity that does not directly lead to a precise outcome.

3. It is doubtful whether it is truly possible to prepare us, completely and exactly, for a world of employment in which 10 new professions are born every five years.

**Effective training, in this sense, needs to provide broad tools, tools that offer flexibility, ongoing learning and behaviors that will allow the individual to adapt to a changing world.**

Six decades of technological education have not brought about a substantial change in the education system. The technology that has disrupted almost every field and industry around us has not led to significant changes in the education system. Educational technology has always been a phenomenon that remained subject to the constancy of the school experience, and which was not in a position to propose an alternative to this system. The creation of the "LinkedIn-Lynda universe" perhaps portends a disruptive revolution – for the first time there is a phenomenon which, as in Christensen's disruption theory, may begin with non-consumers of the education system, but will gradually move to the audience that constitutes the education system's principal client – young students. The entry of a such an alternative carries within itself a threat to schools and to the values that they represent, as well an opportunity for those institutions to change from the ground up, in order to respond to this challenge.



# Like

WHEN EDUCATORS  
AND ENGINEERS  
TEAM UP:

# facebook

TAPS INTO

# PERSONALIZED LEARNING

I can assume that most of the readers of this article are using Facebook. Whether you are the around-the-clock-on-every-device user or the "I check in once a day to see if there's anything interesting" kind, you probably realize that Facebook "knows" you.

It knows you because it collects information on you – some of it is information you actively, willingly and knowingly provided, during your sign-up process and since then, but most of it through the

tracking of your "actions" on the Facebook platform: what do you "like", what do you "share", which groups you are part of, which pages you visit, which videos you watch, which friends you approve and which friends you block, how much time it takes you to respond to a chat request – the number of data points that build your "profile" at Facebook's servers is mind-blowing.



**Gilad Nass** | Director of Marketing and Content at MindCET. He is an analyst and specialist on technology and media.

As educators (or parents), we often fantasize about the “holy grail” of education: personalized learning. Wouldn’t it be more effective if instead of treating each student exactly as every other student (at every age), teaching everyone at the same pace and the same curriculum, we would be able to know exactly what he or she already knows (even if they can’t articulate it themselves), understand how fast can they understand and store new content, and forecast their progress along the way so we could prepare and apply a personal learning path for them?

## TEACHERS BECOME TRUE MENTORS

Well, this is exactly what Mark Zuckerberg, founder and CEO of Facebook, is actively supporting, both financially and technologically. In a post he wrote on Facebook (where else?) on September 10, 2015, Zuckerberg wrote that “...When technology is tailored to students’ needs, it frees up time for teachers to do what they do best -- mentor students”.

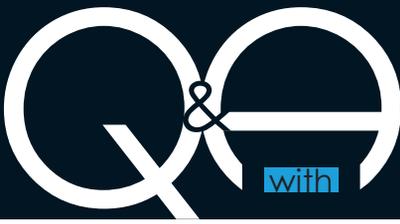
Zuckerberg went on to highlight the activity of Summit Public Schools, a California and Washington-based network of 11 schools, founded in 2000 by parents who wanted to create a better way to prepare their kids (and others) for college and university. Facebook and SPS have formed a partnership, which Zuckerberg described as “educators and engineers team up”, building the “Personalized Learning Platform”, or PLP. This platform will be separate from the Facebook platform, and privacy is regarded at the highest standard. It is still unclear how this platform will work, but it is a good example of utilizing private and commercial technology within the public sector (even if the public sector will get it only after the private sector used it first).

## AN ALTERNATIVE SCHOOL

This isn’t Zuckerberg’s only (or even first) foray into personalized learning: earlier in 2015 he joined as an investor in Altschool (as in “Alternative School”), a network of schools founded by ex-Googler Max Ventilla. Altschool doesn’t use the traditional mechanism of dividing the kids by classes and the day’s structure by “lessons”, but rather uses a central learning space for all the students, where they can each follow a personalized “path” prepared for them by the teachers. That system relies heavily on technology (developed in-house), which assesses the student’s knowledge and progress, and enables the teacher to prepare customized lesson plans for each student. Altschool is privately run, costs about \$21k a year for each student, and has raised over \$130m from big-name tech entrepreneurs and VCs (including Zuckerberg). While it is run like a start-up (so it has a business plan), Altschool’s founder claims that he wants to share Altschool’s tools and methodology with more schools in the future for free.

Facebook’s interaction with the education world started even earlier, and a few years ago the company worked with educators in the U.S and U.K to create a sort of guideline which would both encourage and educate teachers on the benefits of using Facebook in the classroom. This guideline was mostly focused on using Facebook as a communications platform, and how to deal with possible issues that arise when presenting kids with access to a fairly unsupervised content platform.

