The University of Texas at Austin
Charles A. Dana Center

The Urban Mathematics Leadership Network & Achievement First Public Charter Schools:

A collaboration for strengthening mathematics education

Introduction

"Guys you are so close to the answer. What specifically did you see about the number line that makes you think that?"

Fourteen sixth-grade math teachers have partnered up to practice teaching a lesson to each other. Pretending to be students, the teachers give incomplete and incorrect answers, providing their fellow teachers with the opportunity to practice the skills necessary to get their classes to complete understanding of the topic at hand.

It is obvious, listening to these groups of teachers as they act out their roles as teacher and students, that they all share a common language specific to their school culture: They give each other "love" and "snaps" and "woo hands" as signs of encouragement. They talk about "annotating" the question and "tracking" the instructor. Because of this common language and practice, these Achievement First teachers' students will experience the same teaching methods—with similar verbal approaches—from grades 5 to 8.

Over the course of this three-day training, held at Achievement First Brooklyn High School in the summer of 2017, the roughly 200 participants in the mathematics strand will practice delivering instruction dozens of times. They will teach and reteach. They will practice a variety of teaching techniques. They will watch videos of featured fellow teachers—perhaps someone sitting next to them in this session—delivering expert instruction, and they will then practice what they have seen. Often, that featured teacher will turn around and practice with a partner like everyone else in the room. These sessions are truly continuous improvement in action.

The Achievement First facilitator who is leading today's professional development says that it was not always like this. The move towards working with teachers on their in-class curriculum delivery is recent—it started within the last two years.

The Achievement First district mathematics team's work with teachers around the Common Core State Standards for Mathematics—and the New York Common Core Learning Standards for Mathematics[1]—began years ago.

First, they engaged with teachers around understanding the new standards, and then they engaged around understanding a standards-aligned scope and sequence and curriculum. Now that the Achievement First mathematics team feels confident in the charter system's scope and sequence, in their curriculum, and in their lesson plans, and now that they also feel confident that they have clearly communicated these pieces to faculty, they are ready to work with teachers on the nitty-gritty of daily interaction: how to move students towards full comprehension.

Over the five years that the Achievement First district mathematics team has been working with the systems' teachers around Common Core implementation, they have also been a part of the Urban Mathematics Leadership Network (UMLN). How has the Achievement First math team moved to this place in their implementation of the standards, and what part, if any, did their participation in the Urban Mathematics Leadership Network play in helping to get them there?

Part I. The History and Mission of the Urban Mathematics Leadership Network

In fall 2007, the Charles A. Dana Center at the University of Texas at Austin and the Aspen Institute launched three coordinated networks of urban district leaders: the Urban Mathematics Leadership Network, the Urban Literacy Leadership Network, and the Chief Academic Officers network.

The Dana Center, led in this work by its executive director (and professor of mathematics and of public affairs) Uri Treisman and by the Center's then–director of mathematics Dr. Susan Hudson Hull, launched the Urban Mathematics Leadership Network in 2004 because the Center's leaders saw a need in the school districts they visited and worked with.

> "Leveraging the UMLN to help districts learn from each other and to explore joint solutions to commonly held problems and challenges offers the promise of creating robust strategies that individual districts could not develop on their own."
>
> Charles A. Dana Center web page on UMLN[2]

Before the UMLN, says Treisman, "no one knew each other. Chicago, New York, LA, all of them were working on the same problems." He continues, "It's just so hard to do leadership in urban math districts. We need to build on each other's work—then patterns emerge."

This lack of communication across school districts tackling similar challenges is one of the main problems that the UMLN was founded to address. The UMLN is designed to bring people together and to give math leaders a chance to connect with each other away from their district.

While the UMLN initiative launched in 2004, the UMLN collaboration with the Aspen Institute began in 2007. Aligning the work of the UMLN with other work going on in the district, including the work of chief academic officers, was designed to make sure that the districts' key decision makers are a part of the conversation.

Each year from 2004 to 2017, the Dana Center has held at least one UMLN convening, bringing together teams of representatives from districts in the network. These convenings provided information to the district teams and, most importantly, gave them time to collaborate as a group and with other groups from urban districts around the country.

According to internal Dana Center writing about the project, "the goal is to enable colleagues who often work in silos to collaborate in building district capacity and identify common tools and strategies for improving instructional outcomes."

