The Chico Red Balloon Project:
Re-Imagining the Chico Learning Experience

DARPA → AASCU → CSU, CHICO

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The Chico Red Balloon Project Team

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The Red Balloon Contest

On December 5, 2009, the Defense Advanced Research Projects Agency (DARPA) Network Challenge conducted the DARPA Network Challenge (DNC), a social network mobilization experiment to identify distributed mobilization strategies and demonstrate how quickly a challenging geolocation problem could be solved by crowd-sourcing. Ten numbered, 8-foot, red balloons were simultaneously launched and moored in parks across the contiguous United States. The first person to report to DARPA the correct locations of all ten balloons was awarded a $40,000 prize.

DARPA announced the Network Challenge to mark the 40th anniversary of the ARPANet, precursor to today’s Internet, to explore how broad-scope problems can be tackled using social networking tools. The Challenge was to explore basic research issues such as mobilization, collaboration, and trust in diverse social networking constructs and could serve to fuel innovation across a wide spectrum of applications.

The MIT Red Balloon Challenge Team was the first to identify the locations of all 10 balloons and won the $40,000 cash prize.

Winning time: 8 hrs and 52 min!

1 http://www.youtube.com/watch?v=CgB8ucWqRUs
The AASCU’s Red Balloon Project

Project Impetus

Reading about the Defense Advanced Research Projects Agency (DARPA) experiment, triggered a ‘red balloon’ moment for George L. Mehaffy, Vice President for Academic Leadership and Change of the American Association of State Colleges and Universities (AASCU). To him, the Red Balloon contest served as a metaphor for a newly-networked world. This new way of generating, aggregating and disseminating information, he thought, has profound implications for higher education. It challenges our long-held practices of teaching and learning, institutional organization and structure, and, indeed, the very notion of expertise. At the same time, he concluded, the Red Balloon contest can also serve as an analogy for how a community of higher education institutions and their national association can work together to promote and support change in higher education.

Project Goals

The goal of the Red Balloon Project is to collaboratively create models of undergraduate education that:

1. Will allow us to successfully educate, with fewer resources, an increasing number of students who are likely to be more culturally, linguistically, and racially more diverse than our current students.

2. Utilize educational technologies to better engage students in authentic learning experiences more aligned with the ways that knowledge is being generated, aggregated and disseminated in an age of networked knowledge.

3. Provide students with the knowledge, skills, and abilities they will need to become successful participants in careers, engaged citizens in a democracy, and thoughtful leaders in the global society of the 21st century.

The Red Balloon Project is intended to use the power of a group of higher education institutions working together. Accordingly, at its heart, the Project is designed to be a learning community of AASCU institutions in which we can all learn faster together.

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Drivers for Change

Universities are said to be at a critical crossroad. “They are both at great risk of competitive disruption and potentially poised for an innovation-fueled renaissance.” To continue to play their indispensible function in the new environment for higher education they must bring about change more fundamentally and more quickly than they are accustomed to. They must, it is suggested, genetically reengineer themselves.

While the language of crisis is nothing new to higher education, the current set of drivers of the crisis is perceived to be of a disruptive nature. E. Gordon Gee, President of Ohio State University, in his Robert H. Atwell Lecture at the American Council on Education Annual Meeting in 2009 remarked: “... the choice for higher education during this critical juncture is reinvention or extinction.”

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5 Ibid., p. 379.
6 Clayton M. Christensen, Michael B. Horn, Louis Caldera and Louis Soares, Disrupting College: How Disruptive Innovation Can Deliver Quality and Affordability to Postsecondary Education, February 2011 at http://www.innosightinstitute.org/
Creating New Educational Models

Mehaffy has noted that ... “The model of the university as a collection of experts ... the model of teaching that requires expert knowledge ... the model of an institution that requires the physical presence of human beings ... all ... are being called into question in the Information Age.”

Put simply ...”the present dismal financial circumstances, growing expectations, and rapidly developing technologies, challenge us to develop new, more sustainable, more effective, and more adaptive educational models.”8

In response, the AASCU Red Balloon Project has identified to following areas for its Red Balloon Initiatives:

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8 George L. Mehaffy, The Red Balloon Project: Re-Imagining Undergraduate Education, AASCU 2010, p. 16
Chico Red Balloon Project: The Challenge

“Our duty is to wholly reinvent ourselves. We are America’s future—intellectually, socially and culturally.”9 The essential question facing us is: “What should the Chico Learning Model of the 21st century look like?”10 Stated more operationally, “How do we leverage Chico’s current unique learning assets with insights from the new learning sciences and new technology-based tools to create engaging personalized Chico learning experiences that mirror the future as well as the reality of our students’ daily lives?”

