
Case Study

**Intel® Education Initiative**

Education

# Transforming Education in India with the Intel® Education Initiative

## Karnataka leads the way in transforming education with technology

Since liberalizing its economy in the early 1990s, India has experienced rapid economic growth—in 2006, the Indian economy ranked sixth largest in the world[1]. Goldman Sachs predicts that by 2050, India will be the world's third largest economy behind China and the US[2].

India's status as a global hub for IT services[3] contributes significantly to its meteoric rise—and technology looks set to continue as India's centerpiece its movement towards great economic power.


Key to maintaining India's lead in technology is the production of a skilled workforce that is in-tune with the global economy. To that end, India's education system has adapted rapidly to meet growing demand and to overcome significant challenges that include:

- Reigniting student interest in unpopular sciences
- Providing access to higher education and technology, which remain out of reach to a large proportion of Indian society
- Improving the use of technology as a tool to enhance learning

## The Intel solution

Intel has partnered closely with India's central and state governments to address the country's educational challenges and to accelerate the development of its educational system to meet the country's economic goals.

For several years, Intel has helped accelerate India's education system through the Intel Education Initiative. This multi-faceted initiative is designed to prepare today's students and teachers for tomorrow's demands—encouraging development of 21st century skills in Information and Communication Technology (ICT), critical thinking, collaboration, and creating a strong background in mathematics, science and engineering.

Though the Intel Education Initiative is an India-wide effort, we look in particular to the initiative's activities in India's eighth largest state, Karnataka.

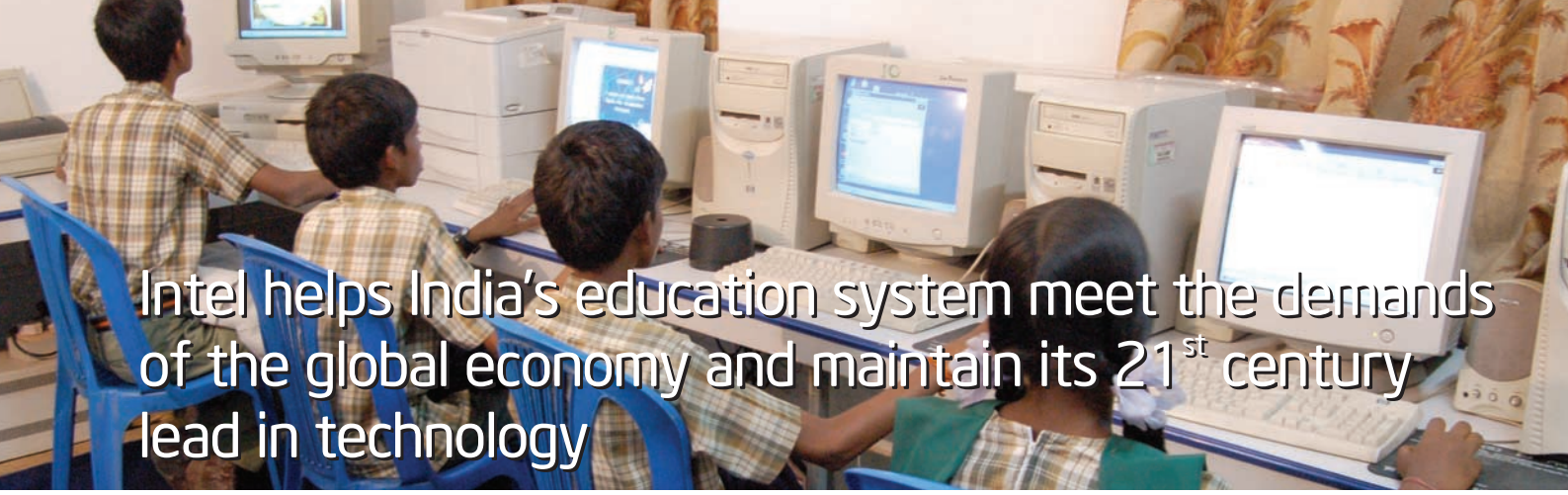
Karnataka's educational and literacy standards are above the national average and the state is home to India's premier educational institutions.

