



Utah's Early-College  
Schools Foster  
Future Innovation

# high-

By Angie Hill Lucas



# tech high

The three traditional R's—Reading, wRiting and aRithmetic—aren't quite enough to equip today's high school students for the demands of college and the professional workforce.



## Building the Future

"I'd like to see students leave our high school with college credits, [committed to] earning a college degree, being productive workers and productive citizens, ready to contribute to a changing environment," says Al Church, principal of AMES, one of the six new high-tech, early-college high schools opening statewide.

"We're trying to take our own talent base here and let them be the ones who actually found and create companies," adds Gary Reed, principal of NUAMES, another of the schools.

Partnerships with local business interests and higher education will fuel the effort to graduate more highly educated students in math, science, engineering and technology. And students are getting real-world experience early in their academic careers.

For example, 10 high school juniors from AMES will be involved next year in an EPA-funded project on hydrogen fuel cell research at the University of Utah.

"They'll get credit and college exposure," Church says. "And before they leave the U, maybe, who knows, one of them is going to invent something or know more about the notion of alternative fuels. That's the promise of what these schools should be, tenfold as they grow."

In fact, by some estimates, only 32 percent of high school graduates nationwide are adequately prepared for a four-year college or to enter today's increasingly technical and highly skilled workforce.

Utah has a plan to address the problem of under-prepared students and employees in the form of six new high-tech, early-college high schools opening from Logan to Cedar City through 2006.

These six schools are introducing three new R's into Utah public education — Rigor, Relevance and Relationships — with the hopes of having a lasting impact on Utah students, the education system and, ultimately, the business community and economy.

The first of this coming wave of young, high-tech graduates from these schools will hit Utah's job market as early as 2008, armed with bachelor's degrees in math, science, engineering and other technical subjects, along with a spirit of invention, creativity and entrepreneurship.

That's the hope, anyway, as the second and third of the six charter schools prepare to open this August.

### History of the Initiative

Utah's high-tech high schools grew out of a nationwide New Century High School Early College Initiative sponsored by the Bill and Melinda Gates Foundation of Boston, Mass.

According to the Gates Foundation, "Virtually all jobs that yield a living wage demand an education beyond high school — educating America's young people is increasingly critical to the future of our society, economy and democracy."

The foundation's main goals are to help high schools better prepare all students for college, work and citizenship, to reduce financial barriers to higher education and to reach out to traditionally underrepresented students.

The initiative came to Utah through

the efforts of Governor Leavitt and Tom Vander Ark of the Gates Foundation.

"The state became interested in working with the Gates Foundation in their efforts to create a consortium of early-college high schools around the country," says Darrell White, Utah's deputy for education, Office of the Governor.

The plan was formulated to set up six high schools at geographically diverse locations throughout the state, White says. The high-tech high schools had to partner with at least one local school district, one institution of higher education and local businesses. The first of the six schools, AMES (the Academy for Math, Engineering and Science) opened in August 2003. The school partners with the University of Utah, the Salt Lake City and Granite School Districts and local business interests.

Opening in August are Itineris (the Latin word for "journey" or "route"), in partnership with Jordan School District and Salt Lake Community College; and NUAMES (Northern Utah Academy for Math, Engineering and Science), in partnership with Weber State University and the Ogden, Weber and Davis School Districts.

Schools four and five, located in Provo and Cedar City, will open in August 2005, and the final school, in Logan, opens August 2006.

In order to qualify for funding through the Gates Foundation, each of these charter schools must recruit from underrepresented students, set rigorous educational standards and provide at least two years of college-level work, White says, making it possible for students to earn a bachelor's degree within two years of high school graduation.

"We chose math, engineering, science and technology as a curriculum focus," White says, which is not required of all New Century schools nationwide.

"[Utah's six schools] will offer the full range of courses for high school graduation, but all the curriculum beyond the required courses will be focused on math, engineering, science and technology."

Even so, each school has the freedom to develop its own particular focus and personality. AMES has chosen a math, engineering and science focus, while Itineris will focus specifically on biotechnology, "which, of course, is a very lucrative and growing field in high-tech industry, and Utah has considerable interest in that area," White says.