Chico Red Balloon Project: The Vision

CSU, Chico considers itself a vibrant learning community. It is widely known for its excellence in learning; especially for its role in facilitating student learning and student success. Given its rich history of innovation in pedagogy and in the use of information and communication technologies, it is well poised to partake in the next round of exploration and experimentation with alternative educational models. In fact, the Chico Academic Plan calls for the pursuit of ‘active, collaborative and transformative pedagogies’ and for ‘ensuring learner access to the most effective information and learning resources.’11

Within this historic and strategic context, we foster engaging and empowering learning experiences for our students—both inside and outside the classroom—through innovative pedagogies and the use of state-of-the-art information and communication technologies. We create enriching and personalized learner-centered learning environments by building out university-wide learning and teaching infrastructures and providing seamless access to 21st century digital learning opportunities and resources.

Realizing this vision is no small task and will require revolutionary transformation rather than evolutionary tinkering. Building capacity for this transformation requires commitment, collaboration and investment for success. As we enter the second decade of the 21st century, there will never be a better time to get started, even while the fiscal chaos puts us on the edge.

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10 For an interesting analysis of current assumptions underlying our educational systems, see http://www.youtube.com/watch?v=zDZFcDGpL4U&feature=player_embedded# . See also Sir Ken Robinson’s presentations http://www.ted.com/talks/lang/eng/sir_ken_robinson_bring_on_the_revolution.html and http://www.ted.com/talks/salman_khan_let_s_use_video_to_reinvent_education.html . For an alternative ‘academy’ model, see http://www.ted.com/talks/salman_khan_let_s_use_video_to_reinvent_education.html
11 See http://www/vpaa/AAGoals.shtml
Translating the Chico Red Balloon Vision into Reality

The Chico Red Balloon vision challenges us to address the question “If we were to redesign education not to make historic models of schooling more efficient, but instead prepare students for the 21st century—simultaneously transforming teaching in light of our current knowledge about the mind—what types of learning environments might sophisticated Information and communication technology (ICT) enable us to create?” 12

Figure 1 presents a graphic depiction of such a new model.13 The model puts students at the center and empowers them to take control of their own learning within engaging environments.

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12 Chris Dede, “Reinventing the Role of Information and Communication Technologies in Education,”
This ‘ecological model’ of learning draws attention to the multiple aspects of a learning environment, including learning activities, roles learners can take on, materials and social resources for learning, knowledge distributed through social networks and the practices for sharing and exchanging information. It also suggests the exploration of the relationships between people and their environments as well as the conditions under which they can exert reciprocal influence.

**Role of Learning Sciences**

Approaches to learning within American higher education settings have been changing. In 1995, Robert B. Barr and John Tagg suggested that a shift from an “Instruction” paradigm to a “Learning” paradigm had changed the role of the university from a place that ‘provides instruction’ to a place that ‘produces learning.’

“The goal of the learning sciences is to better understand the cognitive and social processes that result in the most effective learning, and to use this knowledge to redesign classroom and other learning environments so that people can learn more deeply and more effectively.”  

Learning scientists are studying learning in a variety of settings, including not only the more formal classroom but also the informal learning that takes place in alternative learning spaces, residence-hall learning communities, student organizations, internships, capstone experiences and on the job.

Emerging from learning sciences research so far is a set of key pedagogical findings: the importance of learning deeper conceptual understanding rather than superficial facts and procedures; the importance of learning connected and coherent knowledge rather than knowledge compartmentalized into distinct subjects and courses; the importance of learning authentic knowledge in its context of use rather than decontextualized classroom exercises; and the importance of learning collaboratively rather than in isolation.

**Role of Technology-Based Tools**

If advances in the learning sciences show us how students learn more effectively, technology makes it possible for us to act on this knowledge. Evolving information and communication technologies can be leveraged to provide powerful and engaging content and learning experiences for our students as well as the resources and assessments to measure their learning success in more meaningful and more comprehensive ways; “Learning Powered by Technology” as the U.S. Department of Education calls it. (See Appendix A).