As India's IT services hub, Karnataka—particularly its capital Bangalore—has become a hotbed of activity for the Intel Education Initiative, including:

- Intel Computer Clubhouse
- Initiative for Research and Innovation in Science (IRIS)
- Intel Higher Education
- Intel Teach

Through these programs, the Intel Education Initiative helps equip Karnataka youth with the skills necessary to succeed in the 21st century.

At the same time, Intel helps build an efficient pipeline from schools to industry, ensuring Karnataka's graduates are well equipped to tackle the demands of the state's technology economy—providing other Indian states with a blueprint for how their educational standards can be rapidly improved with technology.



# Intel helps India's education system meet the demands of the global economy and maintain its 21st century lead in technology

## Intel Teach, Karnataka

At Intel, we believe that the Intel Teach Program bridges the divide between merely using technology in teaching to creating meaningful learning experiences. Worldwide more than four million teachers in 40 countries have completed the free Intel Teach training. Teachers leave the training armed with strategies to help their students develop digital literacy, creativity, critical thinking and collaboration skills.

In India, the Intel Teach Program was launched in 2000. Since then, over 690,000 pre-service student teachers and in-service teachers have been trained in the country. As the program expands to 13 more states in India, many more teachers and students are experiencing new ways of teaching and learning in the classroom.

### Teaching the teachers in Karnataka

Dilshadh Begam, an English teacher at Government High School in the Hire Aurrad, Gulbarga District, is one of the more than 18,031 in-service teachers in Karnataka to have successfully inculcated Intel Teach methods into the classroom.

"Earlier we taught Listening-Speaking-Reading-Writing (LSRW) skills. But after attending the Intel Teach Program we teach 21st century skills. These important skills include analysis, synthesis and evaluation skills, all of which are attained by our students earlier than before," said Dilshadh, who has taught at the school since 2004.

While completing her education degree, Dilshadh became interested in integrating technology in education. "I was never given the opportunity to use technology before I became a teacher, but I always had the idea—what I really wanted to do was incorporate technology into the classroom," she said.

Dilshadh was given this opportunity when she discovered the Intel Teach Program through her local District Institute of Education and Training (DIET), a teacher training college. With the full support of her principal, Dilshadh embarked on the 12 day course at the DIET. Dilshadh's attendance greatly benefited her school as she became the school's only Master Trainer, going on to train 11 other teachers.

"When I got an opportunity to attend the program, it proved to be a boon for the teachers, as we could use innovative skills in the classroom," said Dilshadh. "Because of the Intel Teach Program, I was able to actively integrate computing skills into the classroom," she said.

Dilshadh was instrumental in having Intel Teach initiated at her school, where over 320 students between 12 and 16 are taught a range of subjects—including English, Math and Science—before going on to college. The school was established in 1984 and caters to students from poor, rural backgrounds.

Dilshadh noted that the biggest challenge she faced was engendering a collaborative spirit among her students. "50 percent of our students are average, 50 percent are below average. The main challenge was participation and making all of them work together—gifted and below average—and to help them understand together, in the proper way," she said.

Dilshadh was able to achieve this collaborative spirit with the teaching methods she learnt through the Intel Education Initiative. "Besides LSRW skills, I now have the opportunity to use methods which are more participatory and that help to improve collaboration among students through team projects—there's been an overall improvement in results because of this collaboration," she said.

Since Government High School entered the Intel Teach Program, Dilshadh said that there has been an annual improvement of 10 percent in school leaving grades at her school. The collaborative spirit between students also helped the school's students garner prizes at state-level competitions.

This is reason enough for Dilshadh—who recently won an award for "Best Integration of Technology in Education" in Karnataka—to be happy with the positive change she helped bring to her students and community. "I believe that teachers are like candles illuminating the surroundings to bring positive change," she said.

### Inspiring Karnataka's students

Pavana and Pramoda, students from Koteshwara Government School in Udupi Village, are models of how the Intel Teach Program has brought positive change to students as well as their teachers in Karnataka.