In describing the program's goals, Brian Newsom, a former Dana Center staff member who helped lead UMLN from roughly 2010 to 2017, said that its purpose is "to bring math leaders of urban school districts together to find a solution for common problems." He went on to describe the particular issues faced by math leaders in large urban districts. "What happens is that you have these math leaders of urban districts, and they are the largest district in the state. They don't really have anyone within the state with the same problems that they are having." He continued, "At UMLN they are able to talk to someone with the same kinds of problems that they have."

Newsom described the UMLN goal as providing urban math leaders "with the latest research, the latest leading work that's being done in mathematics education," and giving these leaders "a professional development learning opportunity.… with access to experts in the field."

He describes his own experience as a participant in UMLN before joining the Dana Center, "When I was a member, Uri [Treisman], Phil Daro, and David Foster always attended the meetings. I normally wouldn't have access to these leaders. Here's an opportunity for me to come to a meeting and have access to three of the most influential math leaders of the time."

Katey Arrington, another of the UMLN's Dana Center staff leaders, described UMLN as having three chief goals:

1. To give district math leaders a chance to learn from each other.
2. To enable the Dana Center to support professional learning for the leaders to inform their work.
3. To provide Dana Center staff the chance to learn from the challenges and successes reported by the district leaders.

From 2015 to 2017, the UMLN workshop goals focused primarily on supporting districts in implementing education standards—particularly the Common Core State Standards for Mathematics, adopted by many of these districts' home states. This work has included everything from learning about the standards, to creating curriculum, to improving teachers' classroom implementation, to assessing student learning.

In particular, the UMLN sought to improve the capacity of its member districts…

> … to communicate consistently and effectively about the Common Core State Standards for Mathematics.
>
> … to provide high-quality, coherent professional development to support effective implementation of the standards.
>
> … to monitor and adjust implementation of the CCSS for Mathematics to support fidelity to the standards' vision.

Part II. The Achievement First Context

Achievement First is a public charter school network with campuses in Connecticut, New York, and Rhode Island. The network began in fall 1998 with one school, Amistad Academy, in New Haven, Connecticut.[3] Based on their success with Amistad Academy, school leaders there incorporated a nonprofit charter network in 2003 and founded a second Achievement First school in 2004. As of 2017, Achievement First has 34 schools in 5 cities, serving some 11,600 K–12 students every year.

Achievement First's mission is

> "to deliver on the promise of equal educational opportunity for all of America's children. We believe that all children, regardless of race or economic status, can succeed if they have access to a great education. Achievement First schools provide all of our students with the academic and character skills they need to graduate from top colleges, to succeed in a competitive world and to serve as the next generation of leaders in our communities."[4]

At the time that the state of New York began implementing the Common Core, students from Achievement First schools had been performing exceptionally well on the New York State Assessments. That changed when performance on the Common Core State Standards started being assessed.

A regional superintendent for Achievement First (who also manages the middle and high school math program) describes the change: "Common Core came out in New York in 2013. Like everyone else, it was a rude awakening for us. Our scores dropped 30 to 40 points on the New York State Assessment. We had a very inflated impression."

Achievement First schools in New York (grades 3–8) went from an 88 percent proficiency in mathematics in 2012 to a 46 percent proficiency in 2013; middle schools in New York (grades 6–8) dropped from 92 percent to 47 percent proficiency in the same year. "We realized that we needed to make lots of changes."

Since that time, the math leadership team at Achievement First has made significant revisions to the content, the pedagogy, and the structure of their mathematics courses. They have also changed the structure of how mathematics is delivered in their district. Now students engage in two blocks of mathematics each day, one focused on core learnings and one focused on cumulative review. In addition to the change in structure, a regional superintendent for Achievement First describes a move from "I-we-you" lessons five years ago (direct instruction, followed by group practice, then individual practice) to conjecture-based lessons today. In the "core learnings" math course blocks, students engage daily in factual fluency ("fast facts"), skill fluency (repeated skills), mixed practice (a spiraled review of two to three standards), and the problem of the day (applied math). The problem of the day involves more rigorous application of the standards, incorporating multiple standards into a multistep problem.