For decades, CSU, Chico has provided leadership in the wise use of technologies to improve the way it learns, teaches and conducts business. Indeed, Chico is recognized as an innovative and dynamic campus that integrates technology into its very institutional fabric by providing students, faculty, and staff with the information and communication resources and services to accomplish the work of the university. Information and communication technologies have and will continue to transform the Chico educational experience, encourage collaboration in generating superior solutions, and help transcend budget challenges.

Chico’s new *Information and Technology Strategic Plan* calls for a further enhancement of the learning and teaching environment, an enrichment of campus connectivity and infrastructure, a further improvement of information and technology service delivery, and a more intentional

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17 *The Information and Technology Strategic Plan, 2011 – 2015,* ...
leveraging of its information and knowledge management resources to ensure the realization of its vision, mission and strategic priorities. Thus, CSU, Chico is very much poised to thrive in the new landscape for higher education.

**Role of Faculty**

Dedicated faculty are at the heart of the learning process at Chico. Their role, however, continues to evolve as it gradually moves from that of ‘sage on the stage’ to ‘guide by the side’ while students combine their role of quiet knowledge absorbers with that of active participants in knowledge building. Faculty occupy an ever-changing place in the emerging learning environments. Whereas traditionally faculty were the source of knowledge and expertise operating in a learning space they controlled, control in the newer learning environments is less rigid, giving the faculty more exciting and engaging options to affect student learning and the learning culture.

In these new environments, courses and related learning activities are no longer designed solely by the faculty member. Rather, they are increasingly produced by a team consisting of the faculty member as the content expert augmented with expertise from instructional designers, graphic artists, media specialists, educational pedagogy experts and assessment experts. As a result, faculty can use their core-competencies to design and deliver high-quality educational experiences that maximize student learning and student success.

**Role of Students**

As early as 1998, the CSU articulated the principle (#3) that “Students will be expected to be active partners with faculty in the learning process ...” In its more recent Access to

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Excellence strategic plan, the CSU reiterated its commitment to “enhance student opportunities for ‘active learning’.” \(^{19}\) Similarly, CSU, Chico professes to “(We) promote active learning, curiosity, and the recognition that learning occurs in our classrooms, studios, and laboratories, and beyond, through the co-curricular experience, service engagements, social interactions, and other expressions of a full and healthy student environment.” \(^{20}\) Thus, we expect our students to purposefully engage in authentic disciplinary practices that prepare them for the 21\(^{st}\) century global society. Accordingly, upon their arrival on campus, we encourage them to see themselves as active participants in learning \(^{21}\)

Recent studies of the Net Generation suggest an overlap between their working characteristics and the findings of the learning sciences highlighting the importance of learner engagement. Learning by the Net Generation is best served when it is contextual, connected, active, and social. \(^{22}\)

**Role of Enabling Support Programs**

Successful educational use of technology depends both on pedagogical techniques that capitalize on the potential of the technology and on technical proficiency with specific tools. Development programs focusing on teaching and learning in a technologically-rich learning and working environment are therefore essential to building understanding, confidence, and success in advancing 21\(^{st}\) century learning. Simply put, faculty, staff and students must have appropriate technological tools and the ability to make these tools serve their designs for learning.

**Faculty Support**

CSU, Chico has systematically provided training and support for the wise use of technology in learning and teaching. It has a strong learning technology infrastructure of networks, digital technology classrooms, faculty computers, laboratories, and a campuswide learning management system. Faculty have access to electronic learning resources from both the library, the Internet, and the open source community. They have instructional technology support through the Technology and Learning Program and funding through CELT and other grants. They have access to specialized training and support through the Academy e-Learning

\(^{19}\) See [http://www.calstate.edu/accesstoexcellence/](http://www.calstate.edu/accesstoexcellence/)

\(^{20}\) See [http://www.csuchico.edu/prs/documents/strategicplan5_06.pdf](http://www.csuchico.edu/prs/documents/strategicplan5_06.pdf)

\(^{21}\) See also EM 10-01: The General Education seeks to foster the value of Active Inquiry coupled with Personal and Social Responsibility.

and college “online boot camps”. They can showcase their work and collaborate with their colleagues through forums such as the CELT conference. There are also some financial resources available through CELT and other grants.