When it was their turn to develop an open-ended project initiated by their teacher and Intel Teach Master Trainer, Reshma Kumari, the students

### Spotlight: Intel Education Initiative

- As a corporation dedicated to harnessing the power of technology to transform lives, Intel actively drives programs, policies and solutions that promote educational excellence all over the world.
- Educational initiatives, including Intel Teach, Intel Computer Clubhouse, Intel Learn, Initiative for Research and Innovation in Science, and the Intel Higher Education, are part of the Intel World Ahead Program:
  - Education forms a key pillar of the Intel World Ahead Program and plays a vital role in helping develop a skilled work force in any economy.
  - Educational initiatives are created in close association with Governments and Educators worldwide.
  - Under the Intel World Ahead Program, Intel is investing USD 1 billion over the next 5 years to enhance lives by providing access to uncompromised technology for anyone, anywhere.
- In India, the Intel Education Initiative plays an active role, helping to enrich the quality of technological and intellectual human resource available for the rapidly evolving technology economy.

were determined to use the computer skills they had learnt in class to create a project that would raise awareness about HIV-AIDS and to correct myths attached to the disease.

Their inspiration for the project came from a classmate who excelled academically but became physically weaker as the months passed. It was later discovered that he was tested HIV positive—the classmate eventually quit school. Pavana and Pramoda were shocked at the neglect and mistreatment their classmate received after his condition became known and were determined to change negative attitudes towards AIDS.

To the dismay of their parents and friends, while developing their project, the pair visited the local hospital to interview AIDS patients. Despite the lack of computers, electricity and Internet connectivity in their under-served community, Pavana and Pramoda trawled the Internet for all the information they could find on AIDS, creating a visually-powerful presentation that left a deep impact on classmates, teachers and villagers who viewed the presentation at Koteshwara Government School. Pavana and Pramoda also used the information they collected to educate and talk to people in their village about AIDS.

Recounting how they developed their presentation, Pavana said: "Learning how to use a computer and the Internet for information we needed made it easier for us to reach our goal of promoting AIDS awareness."

Despite the many challenges they faced, Pavana and Pramoda are proud of how they overcame their challenges to make a small difference to the community they live in. With the help of their project, the people in Pavana and Pramoda's village have a better understanding of AIDS and the ways in which it can be prevented.

Pavana and Pramoda were thrilled to win the 2006 Intel Technology Award for their project on HIV-AIDS awareness. Their teacher, Reshma Kumari, was especially proud of her students. "The Intel Award is a great encouragement to a school where some students manage just one meal a day. The lack of infrastructure has not hindered the students from being 21st century learners. I thank Intel for conducting these trainings which are complete professional development programs," she said.

**Empowering Karnataka's future teachers**

In Karnataka, teacher training is conducted at District Institutes of Education and Training (DIETs). Working with Intel Teach, Training Head at the Bangalore (Urban) DIET, Sabeerunisa, actively promotes technology in education.

Sabeerunisa's DIET was established in 2005, with the aim of providing quality education to teachers and through them, students. The DIET trains 4,500 teachers annually in mathematics, languages and with the help of Intel Teach, teachers learn how, when and where to incorporate technology into their lesson plans, with a focus on developing students' higher-order thinking skills.

"With the Intel Teach Program, we have ensured 100 percent implementation of quality training and technology-aided teaching," said Sabeerunisa.

Sabeerunisa believes that the focus of Intel Teach on developing 21st century skills has had a great impact on teachers and students. "These encourage deeper thinking, creativity, higher order thinking skills and inquiry based learning—they give teachers the motivation to teach more and more," she said.

Sabeerunisa believes that the Intel Teach Program enables teachers to overcome the limitations of blackboard teaching, particularly when it comes to teaching math and science. "With Intel Teach, teaching has moved outside of normal blackboard teaching, and students are encouraged to develop projects in other areas, for example AIDS awareness. With non-blackboard teaching, communication skills are also being developed," she said.

The Intel Teach Program has also allowed students to learn about ICT earlier: "Instead of learning about computers at a later stage, they have the full confidence of working with technology at a young age", she said.