The latest ventures by Facebook and its founder, however, are finally trying to utilize Facebook’s analysis technology, and not Facebook’s content platform, to enhance education. It is not Facebook’s attempt to take on Edmodo (which is pretty much marketed to its users as the “Facebook for Education”). No, this time Facebook reaches out to educators and tells them that it might be able to help them understand their students, like it understands its users.



Mariana Waksman



Mariana Waksman Education and Academic Relations Manager Strategic Partnerships at Intel Israel

# Girls & STEM can change the game for Women & Technology

What are the major educational challenges today?

>> Schools have not changed for the past hundred years at least, while the dynamics of the technological industry in the past years have changed almost every eco-system around us. The fact that children are exposed to large amount of information that can be reached instantly and a large number of technological devices that they are in contact with daily has completely changed the game, and this needs to be translated in the day to day learning experience for the children as well as in the teaching experience for educators. We need to start motivating students in innovative ways to go beyond the conservative educational models and grow skills that are needed in the 21st century such as analytical thinking, problem solving, team working and creativity. The skills that are easiest to teach and measure today are also the ones that are easiest to digitize, automate and outsource.

Is the current state of the educational systems part of the cause of the global gender gap on STEM fields?

>> It is definitely part of the cause. The educational systems as mentioned before

have not changed for so many years. The patriarchal bias is still present in the educational systems and girls are still proactively motivated by the school system to address human and social sciences and less to STEM fields. STEM subjects are still considered "masculine" and there is a need for raising awareness of the opportunities that STEM fields open to all the population (girls and boys) in the future lives of youngsters and this is a job that must be seriously addressed at a national level.

Does the gender distribution on STEM subjects affect the job market?

>> It definitely does.

The industry is short in engineering and science workforce, and this shortage is growing every year. It is said that by 2020, only in the USA, there will be 1.4M computing jobs but only 400,000 science students to fill them, and while 74% of girls express interest in STEM as a major, only 0.3% actually choose a computer science major.

The opportunity that growing the number of girls in STEM fields will open to the job market are enormous. Moreover, raising



the PISA scores of students in OECD nations by 25 points could increase the aggregate GDP of OECD nations by over 100 trillion US dollars over the lifetime of the children born in 2010 (Source: OECD). Beyond that, the nature of work is changing, different skills will be required in the industry and the gender distribution will be crucial to allow markets to be competitive.

#### Why is the HighTech industry showing interest in the gender gap in STEM fields?

>> The high tech industry need innovative leaders, the best-equipped workforce possible and different new skills and competences are demanded to maintain competitiveness and continue growing and bringing the new technologies that are the basis for our day to day living in almost every sector of life.

The gender gap is becoming a much more acute problem in this new era where employability is measured by innovative thinking and where the highest innovation has been proved to come from diverse groups when compared to homogenic groups. This is the reason why the high tech industry is actively acting to close the gender gap

that will allow for a diverse workforce in the future.

There is no gender gap in the consumer market or customers of the high tech industry, consequently there should not be a gender gap in the workforce that plan, design and bring to market products if we want to continue being competitive. Intel in Israel is working to promote STEM education for four decades already and has committed to invest 20 million NIS over four years until the end of 2016. Intel is a founder and among the leaders of "5\*2" National Initiative, an initiative that builds on the national effort undertaken by Intel and the eco-system to increase the number of strong STEM graduates from high schools. Over the past school year, 500 Intel volunteers performed a range of volunteering activities to spur the motivation for increased STEM subjects. Intel has also focused programs for girls in STEM, in the past year we reached over 1000 girls through different motivational programs to connect them with the opportunities that the STEM fields will open in their future lives, and altogether in the past 10 years Intel has reached over 250,000 girls in the country in different STEM activities.

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# DEEP LEARNING WILL TRANS EDUCATIONAL TECHNOLOGY

...TENSORFLOW -

**Google's** LATEST MACHINE  
LEARNING SYSTEM, OPEN SOURCED  
FOR EVERYONE...

(GOOGLE ANNOUNCEMENT, MONDAY, NOVEMBER 9, 2015)



**by Dr. Koby Gal** leads the Human Computer Decision-Making lab and is a member of the Artificial Intelligence Group (AIRG) at the Faculty of Engineering Sciences of Ben-Gurion University of the Negev.

At the individual level, we will be able to automatically detect which solution strategy a student is following when interacting with open-ended virtual laboratories, and to distinguish between salient activities and those representing explorations and trial and error. We will be able to provide machine generated support for students that guides and supports their learning while minimizing intrusion. We will be able to detect which students' solutions are creative, in that they exhibit behaviour that is both novel and of value, and use this information to design principles for educational software that support creative thinking in students.