At the core of this transition to a new way of teaching mathematics systemwide was the central Achievement First math team, at that time led by Achievement First's director of K–12 mathematics and its director of middle school mathematics. The Achievement First regional superintendent describes this team's work:

> "To design assessments that are at the rigor of the Common Core. To provide curriculum that builds conceptual understanding and applies concepts and skills. To set a vision for rigorous math instruction. To train teachers how to teach math lessons at the rigor of the Common Core. To respond to data, to monitor the quality of instruction, to ensure that all of our teachers are teaching Common Core–aligned math lessons, all towards the ultimate end goal of providing students with the most rigorous math education they can find."

By 2016, the students at Achievement First were outperforming students at other schools in their host districts.[5] Proficiency rates on the post–Common Core state exams have been continuously improving, and in 2017, 68 percent of Achievement First middle school students in New York were proficient in mathematics on the state exam, an improvement of 21 percent since the implementation of the Common Core State Standards for Mathematics. And beginning in 2012, when the staff at Achievement First initially started to transition to new standards and a new level of rigor, the Urban Mathematics Leadership Network has supported their work. Members of Achievement First's mathematics leadership team have participated in annual UMLN convenings consistently over that time, and they have consulted with the Dana Center on this work outside these convenings as well.

Part III. The Dana Center and Achievement First: Working Together Toward Common Core Implementation

From 2012 to 2016, Achievement First staff participated in UMLN convenings and worked with the Dana Center staff beyond the scope of those convenings. Staff members from both Achievement First and the Dana Center note that the two groups have worked together on every aspect of Common Core State Standards implementation.

The Dana Center UMLN staff identified two factors that enabled the Achievement First team to make rapid progress based on their work at UMLN: the first was Achievement First's consistency within the network; the second was the flexibility Achievement First enjoyed within their district context, which allowed for innovation. One Dana Center UMLN lead described Achievement First's engagement thus: "They really participated well. They were on top of things. When we asked them to do action planning, they did action planning. They want to change in positive ways. Achievement First has had the attitude of 'we need to change every day to get better.'"

Over the last several years, Achievement First professional development workshops have focused on (1) learning about and understanding the new standards, then (2) designing and understanding a new scope and sequence and curriculum. After (3) setting an agenda for future work, by 2016–2017, Achievement First professional development began focusing primarily on (4) working with teachers around improving classroom practice—that is, continuously improving their implementation of the standards in their classrooms.

(1) Learning about the Common Core State Standards.

Achievement First began participating in UMLN in the 2012–2013 school year. Their first years in the network aligned perfectly with the roll-out of the Common Core State Standards in the state of New York. In these early years of Achievement First's engagement with UMLN, Dana Center staff worked to ensure that network members who attended UMLN convenings were well versed in the new standards. One of the ways the Dana Center achieved this was by having representatives from the new standards' assessment providers—PARCC and Smarter Balanced[6]—come in to speak to network members.

One Dana Center UMLN staff member states, "If we think about the trajectory of UMLN when Common Core was rolled out, the first support was really helping districts understand what tools they should be using in supporting teachers in understanding the standards."

The Achievement First director of K-12 mathematics at the time remembers participating in these conversations. She notes, "When everyone was trying to figure out what Common Core was going to mean, they worked really hard to get someone from the SBAC [Smarter Balanced Assessment Consortium] or PARCC to show up and give us the opportunity to ask questions. They were just starting to build out their website."

She continued, noting that UMLN was a "source for information when there wasn't a lot of clear information, specifically for Common Core. You knew that if they were going to do a session, it's because they thought it was really good. With a sea of things to access, it was good."

By attending the UMLN convenings in these early years of the Common Core, the mathematics leadership team at Achievement First participated in activities that gave them a clearer understanding of the standards. They were able to interact with the standards and the individuals who designed them in ways that would have been far more difficult had they not been part of the UMLN.

(2) Designing a Scope and Sequence and Curriculum

The mathematics team at Achievement First has worked since 2012 to create curriculum for their program that incorporates the Common Core State Standards and that meets the level of rigor of the assessments that Achievement First students must contend with—the New York State Assessments and Regents Exams in New York, the SBAC assessment in Connecticut, and the RICAS (Rhode Island Comprehensive Assessment System) in Rhode Island.[7]

A Dana Center UMLN lead describes the work done with curriculum planning for the Common Core State Standards as ongoing at multiple UMLN convenings. These conversations included discussions of including

social and emotional learning (SEL)[8] in the curriculum, ways of compressing content, and strategies for embedding skills within the curriculum. The Dana Center created an Alignment and Intentionality guide and tool that UMLN districts were able to use for planning across grade levels and that provided district teams time to plan as a group while they were at the convenings.