**State support for the Intel Teach Program**

Much of the success for the Intel Teach Program in Karnataka is due to the extensive support it receives from state education bodies such as the Department of State Educational Research and Training (DSERT).

Founded in 1975, DSERT is aimed at providing academic leadership in school education. The department also provides qualitative improvement in school education through teacher training.

## Intel Teach in Karnataka: Overview

The association of the Karnataka Government, Department of State Educational Research and Training (DSERT) and Intel Education has been extremely fruitful since its inception in mid-2001. Schemes driven by Intel to promote ICT integration in Karnataka classrooms include:

- Teacher Development Program
  - Training program to integrate technology in daily teaching
  - 1,210 schools covered
  - 1,726 Master Trainers trained; 16,305 teachers trained by Master Trainers
  - Total of 18,031 teachers trained in Karnataka
- Training Program at District Institutes of Education and Training (DIET)
  - 32 teacher educators trained as Master Trainers at 18 DIETs
  - 256 teacher educators trained by Master Trainers, impacting 2,000 student teachers per year
- Support for ICT in education
  - Refresher courses and technology workshops for 460 Master Trainers on ICT integration.
  - DSERT and Intel jointly developed a project-based learning handbook for teachers to facilitate ICT implementation.
  - In 2006, Intel Teach oriented more than 1,150 principals in using ICT in education.
- Intel Teach contests for schools and teachers
  - Motivational tool for technology implementation in the classroom.
  - An annual "Best Use of Technology in Education" contest was jointly launched by DSERT and Intel Teach in 2003. Since then, there has been substantive year-on-year improvement in the quality and number of projects, with significant participation from rural communities.

"Intel Teach allows our teachers to develop leadership skills, learn teamwork, ICT integration with education and how to build our children's independence for the realities of life." Sabeerunisa, Training Head, Bangalore (Urban) DIET"

### DSERT: Driving ICT education in Karnataka

DSERT provides academic leadership in Karnataka, including the adoption of ICT in the classroom. Besides Intel Teach, DSERT has been actively involved in other projects to promote the ICT in Education, including the Mahiti Sindhu Project.

- This ambitious five-year project aims at giving free computer education and computer-based education to government school students from rural and economically poor sections of society.
- The project aims at enhancing the quality of education and introducing students to the world of opportunities computers have to offer.
- In addition to computer education, students learn mathematics, science, social studies and English subjects through computer-based education.
- Teachers involved in the project are given special training.

Y.T. Gurumurthy, deputy director of public instruction (DDPI), heads the Teacher Education Unit at the DSERT. As DDPI, Gurumurthy administrates teacher education in Karnataka at elementary and secondary levels as well as at pre and in-service levels.

Gurumurthy believes that training teachers with the Intel Teach Program is key to improving education in Karnataka and India. "Before the Intel Teach Program, we had computer programs in the schools, but they were not fully utilized. The Intel approach was different, in that it trained our teachers to focus on project-based, computer-based teaching. With the Intel Teach Program, our computers are being used in a better way," he said.

Gurumurthy has witnessed how the Intel Teach Program benefits teachers, principals and students: "Intel has greatly supplemented our department's objectives," he said. "Through their teachers, our students benefit from the Intel Teach with improved academic achievement," he said. "Intel has greatly added value to education in Karnataka," he said. "We fully support, and welcome new educational initiatives from Intel."

## Intel Computer Clubhouse, Bangalore

The Intel Computer Clubhouse network is another facet of the Intel Education Initiative in India. Intel Computer Clubhouse around the world provide a creative and safe after-school learning environment where children in under-served communities work with mentors to explore their own ideas, develop skills and build confidence through technology. The first Intel Computer Clubhouse in India was launched in New Delhi in 2001 and in 2002 Intel provided funding for an Intel Computer Clubhouse at Children's Lovecastles Trust (CLT), in Jakkur Village, Bangalore.