Google recently announced that it was releasing the code for its Artificial Intelligence engine as publicly available to the scientific community.

# FORM

Although this may seem like a technical and mundane announcement, it is sending ripples through the technological industry worldwide.

Google's AI engine uses an increasingly powerful form of artificial intelligence called deep learning, which is capable of recognizing complex patterns in data using statistical algorithms.

Former generations of machine learning algorithms relied on humans to provide examples of the learned concept and to handcraft features to detect in the data. In contrast, deep learning methods use thousands of individual learning algorithms in parallel to analyze massive amounts of data. They are able to sort data into categories automatically, and to use these categories to construct features. These methods have been able to learn visual concepts (such as cats) from analyzing YouTube videos to recognize spoken words, to translate from one language to another, improve Internet search results, and more.

The proliferation of e-learning software in schools, the increasing use of open-ended environments in the classrooms, and the prevalence of online platforms like Massive Online Open Courses (MOOC) is providing massive amounts of data of how students interact with educational software. This provides new opportunities for using deep learning methods to improve our understanding of how students learn and personalise the educational environment to their needs.

At the group level, we will be able to build systems that support collaborative learning of several students working together to solve problems. These systems will be able to automatically recognize key interaction patterns within student groups such as confusion, signs of cognitive difficulty and impasses in communication among the students. They will be able to predict the results of different intervention strategies for alleviating these difficulties, and provide recommendations for effective intervention outcomes to teachers and educational researchers.

**We are at the dawn of an AI revolution in the field of education, brought about by the combination of two key factors: the increasing availability of massive amounts of data of students' interactions, and the ability to make sense of this data using deep learning and other sophisticated machine learning methods.**



# Are YouTubers slowly but efficiently defining new pedagogic approaches?

The sharp rise of friendly short videos as kids' mainstream media consumption and why educators should take notice



*by* **Dr. Cecilia Waismann** |  
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Psychology and an expert on  
education technology.

During the last decade, videos have been widely used as an engaging and enriching tool for teaching in the classroom. Later on, Khan Academy's success helped establish video as an instruction tool for any learning environment, starting as homework tutoring and slowly gaining credibility as an integral part of new pedagogical approaches such as flipped classroom or blended learning. Today, a new phenomenon is defining how videos could be used by educators – the YouTubers – massive success with kids ranging from toddlers up to teenagers.

YouTubers are those internet celebrities who produce “home-like” videos, mostly commenting on various subjects. They talk to the viewer as a close friend, making jokes, using very informal language, and suggesting likes and dislikes. Depending on the age of the user, YouTubers can suggest toys and playful activities for the younger viewers (the millions-making-machine for toy companies known as the unboxing videos), comment on games, inform on different subjects, or simply entertain with comic-like videos.

We do not know if YouTubers raised as a natural internet users' phenomena, or to what extent Google was behind its explosive rise in popularity. How much data-knowledge did Google acquire from kids' internet use, even before Google officially targeted kids with its educational and YouTube apps? Google published, for example,

that the kids' game “Minecraft” was the 2nd most searched topic on YouTube after “music” in 2014 – exposing a straight forward source of data on kids' internet use and a huge market potential ready to be targeted.

## Tips educators can take from YouTubers

### 1 Short videos are consumer friendly

“Short-form video” generally applies to videos that last anywhere from a few seconds to less than 10 minutes and is the hottest growth category in digital media, with an exceedingly high penetration rate among kids and teens. Research shows that the optimal video length for education is 6 minutes, and that 10 minutes is the limit at which viewer attention starts to decline.

### 2 Keep video length manageable and effective by “chapterizing” content

Many YouTubers create more than one video about the same subject, prioritizing video length as a major feature to keep it engaging and meaningful.

### 3 A friendly character is more reliable

One of the secrets of YouTubers have been their friendly approach to viewers. PewDiePie has the most subscribed channel on YouTube reaching 40 million subscribers and more than 10 billion views. His popularity is believed to come from his easy approach to the viewers, making them feel they are spending time with a known friend.

**4** *Home like settings put viewers at ease*

YouTubers have differentiated themselves by setting their videos on a home-like environment - a kid's room is where he/she feels most comfortable and free. This became especially true with the youngest generations who can bring the whole world into their private rooms through their digital devices. YouTubers have intelligently exploited the "my room" idea to engage kids. The viewers feel they have access to the YouTuber where usually only friends have access!