Later, The Dana Center began to work with Achievement First in translating their adopted Common Core standards into a scope and sequence and curriculum. A UMLN lead noted, "They sent [examples of their] scope and sequence to us… and we had teams of people review them and giving them feedback. Conversations that started at UMLN continued as consulting."

The Achievement First director of K–12 mathematics at the time talks about continuing work with the Dana Center based on Achievement First's participation in the UMLN. "We were in UMLN first, then as we on the network side were working with some of our strongest teachers, and we wanted to design unit plans and make sure it was aligned [to the standards], so we reached out to a UMLN lead and the team went down to Austin [where the Dana Center is headquartered], and got feedback on our K–12 scope and sequences, made sure they met the requirements for rigor, focus, coherence, and amount of teaching time, and made sure that they vertically aligned. To do that with Dana center folks was awesome."

The former Achievement First director of K–12 mathematics goes on to describe the ways in which the Dana Center and UMLN were "particularly helpful in making sure that the curriculum embeds the small skills." She explains

> "In Common Core math, standards in the grade level are grouped underneath a cluster heading, [and] 8 to 10 cluster headings per grade are identified as *major*, *supporting*, or *additional*. In the design of Common Core, it's stated that your focus should be on the major cluster standards for the grade—have 80% of your teaching on that. *Supporting* and *additional* content should be taught in conjunction with the *major* [content] instead of as standalone. Instead of metric conversions being their own unit, putting them into a unit on multiplication and division. The metric can be embedded in a major unit and can be supporting that work. To keep it all joined together, instead of the traditional way it used to be. Here's a chapter on X."

UMLN convenings provided the Achievement First mathematics content leaders time to work on their curriculum and planning as a team. The consulting from the Dana Center provided additional guidance. The director for K–12 mathematics at the time identified the main impact of participating in UMLN as the *unit planning*. "It's not that we wouldn't have unit planned, but it would have looked different without the involvement of the Dana Center."

(3) Setting an Agenda

Members of both the Achievement First team and the Dana Center UMLN staff team spoke about using their work together to identify what topics were most deserving of attention. The Achievement First director of K–12 mathematics from that time describes UMLN as a kind of clearinghouse, sifting through all available resources to provide the most useful information to network members. She talked about UMLN sorting through the "sea of things to access" to pull information that could be trusted.

The Achievement First team would choose what they considered to be the most critical pieces of learning from the UMLN convenings to inform their work after returning to their districts. One member of the Achievement First math leadership team describes how they would "always spend time after the conferences and determine 1 to 2 things that we were definitely going to bring back and implement. We always came away with something that was going to shift how we were thinking about—or doing—something."

When staff from the Dana Center began working with the Achievement First math team as advisors, they visited selected Achievement First schools and worked with all three of the Achievement First math content leads. Some of the topics addressed included helping the leads to determine "What are the kinds of things that are worth spending your time on. How do you prioritize? How do you make the difference that you're looking for?"

A goal of the UMLN convenings is for participating districts not just to learn from the presenters and from each other, but also for the UMLN and the Dana Center team to learn from the districts.

One Dana Center UMLN lead describes her work with Achievement First in turn affecting the content of future convenings. "They've informed what the meetings would look like. There were several instances where they were struggling with something. We talked to a few other districts, and guess what? They were struggling with that too. So we created professional development that would be specifically helpful, and Achievement First helped to inform that." She cited as an example Achievement First's work of integrating the Common Core State Standards for Mathematical Practice (SMPs) into math instruction, and specifically how certain social and emotional learning (SEL) competencies are embedded in the SMPs.[9]

(4) Improving Classroom Practice

A regional superintendent for Achievement First who manages the middle and high school math program describes the shifting priorities for Achievement First's professional development goals over time. He notes that the mathematics team "shifted towards common lesson plans about two years ago. Now that we have common lesson plans, we're … focusing on making sure that there are consistently strong execution of those lesson plans."