Bhagya Rangachar, founder and managing trustee of CLT, spent most of her adulthood in the US as a software developer before returning home to Karnataka ten years ago. Bhagya started CLT in 1997 by initiating a mid-day meals program that provided free lunch to malnourished children in Karnataka's government schools (the program is now run by the Karnataka government).

Bhagya soon realized that education was not a priority for many government school children and she decided to develop a learning enhancement program that built on the spontaneous mentoring she saw during the mid-day meals. To house this program, Bhagya constructed a multi-purpose resource centre in Jakkur village, next to the government school. This ensured maximum coverage for the school children from neighboring villages who attended the government school. "The idea for the resource centre, and the philosophy of CLT, was that we take the existing social structure and overlay our existing network to make the existing system more effective and efficient," explained Bhagya.

In 2002, Intel—impressed with the trust's work with government school children and tight community links—granted CLT funding for India's second Intel Computer Clubhouse. Intel provided complete three-year funding for the Intel Computer Clubhouse infrastructure, 25 fully-equipped computers, a music studio, a robotics lab, software including the Adobe Suite*, Sony ACID Pro*, as well as technical support and training. Intel also provided funding for CLT staff to attend global Intel Computer Clubhouse conferences and for three teenagers to attend an Intel Computer Clubhouse Teen Summit in Boston.

"The timing of the Intel funding for us was like a catalyst that helped us grow another pair of wings. With the support (Intel) built around us, we could really take off," said Bhagya. "The Intel funding helped us...reach a greater number of children...otherwise, we would have been limited and it would have taken us longer to reach these children," she said. Over 1,000 children from Jakkur and surrounding villages use the Intel Computer Clubhouse every year.

What impresses Bhagya most about the Intel Computer Clubhouse network is that it is well-designed, providing comprehensive training that does not replace the indigenous environment. This is important "because of our children, our problems are different and our social-cultural patterns are different," she said.

With the Intel Computer Clubhouse, Bhagya provides members with more than just a computer centre environment. "It's a place where the kids can come and use as an exploration space, as a mini lab. Youth can get together here when the streets and their homes don't have anything else for them," she said. "This is a very comfortable and safe place for them to figure out things together. Children are constantly experimenting and learning and building self-confidence while they're doing it."

To keep costs low, CLT depends extensively on volunteers who form over 90 percent of staff strength. Many, including Intel professionals working in Bangalore, spend

"We are thankful to Intel, for their enterprise to train large numbers of teachers in the state under their Intel Teach program. It is evident from teachers and students that the Intel Teach Program is not only empowering our teachers to use technology, but also actively promoting the development of critical thinking and important skills among students by adopting innovative methods like project-based and inquiry-based learning."

Basavaraj S. Horatti
Minister for primary and secondary education
Government of Karnataka

their weekends mentoring the children at the Intel Computer Clubhouse. With the Intel Computer Clubhouse open learning concept, older Intel Computer Clubhouse members also "soft mentor" younger members. "Technology is a great tool for the self-directed and peer-to-peer learning that is happening," said Bhagya.

A host of projects have been created by the children at the Jakkur Intel Computer Clubhouse, including newspapers, websites, short films and Flash presentations. With the Intel Clubhouse Village website, these children can share their work with Intel Computer Clubhouse members from around the world. "The Clubhouse Village website is an amazing platform for learning and sharing what works, what doesn't work and what are some of the problems in other underserved communities," said Bhagya.

**Enhancing learning with technology at CLT**

Overseeing all the CLT programs and volunteers is Sandhya Gatti, head coordinator at CLT. Before joining CLT five years ago, Sandhya was a teacher at a Karnataka private school. Dissatisfied with her school's unwillingness to move beyond conventional teaching methods, Sandhya decided to join CLT as it gave her a platform to try out "unconventional methods of making learning attractive".

Central to Sandhya's approach to learning is technology. "What I tried to do was come up with projects that involve technology and other mediums of learning like theatre, art and music, and to see how technology could enhance these projects," she said. "Project ideas evolve from discussion with the children; children come up with their own problems. This leads to a better understanding of their environment," she said.