**5** *Kids are motivated to learn*

VSauce and Extra Credits are good examples of "serious" content being consumed voluntarily by kids. The latter (with more than 92,000,000 views) bases its content on gaming, and brings data and information not only on gameplay but on subjects such as gender imbalance, propaganda manipulation, MOOCS, Games in education, among others.

**6** *Correct language can be colloquial in order to ease knowledge consumption*

Michael Stevens (VSauce) is the most popular YouTuber with information/education-related content, producing, with other partners, a few channels on YouTube, mostly on science as well as technology, philosophy and other general topics. They have reached more than 16,000,000 subscribers and more than 1,600,000,000 views. They are careful with the language they use, keeping it very friendly and amusing, thereby differentiating themselves from most YouTubers who abuse on slang and curse words.

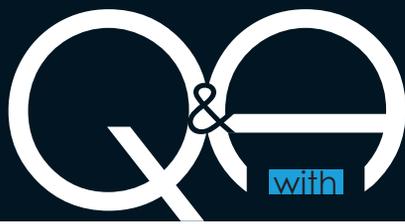
**7** *Accessibility is key*

Shouldn't learning content be available on demand anytime, anywhere, instead of keeping it chained to the classroom chair? At least three-quarters of all U.S. children ages 8 and younger, and the great majority of older kids have access to a smartphone or tablet, according to Common Sense. They mainly use it for games, social networks and YouTube, and, the younger they are the longer their screen time is spent on YouTube. Evidence suggests that tablets and smartphones have become essential devices for parents to entertain their young kids.

**YouTubers:  
a very attractive  
business targeting  
kids**

YouTubers have become the main Google channel for targeting kids as a very profitable market. Noise is being made by different media, trying to raise awareness about the manipulation and the fast-growing business being built through the popularity of the YouTuber phenomena. Variety's cover of the most popular YouTuber, PewDiePie, with a crossing out mark on top of his picture has aroused strong reactions from his millions of fans. "On camera, PewDiePie acts like he's spending time with a friend ... it was revealed earlier this month that he made \$7.4 million in 2014, the ensuing uproar prompted him to upload a video defending himself". The income of many YouTubers exposes the money-making industry behind them, and suggests that kids are victims of manipulation as they grow as a digital target market.

YouTube Kids App, launched in February, 2015 in the US, has reached more than 10 million downloads (most probably from concerned parents looking for a safe internet environment for their kids), and in November was launched in the UK, Ireland, Canada, Australia and New Zealand. Its added value is the promise of a "protected" environment, meaning - a strict selection of channels/videos and controlled user interaction. Its free use is paid for by advertisements targeting kids, which has elicited some controversial criticism about the "protection" philosophy promised by Google. In October, Google launched YouTube RED, allowing general users to remove advertisement, leading to the hope that Google may offer a similar service for YouTube kids.



Debbie Chachra

## How do we better prepare students to create the world that we all want to live in?

How do you see the future of instruction in educational settings? Is the educational system ready to prepare the professionals of the 21st century?

>> I'm not sure I want to generalize about 'the education system', as it varies widely—at different educational levels, in different countries and (as I'm acutely aware, living in the US), by location. But one way of looking at it is this: If we are not happy with the world that we live in, what can we change in education to change the world? I look around and I see issues like climate change, economic inequity, the vastly uneven distribution of rights and agency (mobility, access to education, resources) around the world and within individual cultures, and so the question we want to ask is: How do we better prepare students to create the world that we all want to live in? The answers are going to be different in each local environment, but one thing that I think is a constant is the role of motivation—students have to want to engage and succeed in school.

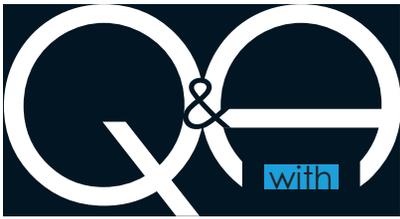
All motivation is not created equal; Edward Deci has really laid the groundwork in this field. Much of education is built around an extrinsic



Dr. Debbie Chachra | PhD and Associate Professor of Materials Science at Olin College of Engineering

motivation model ('do this because I say that you have to') or an external regulation model ('I don't really want to do this, but I know it's good for me'). But this doesn't really work for education: it doesn't foster good learning outcomes, and it often feels coercive to both students and educators. Deci also describes intrinsic motivation: that is, the inner motivation to do something, to be genuinely engaged. He argues that intrinsic motivation can be fostered through having a purpose (which is often related to community), to having autonomy, and to being able to engage in competency development (that is, getting better at something and knowing that you're getting better). For me, the classic example of this is something like learning to play guitar on weekends. There's usually a strong community aspect—the desire to play for or with other people—but you have control over when and how you learn (autonomy), and the positive effect of practice is usually clear (competency development). At least in the US and in the recent past, education has really focused on only the last of these—scaffolding student learning through increasingly complex activities—without really focusing on the first two elements. But students working with