These schools are not just another gifted and talented program. The New Century Initiative targets those who maybe don't realize their full potential and for whom traditional public education has not been effective.

"Part of our efforts are not just to do what's already being done, but to take a different slant for a different group of kids, to help them be more ready for college," says Itineris principal Stephen Jolley.

Each of the schools has an open enrollment policy. The overall goal, as White explains, is to motivate students "not only to become interested in professions in the field of math, science, engineering and technology, but to accelerate their education and to encourage them to get into a program and pursue a college degree and complete it."

The schools, which will restrict enrollment to 500 students each, will recruit heavily among those who are traditionally underrepresented in science, math and engineering professions, including women, minorities and low-income students.

The schools provide intense preparation in the ninth and 10th grades to get the students' skills up to speed and prepare them for college-level work. By the junior and senior year, the majority of

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## Education and Economic Growth

The benefits of higher education extend far beyond college graduation. Apart from the fairly obvious results of higher incomes and lower unemployment rates, there are widespread benefits for communities, businesses, economies, families and society at large when education levels are high.

Education affects economic growth in several ways, but primarily through the creation of new knowledge, according to a U.S. Congress Joint Economic Committee Study (January 2000).

The study finds that the greater the number of highly educated individuals, the greater the number of scientists, analysts, technicians and inventors working to increase the stock of human knowledge.

Then, when more individuals acquire these new skills and knowledge—primarily through education—they increase their value in labor markets.

Simply put, increased education results in increased productivity, which results in higher earnings. The more education individuals acquire, the better able they are to absorb new information, acquire new skills, and familiarize themselves with new technologies.

But also, greater productivity frees up resources to create new technologies, new businesses and new wealth, eventually resulting in increased economic growth.

The study concludes that education is a “public good” that benefits society as a whole as well as the individual—economically and in other ways that cannot be measured by economic growth. Education also enables Americans to be better mothers, fathers, children, voters and citizens.

Source: [www.house.gov/jec/educ.htm](http://www.house.gov/jec/educ.htm)

the students’ coursework will be college courses, taught by college professors for credit.

“One of our hopes is that not only will this help those hundreds who are in these schools accelerate their education and become more successful in college work, but we hope that these six schools will become a model for our regular, traditional high schools,” White says.

### Benefits for Business

Due to close collaboration with business interests, Utah’s high-tech, early-college high schools will be able to address the specific needs of businesses.

The schools’ curriculum focuses on relevant projects and real-life work applications. The emphasis is on active learning that counters the “spectator syndrome” found in much of public education.

“We’re very into cooperative learning, which is one of the answers to [complaints] from business—that students come out with skills but not the ability to use those skills collectively in a group to solve problems,” Jolley says.

“In the ninth grade,” NUAMES principal Gary Reed adds, “we start working with collaboration skills and problem-solving skills, and then each year, the level of this work increases. The idea is to get the kids not only confident and competent with the information, but also to have a good working knowledge of the success they need while they’re in an industrial setting.”

Besides just giving students the skills, the application and the motivation to succeed, the schools are trying to raise the level of the workforce in Utah overall.

“That’s one of the main thrusts,” Reed says. “We want to produce the white collar workers, not the blue collar workers.”

To really understand the needs of today’s businesses, the high-tech schools have many points of contact with the broader business community. At NUAMES, for example, four of the 12 teachers hired so far come from the private sector.

“They enrich the way our classes are

run and the rest of the faculty,” Church says of the AMES teachers he has hired from the business and technology world.

“These people are absolutely excited about what we’re going to do,” Reed says. “I think they’re excited because they know that they’re working with the ‘average kid.’ They see the opportunity for them to open the door for those kids.”

The kids may start out “average,” but the hope is that they won’t stay that way for long. Church’s concept of “rigor, relevance and relationships” provides a completely new educational approach for these students, an approach that requires significant input from the business community.