"Technology makes a great difference to the way children learn because here there are no restrictions, there are no inhibitions...it's a fearless environment," she said. "The Clubhouse is an environment which makes the child feel like they belong and they're not afraid of making mistakes—there is no pressure on them," she said.

**Broadening horizons at CLT**

This fearless environment allows once shy youth like Raghaveendra, Asiya and Sunil to overcome their fears and to participate in confidence-building activities and to develop skills that can contribute to their community and to actualize their aspirations. All three youths have been active Intel Computer Clubhouse members for the past five years.

CLT coordinator Sandhya explains that the horizons of these youths broadened after attending the Clubhouse. "After they come here and worked on various projects, they begin to relate more," she said.

CLT founder Bhagya explains that Intel Computer Clubhouse members are self-motivated to learn: "They're picking up skills at an amazing pace because of the environment, which makes learning easier."

"There ought to be more Clubhouses because for youth at that age...if you have that nurturing environment instead of becoming a liability to society, they can become an asset," she said.

### Spotlight: Intel Computer Clubhouse members

- Raghaveendra, 17, wants to study computer engineering at university and "loves computers, especially music and Adobe Flash*". "I also like working with the Intel volunteers who've been a big part of my mentoring," he said.
- Sunil, 19, is well on his way to becoming a software engineer. Into his first year of a computer applications degree, Sunil was selected to attend an Intel Computer Clubhouse Teen Summit in Boston. "Before coming here I didn't know anything and had no understanding about computers," he said. "But when I came here, I learnt many things; now I can teach and mentor the others in software," he said.
- Asiya, 17, former editor of the Clubhouse newsletter also hopes to become a software engineer: "I like the Clubhouse very much and especially like the cooperation of members," she said.

## Initiative for Research and Innovation in Science, Karnataka

IRIS is the component of the Intel Education Initiative that focuses on promoting science to India's youth. It is a collaboration between Intel, the Department of Science and Technology (DST), Government of India and Confederation of Indian Industries (CII).

Merging two programs—Intel's "Science Talent Discovery Fair (STDF)" and DST-CII's "Steer the Big Idea"—IRIS has become India's largest science initiative, promoting science research among young Indian innovators between the ages of 6 and 35.

IRIS rewards outstanding projects, providing a platform for winners to showcase their work at the Intel International Science and Engineering Fair (ISEF). Intel ISEF is the world's largest pre-college science competition, providing young scientists an opportunity to display their work and win USD 4 million in awards and scholarships. IRIS winners also present their work at the International Exhibition for Young Inventors (IEYI)—an annual event that provides an additional platform for young inventors to display their projects on the international stage.

### IRIS/Intel ISEF spotlight: Karnataka winners

- Name: Aavishkar Apoorva Patel
  Institute: National Public School, Indiranagar, Bangalore
  Award: IRIS 2006 winner/Intel ISEF 2007 entrant
  Project: Coupled oscillator model for Grover's quantum database search algorithm
  Brief: Demonstrates how the energy of a coupled oscillator may be focused into a single oscillator--may be useful in the construction of nanotechnology devices
- Name: Prathik George
  Institute: Kendriya Vidyalaya No. 1, Bangalore
  Award: IRIS 2004 winner/Intel ISEF 2005 entrant
  Project: An algorithm for hidden and occluded surface removal from one or more viewpoints
  Brief: Evolves a technique for hidden and occluded surface removal of 3D objects from one or more viewpoints
- Name: Amruth.B.R
  Institute: Sadvidya P.U. College, Mysore
  Award: IRIS 2003 winner/Intel ISEF 2004 winner
  Project: Mechanical wave modulation and its applications
  Brief: Develops an effective shock absorbing system for decreasing the impact of waves by modulating amplitudes

**Popularizing science and creativity**

IRIS activities at DST are managed by the National Council for Science and Technology Communication (NCSTC), a body within DST. The NCSTC was established 25 years ago to stimulate interest in science and technology.