Debbie Chachra

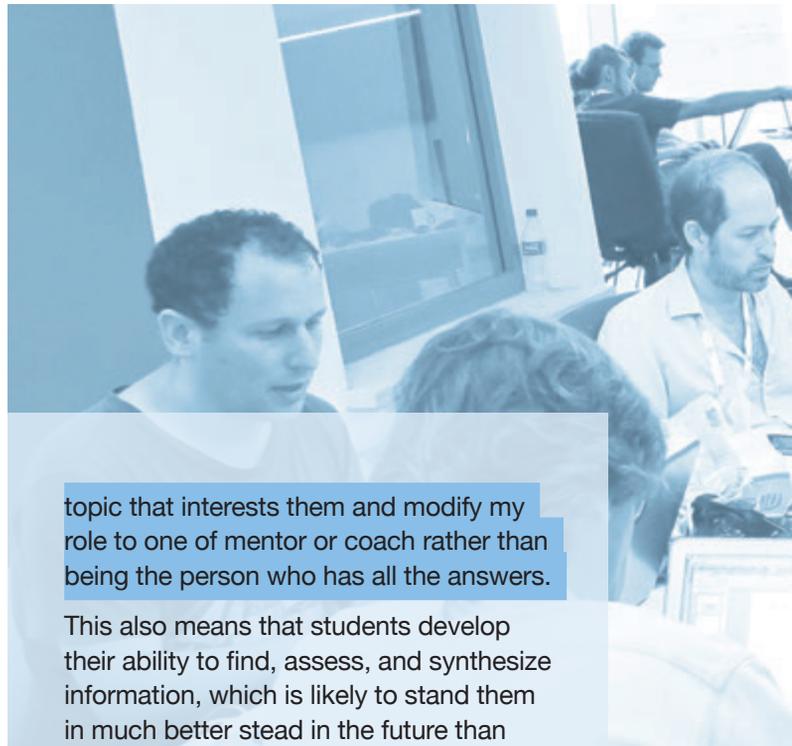


purpose, and with the freedom to choose how they work, learn better. Dan Pink, in his book *Drive*, makes the case that they also work better, and suggests retooling work environments to foster intrinsic motivation.

So we can think of a future world where learning and work are motivated by more than, 'because we say so'.

Another change that is widespread and likely to grow is access to information within the classroom. We have a model of education that is based on the instructor having all the knowledge and transmitting it to the students (think about the layout of a typical lecture hall, with all the seats focused on the spot where the instructor stands at the front of the room—the broadcast model of pedagogy is literally encoded in the architecture of many learning environments). So it makes sense to very clearly delineate what the topic of a class is: it needs to be narrowly defined, because the instructor needs to be able to control what content will be addressed in order to be sure that they have the relevant knowledge to teach students. The barrier to accessing knowledge used to be enormously high, and the only 'easy' path students had to new information was through the educator. But now, my students can access much of the world's knowledge on a handheld device without getting up from their seats.

Because the barrier to information is now so low, it doesn't make sense to limit what they do in the classroom to the topics that I know really well; rather, it makes more sense to let them pick a



topic that interests them and modify my role to one of mentor or coach rather than being the person who has all the answers.

This also means that students develop their ability to find, assess, and synthesize information, which is likely to stand them in much better stead in the future than rote learning. I recognize that we are enormously privileged to have access to laptops, smartphones, and broadband, but it's hard to imagine that accessing information will get harder anytime soon; we are on a trajectory where more and more people are getting access to the world's information, and we need to change how we teach accordingly.

#### What is the value of the maker movement to learning?

>> When Olin College of Engineering started, we knew that project-based learning--hands-on design, building and analysis--would be a big part of the curriculum (and it still is). I think that when we started it was about moving away from the engineering science model of doing analysis, with a focus on closed solutions that were the one right answer, and towards a more expansive, open-ended model. Working on projects allows students to work collaboratively; to develop their lifelong learning skills as they decide what they need to know, then find and assess information; to develop their communication skills to share what they did—all skills that have been recognized as important in the workplace, but usually considered ancillary to technical content in engineering



education. But of course,

hands-on design projects also foster intrinsic motivation: students choose to build something that is meaningful for them, they get to choose how they'll work on it, and the role of the educator is to provide them with individualized guidance and mentorship.