As part of the Dana Center's work with the Achievement First mathematics leadership team, members Dana Center staff members traveled to selected Achievement First schools in 2014 to observe classrooms. During the debrief of these observations, the Dana Center team talked with the Achievement First team about working with teachers around responding to students in the moment, especially when students gave a "wrong answer."

A Dana Center UMLN lead gives as an example a student who was responding to a question by providing the right content, but using the wrong vocabulary in their answer. The teacher in that moment dismissed the answer as incorrect and moved on. After observing this interaction, the teams talked about helping teachers to probe students' answers by listening deeply to students and then questioning them to help them advance their thinking. The Dana Center staff member encouraged the team to consider students' answers to mathematics questions as "a meaningful back and forth" between teacher and student and not just as an answer that was correct or incorrect.

Three years after that exchange, it is unlikely that an Achievement First teacher would react to an incorrect answer in the same way. The summer professional developments for math instructors are focusing primarily on classroom practice. Teachers are learning to plan their responses to both partially correct and incorrect answers with "back pocket questions" (BPQs), scaffolded questions that they will use after asking a broader, more open-ended question. Teachers are asked to craft what an exemplar student response would be as well as some likely misconceptions, and they are asked to practice responding in the moment to misconceptions and partially correct answers.

Part IV. Professional Development for Moment-to-Moment Classroom Interactions

Back at that 2017 summer training, it is later in the day and every mathematics instructor from the Achievement First high schools in the state of New York is meeting in the high school gymnasium. The current Achievement First director of middle school mathematics is introducing a video of classroom instruction that they filmed in an Achievement First middle school classroom. The instructor on the screen is in the room, and she turns backwards in her seat smiling to whisper something to a teacher at the table behind her.

The creation of the videos was in itself a kind of professional development. The Achievement First director of middle school mathematics describes working with the teachers in the video to hone in on the aspects of their practice being demonstrated, and collaborating together to create something worth sharing.

After the video is over, it's time for the instructors to practice the maneuver they have just witnessed and discussed. When they have their instructions for the next 20 minutes, more than 60 teachers stand in unison, splitting easily into groups of three. They will each take turns being the teacher and the student, practicing the minutiae of this particular strategy for classroom instruction.

Thirty seconds after they have been asked to form small groups, teachers around the room begin their practice instruction. Each individual teacher goes through their script, gesturing to imaginary whiteboards and directly addressing the "students" sitting in front of them. When they finish, each instructor gets 2 minutes of feedback, and they immediately begin again the instruction that they have just completed. Everyone is engaged. Session leaders and district officials move through the room, sometimes providing feedback, and sometimes just listening. While another district might have the instructor who was featured in the video walking around and giving feedback, at Achievement First, she is in a group of three refining her practice alongside her colleagues.

The structure of this professional development is a clear example of Achievement First's deep engagement with the practice of continual improvement. As described in their core values, "We know that excellent outcomes are the result of excellent habits; as Aristotle said, 'We are what we repeatedly do.' We believe that deliberate practice, reflection, and feedback are critical drivers of continuous improvement."[10]

In another two minutes the bell dings, indicating that it is time for feedback. One teacher is giving another feedback and recommending that the teacher question the students more carefully. The other teacher replies, "so you're saying, see what they are thinking before I tell them that?" The other teacher agrees and continues her feedback. A bell dings again, and it is time for the next instructor to take their turn practicing.

For each of these instructors, this will not be the first time or the last time that they will practice this week, this month, or this year. And when they attend next summer's professional development, it is also likely that they will still be practicing these techniques, and that the way that they practice will have been improved in some small way since the year before. Nothing at Achievement First ever stops moving or improving.

Over time, the Achievement First mathematics leadership team's work with their teachers around Common Core implementation has moved from understanding the standards, to planning for the standards, to classroom instruction to attain the standards.

It is difficult to parse out the full impact of Achievement First's participation in the Urban Mathematics Leadership Network because their engagement took place over such a large span of time. One Dana Center UMLN staff member noted that the goals of the UMLN are to give district math leaders a chance to learn from each other, to inform their work, and to give the UMLN and the Dana Center a chance to learn from the member districts. This vision is clearly embodied in the work of Achievement First and the Urban Mathematics Leadership Network: a symbiotic relationship that has benefited both organizations.

Part V. Questions

Questions for further consideration

What can a charter school system learn or adapt from a network designed for traditional urban districts?