Anuj Sinha, NCSTC head believes that attracting young people to science through programs such as IRIS is crucial to the future of India. "A lot of our brilliant students go for management education and don't stay in science or research because management graduates get better offers in the service sector. If we are going to neglect our science and research then the economy will never really be sustainable. So I think the challenge for Intel and other well-meaning corporations, is to somehow realize these challenges and contribute towards finding solutions," he said.

Dr. D K Pande, principal scientific officer at NCSTC agrees. He believes that Indian children are drifting away from science because it requires more work and more talent to succeed. "These children think that they can get a more lucrative job with less work somewhere else. So one of our challenges is to get children with talent into science, and to give them a platform where they can showcase their inventions or innovations," he said.

NCSTC Head Anuj said that IRIS will also help India's youth think "out of the box" and be more innovative. "IRIS is focused on inventions and innovations...these are important skills that need to be nurtured, and that is why we have drawn up this IRIS Program," he said.

Principal Scientific Officer Dr. Pande noted that Intel wanted to develop a partnership with NCSTC because it had good networking with grassroots workers, and would ultimately benefit the targeted children. "Intel is a devoted organization. They are working for a good cause. Children are getting exposure and a platform to showcase their creativity. The NCSTC objective is similar, to provide a platform where these young, talented children, can showcase their creativity," he said. "IRIS helps the community, the children. This is our mandate, this is our duty—to work for them," Dr. Pande said.

**Bringing ideas to market**

The gateway to bring innovative ideas to Indian industry is handled by CII, India's largest industry association with branches around the world and with more than 6,300 industry members, encompassing small, large, medium companies in all the sectors.

Anjan Das, senior director and head of the Technology, Intellectual Property Rights and Technology Development Centre at CII cited two reasons for the confederation's partnership with IRIS. "Industry in this country is facing a huge problem of getting quality manpower. IRIS is one of the ways to attract more people to study science," he said.

"Today, if you look at the education system in this country, and what industry needs, there's a gap because people are not attracted to science. With IRIS, we are creating a large pool of youth that can come up with ideas that would ultimately benefit Indian industry," he said. "The second objective is that industries are looking for new ideas, and new ideas come from diverse youth who have huge potential. So what we wanted to do was link these new ideas to market," he said.

Anjan cited the Imperial Innovations Group*, a technology commercialization company owned by Imperial College London, as an example of a systematic framework of bringing ideas to market. "I think that kind of system we need to have ... to quickly move an idea to the market," he said.

Anjan explained that young people were avoiding science because they do not see career prospects. "What we have seen is some young inventor who's done some very innovative product. But in terms of career, he has chosen computer science. So he or she is not pursuing their talent because it is not rewarding in terms of future career—if we can add something to this IRIS system, we're actually leading somewhere," he said.

"With whatever small thing we're doing, we're creating excitement among the youth, that science and innovation is a career, and is ultimately going to help them as well as help the country. So I think IRIS helps ignite, helps kick off the whole thing," he said.

"Science and technology is the only tool we have to remove poverty and the imbalance in society. Children—those who are our future citizens—we have to pool their talent, tap their talent and provide facilities, infrastructure and opportunities so they can showcase their creativity."

Dr D K Pande
Principal Scientific Officer
Department of Science and Technology
Government of India

## Intel Higher Education, Karnataka

In India, Intel is working closely with premier universities and the government to enrich the quality of graduates for the country's rapidly proliferating technology economy. Part of a wider global program, the Intel Higher Education Program has introduced to India several initiatives aimed at raising tertiary education standards, including:

- Introducing a world-class curriculum in key technology areas developed by leading global universities
- Encouraging students to take up higher education in engineering
- Supporting faculty research programs that promote technology advancement
- Promoting innovation and technology entrepreneurship programs on campus

The Intel High Education Program has been especially active in Karnataka by partnering with engineering institutes, faculties and government to improve research and curriculum programs.

Shivan Srivastava, senior manager of the IT Development Workforce Initiative at the National Association of Software and Service Companies (NASSCOM), believes that higher education is crucial to sustaining the output of high quality IT professionals to meet global demand for India's IT services.

NASSCOM is the premier trade body of the IT software and services industry in India and recently held dialogues with Intel to combine their common goals of meeting India's IT human resource needs.