Ursula Franklin, in her series of lectures collected in book form as *The Real World of Technology*, differentiates between holistic and prescriptive technologies. In a holistic technology, the creator has control of the process from start to finish, making decisions as they go (the is normally what we think of when we think of the word 'artisanal'). Prescriptive technologies, on the other hand, are those where each individual contributes to the whole, and therefore they all need to work under centralized guidance (think about the assembly of an iPhone—none of the people who 'make' it have the slightest control over what they are building). The maker movement is primarily about holistic technology—the creator is making all the decisions. So project-based making both supports intrinsic motivation, and fosters the development of a raft of skills because it's typically a holistic technology. But none of these are unique to making—it's possible to design learning experiences that support intrinsic motivation and develop skills like collaboration and lifelong learning that don't involve 'making' anything. So rather than focusing on making in learning, I'd rather focus on how to foster intrinsic motivation and these broader skills across a wide variety of topics and learning experiences.

Is there significant gender challenges educators should be addressing with the newest generation?

>> My focus is on engineering education; in the US, women are woefully underrepresented in science, technology, engineering and mathematics (STEM) fields. For the last forty or so years, the focus has really been on convincing women that they should go into STEM, that they should stick with the courses, that they should tough it out in their fields to succeed. But this deficit model is just wrong. All the data suggests that women are making rational decisions about their choice of fields, because what they see is a deck that's stacked against them (Virginia Valian's book *Why So Slow?*, which focuses on gender schemas and the accumulation of advantage, delves into this in detail). No matter what women do as individuals, they can't change the environment that they're in.

So our job as educators is to acknowledge the reality of gendered environments like engineering and then collectively work on changing it. It's time to stop telling women to do things differently, and time to get everyone to step up.

And I focused on gender here, but the need to change the environment and everyone's attitudes and behaviours is even more profound for race, gender identity more broadly, sexual orientation and a host of other factors.

We need to work together to build the world we all want our students to live in.

While Reddit.com at its worst can be a dreadful place, at its best it has lessons for educators. One can see knowledge and learning assuming new shapes there.



Dr. David Weinberger | Researcher, writer, co-author of The Cluetrain Manifesto, co-director of the Harvard Library Innovation Lab

# Lessons FROM Reddit FOR Educators

STUDENTS' DISRUPTIVE WAVE

With over 170 million visitors a month, Reddit is a mainstay of Internet culture. At the site, any user can nominate a link for discussion. Users up-vote and down-vote the links, determining their relative position on the page. Users can then engage in discussions, many of them unmoderated, about the link. These discussions are organized into tens of thousands of topical discussion boards, which are themselves created by users. As a result, Reddit discussions emerge from crowds of people attracted to a topic, with few constraints, and freed of the restrictions on knowledge and learning imposed by paper.



LISBON, PORTUGAL - FEBRUARY 6, 2014: Photo of Reddit homepage on a monitor screen through a magnifying glass.

↑ [-] *Knowledge is digressive*

↓ Reddit conversations go wherever the participants want. A recent conversation about slavery in Thailand digressed briefly into a light-hearted discussion of what form of government dolphins might create for themselves, and then came

back to the topic. This is less disruptive than it might seem because Reddit conversations are threaded — replies to a comment are indented underneath it — so it's easy to skip distracting threads.

↑ [-] *Knowledge is interest-based*

↓ Reddit discussions are digressive because our interests are not easily confined to the topic at hand. When committing knowledge to paper, the price of digression is usually quite high: we have a limited amount of space to cover our topic. But online there are

no spatial limits, and because it's an interactive medium, it's easier to skip over, or hide, material that one does not want to read. So, at Reddit we see what learning looks like when we can easily pursue whatever grabs our interest at the moment.

↑ [-] *Knowledge is funny*

↓ Even in the most serious conversations at Reddit, one can count on participants to make jokes. Sometimes they're inappropriate, and often they're not particularly funny, but it seems that when

we're freed to learn together, humor and other social forms of behavior show up. Perhaps seriousness is not a property of knowledge but of knowledge's traditional paper-based medium.

↑ [-] *Credentials are not the best way to establish authority*

↓ At Reddit, people contribute their ideas and knowledge generally without announcing their credentials. This of course means that people sometimes make preposterous claims, but the culture and format of Reddit encourages the challenging of claims. The threads challenging statements can be very rewarding, with disputants clarifying their differences and bringing sources to bear. This is not to say that credentials have no place at Reddit. In one common form of conversation, a credentialed authority —

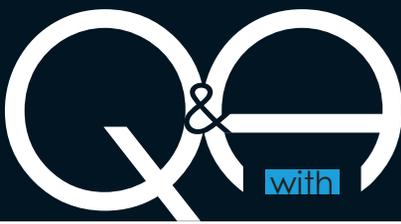
frequently a scientist — fields questions precisely because of her credentials. Even then, of course, all claims are subject to challenge and discussion. In addition, in a Reddit thread that has turned technical, participants will sometimes introduce their comment with a friendly phrase such as “Astrophysicist here.” The participants cannot tell if that claimed credential is real except by reading and probing the quality of the content itself.