To continue to provide all of these support mechanisms and further assist faculty in an era of shrinking budgets, the Red Balloon vision calls for new and innovative approaches to ensure continued faculty support.

Student Support

CSU, Chico has similarly developed a variety of mechanisms to provide a transformative learning environment for its students. The core assets in that respect are an engaged faculty and staff, caring student services, a complementary electronic learning support environment, all set within a beautiful campus. Chico provides information, encouragement, and financial assistance to students from the initial human and electronic outreach services to their timely graduation through high quality personal advising supported by tracking systems that monitor, inform and guide students toward graduation. Such assistance includes teaching our students the use of the technologies professionals employ in our various disciplinary programs. Finally, our efforts at providing social learning opportunities —through formal and informal clubs and groups, and university sponsored events—are integral to building our vibrant learning community.

To ensure the continuation of our student support systems and increase their scope and effectiveness in an era of shrinking budgets, the Red Balloon vision calls for new and innovative approaches to student support.

Role of Learning Spaces

Since education is the core mission of the university, learning and the spaces in which it takes place are of utmost importance in our vision of the Chico Red Balloon project. As recently as a decade ago, classrooms were seen as by far the most important space for learning. Since that time, the notion of the ‘classroom’ has evolved and indeed expanded as ‘virtual’ space has now taken its place alongside ‘physical space.’ Digital devices can practically turn any non-classroom space into an informal learning space thereby extending students’ learning environments.

The Chico Red Balloon Vision calls for the design, reshaping and refurbishing of learning spaces and learning environments in response to changing pedagogical styles and incorporating new

23 Succeeding as a Place and as a Choice, http://www.csuchico.edu/pub/inside/09_02_12/presidentsDesk.shtml
information and communication technologies to address changing student numbers and demography.

Seven types of learning environments may be conceptualized: lecture / classrooms; simulated environments; immersive environments; peer-to-peer and social learning spaces; learning clusters; individual learning spaces; and external learning spaces. \(^{24}\) (See Figure 2) Each type of learning space has its own characteristics in terms of size, form, technology and furniture.

Figure 2. *Effective Design of Learning Spaces* \(^{25}\)

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\(^{25}\) See [http://www.jisc.ac.uk/media/avfiles/programmes/elearning_innovation/saltire_wm.wmv](http://www.jisc.ac.uk/media/avfiles/programmes/elearning_innovation/saltire_wm.wmv) and [http://www.youtube.com/watch?v=KUi4Kb6L5fY&feature=player_embedded](http://www.youtube.com/watch?v=KUi4Kb6L5fY&feature=player_embedded) and [http://www.youtube.com/watch?v=T00l72PipKk&feature=related](http://www.youtube.com/watch?v=T00l72PipKk&feature=related)
We support the experimentation with and integration of Chico’s physical and virtual learning spaces into a single integrated learning ecosystem. Learning does not stop once the faculty member has left the classroom. Instead, it marks the transition from one learning mode to another. Hence, the design of our learning spaces becomes a representation of our vision and strategy for learning—intentional, responsive, inclusive and supportive of attainment by all.

**Role of Assessment**

Technology, it has been suggested so far, can provide powerful and engaging learning content, resources, and experiences. Technology can also help in the measurement and assessment of student and organizational learning. Indeed, technology-based learning and assessment systems can be used to improve student learning and provide analytics to continuously improve
the learning processes at all levels of the university. Learning-related analytics will be used to diagnose, modify and improve the conditions of learning and teaching.

The Open Learning Initiative at Carnegie Mellon University applies learning sciences research to collaboratively design interactive learning environments that generate feedback loops for continuous improvement.

**Figure 3. Positive Feedback Loops to Improve Learning and the Learning Process**

![Figure 3](image)

Technology is used to collect real-time data that informs four positive feedback loops: feedback to students, to instructors, to course design teams and to learning science researchers. In this way, interconnected feedback loops ensure that decisions about learning and the learning process are informed by data aggregated and accessible at all levels of the academic effort.

**Role of Leadership**

“Today Decides Tomorrow” reads the inscription above the doors of Kendall Hall. It is the motto of a university that focuses on the future while carrying forward the best of its past. The Chico Red Balloon effort represents an affirmative step in strategically leading the university

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26 See [http://oli.web.cmu.edu/openlearning/initiative](http://oli.web.cmu.edu/openlearning/initiative)
towards a viable and sustainable position in the changing landscape of American higher education.