The schools are balancing many lofty goals. They’re aiming to build up local math, science and engineering degree programs, to support the Utah economy through an educated workforce, and to increase the number of students who enter and complete college.

“We hope that we will have a greater number of well-prepared graduates in those fields for companies to select from,” White says. “New companies that we’re trying to encourage to come in as well as existing companies who often struggle to find a sufficient number of engineers to fill the positions.”

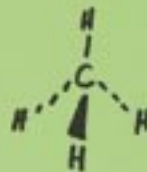
Church is seeing success already in his business partnerships, and says the business community is taking notice of these schools’ efforts.

“That’s one of the things that this project has done a really good job with under Leavitt and the legislative initiative,” Church says. “Teachers and students like to know that their work and their efforts are supported by IBM or Cadence or FatPipe or Altiris. I mean, to have Dave Asay of IBM come and walk around our school and talk to our kids, that really is reinforcing, not just to the students, but to our teachers and to our parents.”

Companies from Intel to NPS to Merritt Medical have an interest in the success of the early-college high schools, says Church, who is upfront about his hopes that student scholarships could arise out of these partner relationships, especially



Smells like



in here!

I Pity the fool  
that don't know  
MySQL!

since businesses have been extremely supportive thus far.

"Intel, for example, just gave us \$15,000 to run a summer school for our kids. I mean, that sends a message that there's a level of support for what our mission is, our vision is," Church says.

### Benefits for Students

"The Gates movement is based on finding those kids who are sitting in the back of a calculus class getting a C-, having never taken a book home," Jolley says. "They sluff English, but they don't go down to the Circle K and smoke, they're hanging out in the networking lab downloading the latest patch for Microsoft to turn into their English teacher for extra credit rather than reading a book."

Jolley points out that, for the most part, public and higher ed in this country is very successful, but there's a large population within those schools not being served.

"We're looking at a group of students who are sitting probably in the middle and not finding success at their potential and we're trying to find another door for them to open," he says.

The schools create a smaller, more personalized learning environment; provide a challenging, targeted curriculum; and work to build confidence in the students.

Research has shown, Jolley says, that smaller schools have a greater impact

on learning than do smaller class sizes. Students at AMES, NUAMES and Itineris will be part of a student body of 500, a drastic contrast to the Wasatch-front average of 2,000.

"Our kids give the tours [to visitors]," Church says. "They talk about their own goals. They talk about what they want to be. And they just have a sense that they're in a special environment."

On top of the skills and applications, the principals say, these students also need to know that what they're learning applies to real life.

"They'll often say to you, 'we're waiting for it to matter. We're waiting for it to count,'" Jolley says.

That's where the business partnerships come in; Church hopes the business partnerships will provide mentors and positive role models for students.

AMES has brought in several guest speakers who have made the concepts and curriculum applicable to students. One of these was engineer Robert Romero of AKT, who said, "If you want to blow things up and see rockets go up into space, which is a cool thing to do, you better understand math is important, and being able to read and write and research and talk in front of your peers is important," Church says.

Other guest speakers from the business community have included Overstock.com's Patrick Byrne, DirectPointe's Michael Proper and Merit Medical's Fred Lampropoulos.

### College Bound

There are many barriers, ranging from money issues to being overwhelmed by the college setting, that prevent students from enrolling in or completing college.

"Our hope is that our students actually end up graduating from high school with some college already under their belt," Jolley says. "They've got the rigor, they've got the navigation, they've got the self-confidence, there is less of an issue with their success at higher ed."

It will take work and commitment, but it is possible for these students to complete a bachelor's degree two years after graduating from high school, giving them a valuable head start. They'll start college as a transfer student and be able to apply for middle-college scholarship money right away and, Reed says, every year of college they complete at an early-college high school saves them \$7,500 in tuition.

Is it realistic to expect that very many of these students will accomplish this goal? Yes, the principals say.

Jolley projects that about a quarter of the graduates will be close enough to get their bachelor's in two years, and about half of the graduates will be within a semester.

And the remaining 25 percent?

"They'll still walk away with the sense that college is accessible to them," he says. ■