↑ [-] *The world is endlessly interesting*

↓ Reddit is a big, big site with new content coming in constantly. One can easily spend hours clicking through topics and conversations. There are lessons in this: We humans have a lot to talk about.

We're interested in many different things. Almost any topic can find some set of people who share an interest in it. And we like doing so.

There are negative lessons to learn from Reddit as well: It can be puerile, obscene, sexist, intimidating or even bullying, wrong, and smug. But at its best, we not only can learn from it, it can give us as educators some hope.



## Allison Baum

“Over 300 million Chinese people learn English. More than the number of English native speakers in the U.S.”



**Allison Baum** Managing Partner at Fresco Capital, a U.S., Hong Kong and Tokyo venture capital firm

What are the opportunities you currently see in China and Japan for EdTech startups?

>> Edtech in China, Japan, and Asia generally is incredibly exciting from both an impact and an investment perspective.

When evaluating startups in the region we are particularly excited about the opportunities in 3 key areas: mobile, language learning, and cross border education.

1. Mobile - While internet infrastructure in many parts of Asia lags behind that of the US, mobile penetration is increasing at a rapid rate. Asia Pacific now has over 1 billion smartphone users and they spend countless hours per day on their devices. Content, communication, and commerce are all commonly and deftly handled over mobile phones and apps like Wechat, LINE, and Facebook. Consumers are accustomed to making purchasing decisions in the context of a handheld device. Because these habits already exist, there is an open channel for entrepreneurs to tap into.

2. Language Learning – As the Chinese and Japanese economies become more

global, there is a rapid and urgent push for improvement in English proficiency. This is happening at every level. K-12 education policy is placing a larger emphasis on English proficiency and conversational ability. In an increasingly competitive job environment, English language skills translate into not only better career prospects, but also tangibly higher salaries. At any age, the market size is compelling as there are over 300 million people in China currently learning English. That’s larger than the number of English native speakers in the United States.

3. Cross border education – There’s an increasingly competitive trend of students in Asia going abroad for university. Last year, 450,000 Chinese students went overseas for university, and that number is growing 20% every year. This is a result of an increasingly competitive local university environment as well as a rising middle class that can afford better education opportunities. Western education institutions such as boarding schools and universities also have their eye on the trend and are incentivized to recruit more and more international students who tend to pay



higher fees than domestic students. However, international students still face many challenges, including a lack of conversational language skills, visas, cultural challenges, cheating scandals, etc. This creates a lot of interesting problems for edtech entrepreneurs to solve.

**Do you find specific areas/verticals in which it seems Chinese/Japanese startups excel?**

>> Each ecosystem has its own strengths and weaknesses. Because there is a less developed edtech ecosystem in Asia, and most edtech investors have historically been focused on the U.S., it has traditionally been more difficult for edtech entrepreneurs in the region to gain access to venture capital. As such, many startups have been forced to generate revenue from day one in order to ensure their survival. In this sense, we see very creative monetization strategies from China and Japan that have enabled startups to generate cash to fuel their growth organically without relying on investment.

**What would be the best advice you can give to an EdTech company**

**interested in penetrating the Chinese/Japanese market?**

>> At Fresco Capital, our model is investing in exceptional entrepreneurs at the early stage, and then leveraging our team, network, and experience to help them build global businesses. We frequently have conversations with both our investors and our portfolio companies about when is the right time to expand to a new market and what is the right strategy to ensure it is successful.

The most important advice I can give to any edtech company looking to enter China and Japan is: Hire wisely, empower your local team with the resources they need to succeed, and invest in local relationships. Find partners that share your values and complement your strengths, and make sure you have the right structure in place so that your incentives are aligned. You will need both operational and strategic help on the ground in order to successfully manage your stakeholders, localize your product, and adapt your business to unique market conditions.

# Kytabu brings the micro-content revolution to Africa's education market

When Tonee Ndungo managed to overcome a difficult and lengthy period of studies, he wanted to help his fellow Kenyans achieve more with less, and ended up founding this year's

GESA winner

When the virtual envelopes were opened, on November 9, 2015, Kenya-based Kytabu was named the winner of the 2nd Global Edtech Startup Awards (GESA) competition. Practically unknown, Kytabu impressed the judges with its inspiring task of bringing digital education to Africa.