Realizing the Chico Red Balloon Vision will allow Chico State to successfully educate, with fewer resources, an increasing and more diverse student population. Building on its past successes and emerging insights on how learning takes place, Chico State will utilize communication and information technologies to engage its students in more authentic learning experiences that prepare them for becoming productive participants in the global, networked society of the 21st century.

Realizing the Chico Red Balloon Vision will require leadership at all levels of the university. If ever the university’s stated value of “we are ‘One University’ where collaboration, mutual support and trust, and common goals define our work together … “ should inform and guide our efforts, it is in this process of re-imagining the university for the future.

Realizing the Chico Red Balloon Vision: The 2011-2012 Steps

The projects envisioned under the banner of the Chico Red Balloon are designed to transform the university. The landscape of higher education in the U.S. and indeed the world is changing. We are just now beginning to grasp the realities of educating in the digital age. To remain the vibrant learning community we aspire to be, we must continue to invest attention, time, and resources more intentionally towards embracing the ‘learning’ paradigm and abandoning the ‘instruction’ paradigm.

For the 2011–2012 academic year, the division of Academic Affairs will undertake the following projects:


2. Reorganize successful but disparate faculty support activities into one integrated, visible Center for Excellence in Learning and Teaching (Learning and Teaching Powered by Innovative Pedagogy and Transformative Technology). The new Center, a prototype
learning environment, will be located in Meriam Library.

3. Increase Chico’s ‘virtual’ learning spaces as part of the Chico learning ecosystem that enables learning to take place anytime, anywhere (VLEs).

4. Refurbish Chico’s physical learning spaces as part of the Chico learning ecosystem that enables learning to take place anytime, anywhere.

5. Conduct feasibility studies for new learning spaces as part of the Chico learning ecosystem that enables learning to take place anytime, anywhere.

6. Recast Chico’s Honors Program as a personal learning network for qualified students and a test for pedagogical and technological innovation.

7. Encourage the Associated Students to create a Learning Café in the Bell Memorial Union.

8. Provide 24 / 7 student services that support students’ academic plans and enhance their progress to degree and graduation.
Recommended Readings


Recommended Resources

http://wikieducator.org/Main_Page  http://nextgenlearning.org/  
http://educause.adobeconnect.com/p53363804/?launcher=false&fcsContent=true&pbMode=normal  
http://www.ted.com/speakers/hans_rosling.html  
http://www.acrossworld.com/
Appendix A: Selected Excerpts from Sources Consulted


Education is the key to America’s economic growth and prosperity and to our ability to compete in the global economy. It is the path to good jobs and higher earning power for Americans. It is necessary for our democracy to work.

We want to develop inquisitive, creative, resourceful thinkers; informed citizens; effective problem-solvers; groundbreaking pioneers; and visionary leaders. We want to foster the excellence that flows from the ability to use today’s information, tools, and technologies effectively and a commitment to lifelong learning. All these are necessary for Americans to be active, creative, knowledgeable, and ethical participants in our globally networked society.

To accomplish this, schools must be more than information factories; they must be incubators of exploration and invention. Educators must be more than information experts; they must be collaborators in learning, seeking new knowledge and constantly acquiring new skills alongside their students. Students must be fully engaged in school—intellectually, socially, and emotionally. This level of engagement requires the chance to work on interesting and relevant projects, the use of technology environments and resources, and access to an extended social network of adults and peers who support their intellectual growth.

Individualized, Personalized, and Differentiated Instruction

Individualization, differentiation, and personalization have become buzzwords in education, but little agreement exists on what exactly they mean beyond the broad concept that each is an alternative to the one-size-fits-all model of teaching and learning. For example, some education professionals use personalization to mean that students are given the choice of what and how they learn according to their interests, and others use it to suggest that instruction is paced differently for different students. Throughout this plan, we use the following definitions:

- **Individualization** refers to instruction that is paced to the learning needs of different learners. Learning goals are the same for all students, but students can progress through the material at different speeds according to their learning needs. For example, students might take longer to
progress through a given topic, skip topics that cover information they already know, or repeat topics they need more help on.

**Differentiation** refers to instruction that is tailored to the learning preferences of different learners. Learning goals are the same for all students, but the method or approach of instruction varies according to the preferences of each student or what research has found works best for students like them.