How can UMLN work with additional charter networks in the future?

How can UMLN continue to be a resource for districts that have made—or are experiencing—significant change?

What could Achievement First still use in terms of improving their network's professional development and their work with teachers?

Endnotes

[1]For more information, see https://www.engageny.org/resource/new-york-state-p-12-common-core-learning-standards-for-mathematics

[2]For more information, see http://www.utdanacenter.org/pre-kindergarten-12-education/k-12-systems-services/leadership-networks/urban-mathematics-leadership-network

[3]For more on Achievement First's schools and history, see http://www.achievementfirst.org/schools and http://www.achievementfirst.org/about-us/history

[4]For more information on the system's mission and vision, see http://www.achievementfirst.org/our-approach/mission

[5]See Achievement First's data summary here http://www.achievementfirst.org/results/across-achievement-first

[6]More information on PARCC, or the Partnership for Assessment of Readiness for College and Careers, may be found here: https://parcc-assessment.org and more on the Smarter Balanced Assessment Consortium (SBAC), here: http://www.smarterbalanced.org

[7]More information on RICAS (Rhode Island Comprehensive Assessment System) is available here: http://www.ride.ri.gov/InstructionAssessment/Assessment/RICASAssessments.aspx

[8]For example, see these materials from the Dana Center's Inside Mathematics service on leveraging social emotional learning competencies for learning mathematics: http://www.insidemathematics.org/common-core-resources/mathematical-practice-standards/social-and-emotional-mathematics-learning

[9]The Inside Mathematics materials on social emotional learning competencies and mathematics explicitly unpack "the connections among the mathematical practices and SEL competencies, as well as supports for integrating them in your classroom instruction": http://www.insidemathematics.org/common-core-resources/mathematical-practice-standards/social-and-emotional-mathematics-learning

[10]See http://www.achievementfirst.org/our-approach/core-values

About these case studies

This case study is one of two interrelated reports that take an exploratory, qualitative look at the ways that two urban districts have participated with the Urban Mathematics Leadership Network, with the goal of describing that participation and the ways that members believe participation in the network has impacted individual and district work. The two case studies are:

The Urban Mathematics Leadership Network and the School District of Philadelphia

The Urban Mathematics Leadership Network and Achievement First Public Charter Schools

This project was supported by the Education & Society Program at the Aspen Institute. These studies were conducted by Dana Center senior research analyst Jennifer Dorsey over a period from roughly May 2015 to October 2017. The intent of these case studies is to describe the ways in which UMLN teams are engaging with UMLN-developed knowledge, tools and connections with other districts—and to describe the extent to which network activities are influencing district services with school based-actions.

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About The School District of Philadelphia: The School District of Philadelphia is the eighth-largest school district in the nation by enrollment. Located in a historic and culturally rich setting, the district serves a racially and ethnically diverse community committed to education. The School District of Philadelphia mission is to deliver on the civil right of every child in Philadelphia to an excellent public school education—and to ensure that all students graduate from high school ready to succeed and fully engage as a citizen of our world. For more information, see **www.philasd.org**.

About Achievement First Public Charter Schools: Achievement First is a growing network of nonprofit college-preparatory K–12 public charter schools in Connecticut, New York, and Rhode Island. In the 2017–2018 academic year, Achievement First served 12,500 students in grades K to 12. The mission of Achievement First is to deliver on the promise of equal educational opportunity for all of America's children. Achievement First believe that all children, regardless of race or economic status, can succeed if they have access to a great education. Achievement First schools provide all students with the academic and character skills they need to graduate from top colleges, to succeed in a competitive world, and to serve as the next generation of leaders in our communities. For more information on Achievement First, see **www.achievementfirst.org**.

About the Charles A. Dana Center at The University of Texas at Austin: The Charles A. Dana Center develops and scales math and science education innovations to support educators, administrators, and policy makers in creating seamless transitions throughout the K–16 system for all students, especially those who have historically been underserved. We focus in particular on strategies for improving student engagement, motivation, persistence, and achievement. The Center was founded in 1991 at The University of Texas at Austin. Our staff members have expertise in leadership, literacy, research, program evaluation, mathematics and science education, policy and systemic reform, and services to high-need populations. For more information, see our website at **www.utdanacenter.org.**