With Kytabu "micro-rents" education books – instead of just digitizing the content which relates to the local Kenyan curriculum, and selling entire books, users can pay for access to specific chapters for a specific type of duration. This means that they don't need to pay for a book they will only need for one year or even just a few weeks, and significantly lowers the amount students must spend to buy the needed content. The payments are made through mobile phones, and content is accessed through mobile devices (smartphones and tablets). Micro-content, or the creation, distribution and monetization of small "chunks" of content, has been flourishing in the last few years mostly in the media market, with short videos, quizzes and other content, but the education market has not yet embraced it fully. Kytabu hopes it will be one of the companies enabling that change.

We recently chatted with Kytabu's founder, Tonee Ndungo, to learn more about the path that led to starting Kytabu, and what the company does.



## From cassette tapes to tablets

Born and raised in Kenya, Tonee studied in Kenya's public schools. Because he was dyslexic, he struggled in class and recorded his own cassette tapes of books to understand his classroom lessons.

After graduating from university, six years later than his peers, Tonee decided to chart his own path, and help others who struggled in their education. In 2010, Tonee founded the NAILAB (Nairobi Incubation Lab) to accomplish his goal. The concept behind the NAILAB is to incubate and turn ICT concepts into real businesses.

In the NAILAB, Tonee helped create new applications, such as iCow, and raised \$5.5 million for the NAILAB. In early 2012, Tonee



**Gilad Nass** | Director of Marketing and Content at MindCET. He is an analyst and specialist on technology and media.

started Kytabu, where he was joined by former Safaricom senior executive Paul Mugambi (now Kytabu's CEO). Even before launching its product, the company won eight local and global awards, including "The Education application most likely to change the world in 2013" by Google, the "Citi Mobile Challenge: Best Social Impact Application for 2015" and the African Entrepreneurship Award 2015. For his work on Kytabu, Toney was selected as the 1st place startup winner of the 2013 GIST Tech-I competition.

With 86% market share for Android-based smart devices in Kenya, Kytabu obviously chose to offer its app on the Google play store first, and will later work on an iOS version. The application is targeted at tablets that are now commonly retailing at less than \$75 in Kenya. "A good number of school have adopted the devices but have been unsure about the content acquisition and applications that they can use in class. Kytabu is working to fill that gap," explains Ndungo.

## The big challenges of small money

"The general idea around renting was the economics of bulk buying and scale," says Ndungo. "We knew selling small content was not going to work with the Kenyan public. Not many people were keen to have expensive content on expensive devices, but if they could have cheap content on expensive devices, that would be manageable for them."

With this initial idea, Kytabu started working, but, like many startups, had to change course a few times. "Pivoting has been a strong point in Kytabu for three reasons," explains Ndungo. "First, we are the first in doing what we are trying to do – leasing content on mobile money is a new concept with many possible loopholes, so we have to be ready to find shortcomings and fix them fast."

"The second reason is the interaction of mobile money and content. We have seen some of this in the market, but not at the small figures we are proposing and running. The numbers are just insignificantly small, so to build a business case, we had to work on volumes, and large ones at that."

"The third thing is the system we are working with. The textbooks we are working to digitize and lease

are from the education curriculum. This means that there was already a ready market for the content, which reduces the entry level challenges that one would have with a brand new product. This allows us to take a few more risks than startups trying out a completely new concept."

## Teachers are students too

Kytabu launched in September 30, 2015, and as of late December 2015 it had about 3,000 users on its application. Ndungo believes the number will grow significantly when the schools open in January for the new school year. "There seems to be more interest within private schools and among teachers than the general public, but that is expected", he says. "Early adopters tend to be in the middle class or high dependency users that have real problems that need solutions. Teachers have to buy most of the books they use to teach, and solution that can reduce this cost burden is welcome."



Q: What would help you push Kytabu forward?

Ndungo: "Kytabu is in the market and the cost of PR and marketing is our largest concern. But the momentum is building up and we are optimistic that with the projects in Kenya pushed by the government and private sector in digital education progressing as they are, we have reason to be optimistic. The Kenyan government is investing in 2 million tablets for 6,000 primary school children, set to roll out in 2017. Kytabu is hoping to be one of the applications on the devices used by the students."

When we spoke to Ndungo in December 2015, he wasn't yet ready to raise money from investors, stating that he'd rather grow the company's user base to at least 25,000 users, and prove the business case, before raising external money. Kytabu plans to expand into Tanzania, Rwanda, Uganda and Congo, as these countries use a curriculum content which is similar to Kenya's.



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