**Personalization** refers to instruction that is paced to learning needs, tailored to learning preferences, and tailored to the specific interests of different learners. In an environment that is fully personalized, the learning objectives and content as well as the method and pace may all vary (so personalization encompasses differentiation and individualization).

**ISTE’s National Educational Technology Standards for Students**

The International Society for Technology in Education has created National Educational Technology Standards for Students (NETS-S) that encompass a full range of technology competencies. The NETS standards include

- **Creativity and innovation.** Students should be able to use technology and their existing knowledge to generate new ideas, products, or processes.
- **Communication and collaboration.** Students should be able to work collaboratively, both in person and at a distance, and to communicate ideas effectively to multiple audiences using new media.
- **Research and information fluency.** Students should be able to use a variety of digital media to locate, organize, analyze, and evaluate information from a variety of sources.
- **Critical thinking, problem solving, and decision making.** Students should be able to define problems, plan and conduct research, and identify solutions or appropriate decisions using digital tools and resources.
- **Digital citizenship.** Students should take responsibility for their own lifelong learning and should practice safe, legal, and ethical use of information and digital tools.
- **Technology operations and concepts.** Students should understand technology systems, select and use technology applications effectively, and be able to troubleshoot systems and applications.
Math That Moves: Schools embrace the iPad

Max Mashal, a sixth grader, used his iPad at Pinnacle Peak Elementary School in Scottsdale, Ariz.
Turning the Classroom Upside Down

Why not have lectures at home and 'homework' at school—and let students learn at their own pace?

We all know the standard drill for a math class. The teacher delivers lectures on a new concept, students do some homework problems, and after a few weeks they take an exam. Some do well, some do poorly, and then it's on to the next topic.

The problem with this model of instruction is that it leaves behind large gaps in understanding. For A students, it might be a 5% gap, for C students a 30% gap. But all of them end up with a Swiss-cheese education—full of holes. Little wonder that, when they reach algebra and calculus, they often struggle. It's like being trained to juggle oranges half-competently and then being expected to juggle knives.

But it doesn't have to be this way. In 2008, I started a non-profit organization called the Khan Academy to deliver free online education. As it turns out, our tools have given students and teachers the power to "flip" the traditional classroom: Students can hear lectures at home and spend their time at school doing "homework"—that is, working on problems. It allows them to advance at their own pace, gaining real mastery, and it lets teachers spend more time giving one-to-one instruction.

At the Khan Academy, in Mountain View, Calif., learning is flipped. Lectures take place at home with videos over the Internet. And "homework" is done at school, where teachers intervene. Salman Khan talks with Kelsey Hubbard about his theory of education.

It all started with my cousin Nadia. Back in 2004, I was working as a hedge-fund analyst in Boston when my relatives from New Orleans visited for the Fourth of July. Waiting for the fireworks to begin over the Charles River, I kept everyone occupied with a battery of brain teasers. Nadia's answers were particularly impressive. She was only 12, but she engaged the problems with more energy and creativity than many engineers and scientists twice her age.

That weekend, touring the campus of MIT (where I had studied math a few years before), I hinted to Nadia's mother that this might be a good college for Nadia. She confided that, despite being a straight-A student, Nadia had done badly on a placement exam and was being tracked into a slower 7th-grade math class. I offered to help.

In our first months of working together remotely, I spent 30 minutes to an hour with Nadia each day on the phone, using Yahoo Doodle as a shared whiteboard. Before long I was also working with her younger brothers and an informal cohort of students around the country. It became clear that the only way for me to meet this growing demand was to put some tutorials on YouTube.

During our live sessions, my cousins had only heard my voice and seen my writing, so for the videos I just used free screen-capture software to reproduce that experience. I wrote in pastel colors on a black background and kept to the YouTube time limit of 10 minutes per video. My cousins soon informed me that they liked me better on YouTube than in person!

I was surprised that they preferred an automated version of me, but look at it from their point of view. They could now pause and repeat the lectures without worrying that they were wasting my time. They could review topics
from previous sessions without feeling embarrassed, and they could tackle new topics without the stress of someone watching over or judging them.

I soon discovered that people all over the world were watching my YouTube videos. More important, teachers were using them to change the basic rhythm of their classrooms. They asked their students to watch the videos at home and then used class time for actual problem-solving. Instead of 30 students listening passively to a one-size-fits-all lecture, they were learning at their own speed. Some could focus on filling in gaps in their arithmetic while others were able to jump ahead to trigonometry—and it all took place in the same classroom. It is often said that technology makes modern life less personal, but in this case, it has allowed teachers to take a big step toward humanizing their instruction.

Today, with the help of some generous donors and a die-hard user base of students and parents around the world, Khan Academy is now a team of six people building software and content, and we have more than 2,200 videos, covering everything from arithmetic and calculus to biology and physics. Surreal as it seems to me, the simple videos that I started making for my cousins have now been viewed almost 45 million times and are being translated into more than 10 languages.

Last fall, we began a pilot program with the public schools in Los Altos, Calif., in the heart of Silicon Valley. The initial results are very promising. In order to help teachers customize their instruction, we created a dashboard of robust data for them to follow, linked to their students’ online exercises. Students don't move on to more advanced concepts until they have mastered basic ones. Those who get "stuck" promptly receive help, often from peers who are already proficient in a subject. The overall effect has been to create a more collaborative classroom culture.

Still more encouraging, our data show that when students work at their own pace, the need for traditional tracking and labeling goes away. Given the time and personal instruction needed to master core topics, supposedly "slower" students are often able to speed ahead. Within weeks, they look "advanced."

To us, the conclusion is obvious: Students simply do better when schools show respect for their natural curiosity and intelligence and give them a chance to achieve an intuitive understanding of fundamental concepts. It turns out that, in order to juggle knives, it helps if you've first learned to juggle oranges with ease.

—Mr. Khan is the founder of the Khan Academy (www.khanacademy.org).

SALMAN KHAN, above, started out posting videos for his cousins on YouTube. Now his academy has 2,200 videos online.
Global Higher Education OER

http://oli.web.cmu.edu/openlearning/

The Future is Open
**Lifelong Learner 2020 Scenario**

Caramela registers for an advanced circuit board design course. She’s having a problem in her response time and needs to learn more about crystallography. Based on her learning requirements and the course objectives, personalized academic material is downloaded into Caramela’s choice of form factors (one for the car, one for reading on her tablet, one for her graphical environment). Her wallet receives the transaction receipts and her expense report automatically reports to her company and the bill is paid instantly.

A mandatory session on campus is available via teleconference, and although Caramela is on her way to the airport at the time, the session is recorded and sent to her wireless audio device which she’ll interact with on the plane. As she reviews and interacts with the material, she watches information automatically populate into her assessment monitor that she filled out with information on why she’s taking this course. She identifies which content is useful to her, examines the auto-generated goal maps and aligns the information with her current projects. An e-mail is automatically generated for her to send to her co-workers, customers, and teacher to update them on new ideas she has that could be related.

A notification from her instructor arrives on her cell phone with a reminder of the first online project he wants to discuss. Along with it come a research project outline, suggested contacts, and an analysis of how her current project that she identified as the reason to take the class relates to this project. The instructor reviews her task list and makes a few suggestions on how to work best with her virtual team.

A couple of days later, Caramela returns from Chicago and emails her boss with some suggestions for a decrease in resources for their project. She’s figured out a clever way to solve one of their problems as a result of the first course interaction and evaluation of workflow for the project. She’s seeing results already, cool! She decides to take a Q&A exercise to see how to best move through the rest of the material rather than watch the movie. She decides to work together with a couple of colleagues, who always share information on the topic she’s reviewing. She returns home and spends the weekend with the kids.

Two Mondays later, she discovered that she did so well on the timed exam that the assessment tool suggests to her, the instructor and her colleagues, that she should probably move on to another interaction level. Caramela is quickly able to advance to a simulated work experience via shared applications from a real-world 3-dimensional toolset accessible from her laptop. It’s a lot easier to work on something you can see, she thinks to herself. She starts to take apart the virtual circuit board she’s been working on, and the 3D environment explains what functionality has been eliminated. She inserts a new chipset that she programmed from working on her project in class, and the circuit board reflects much faster response time. She is enjoying this first week of her semiconductor course.

In only the first week of her online class, Caramela has already demonstrated a level of skill to advance her to reach her career potential through a fully customized learning experience-accessible at her personal convenience and choice of device, personalized level of learning, and length of time to complete. She thinks she’ll sign up for another.