"It is critical that we work with a program, such as the Intel Higher Education Program, that sustains and promotes talent in order to strengthen India's competitive edge," he said.

"The Intel Higher Education Program gives talents a chance to be exposed to high technology, and provides an interface and exposure to upgrade talents and educational institutions," Shivan said.

"We want to focus on expanded university curricula, focused research, and the overall development of an advanced learning environment fostered by industry and education collaboration," he said.

### Building centers of technical excellence at TEQIP

As part of the Higher Education Program, Intel supports the Technical Education Quality Improvement Program (TEQIP), a Government of India-World Bank project aimed at improving technical education by establishing centers of excellence in key technology areas at engineering institutes in Karnataka. These centers of excellence will function as development hubs for technologies such as multi-core and VLSI.

Mr. S. Chandrashekhar, officer on special duty at TEQIP said that the program aims at linking centers of excellence to industry. This matches the objectives of the Intel Higher Education Program. "Intel has the objective of bringing the latest technology to institutions, so the IT workforce is ready for tomorrow," he noted. "We need to have qualified people in the knowledge economy and only with the participation of industry—who should be partners in the education process rather than clients—can this be achieved," he said.

Mr. Chandrashekhar noted that key challenges include creating adequately-qualified teachers and bridging the gap between industry and curriculum: "Normally academia doesn't respond well to change, and by the time they upgrade the curriculum, it could be time to upgrade—we need industry to help bridge this gap," he said.

He also emphasized the need to build communication skills: "Our students focus on developing engineering skills, so communication skills are neglected and when they graduate, they cannot cope," he said.

The Intel Higher Education Program is helping meet these challenges, as it "provides direction on where technology is going, especially in multi-core technology; it helps us to develop skills in technology that have yet to come to market," he said.

Since January 2007, TEQIP and Intel have been moving steadily towards establishing center of excellence. He also noted that Intel has been in touch with institutions on "an individual basis" and keeps them up-to-date with trends such as multi-core technology.

### Creating industry-ready engineering students at VTU

Visvesvaraya Technological University (VTU) is a premier engineering university in Belgaum, Karnataka, with 121 engineering colleges affiliated to it, offering post-graduate and undergraduate courses to over 38,000 students annually.

VTU was established by the Karnataka government to develop qualified engineering graduates for the needs of the economy.

VTU has been actively involved with the Intel Higher Education Initiative since January 2007 to introduce elements from the Intel Multi-Core University Program into its post-graduate Master of Technology (M.Tech.) course.

The Intel Multi-Core University Program is a global effort by Intel to educate academics and tomorrow's software developers in the advanced capabilities of multi-core processors. As part of the program, Intel recently conducted "train the trainer" courses for M.Tech teachers from all of VTU's 121 institutions. These teachers will go on to introduce multi-core and advanced computer architecture into the M.Tech. curriculum and train their students in the new technology.

Dr. Nandini S. Sidnal, who coordinates post-graduate courses at VTU, said that the course had a positive impact on VTU teachers, allowing them to gain hands-on experience in parallel computing. This helps them improve their teaching skills, ultimately benefiting students.

Of the many opportunities that drove VTU to partner with Intel, the most significant was being able to expose students to skills required by industry. "Students are now being introduced to an industry-relevant curriculum that fills the gap in serial and parallel programming skills. This builds their confidence," she said.

Intel is also helping VTU move towards Vision 2020, which aims at bridging the knowledge gap between academia and industry, said Dr. Nandini.

Moving forward, Dr. Nandini hopes that Intel will develop closer research partnerships in multi-core technology with VTU, which has over 1,000 faculty members. "Hardware has been growing so fast such that our applications cannot fully-utilize hardware resources. Intel has been doing this and we need their help in research," she said.

Intel has moved quickly in this direction, recently selecting VTU in March 2007 as one of ten centers of excellence across India for preparing academics and students to use next generation software applications for modern, multi-core platforms.

## Meeting 21st century challenges

With its all-encompassing education programs, Intel is reaching out to improve the lives of Karnataka youth from all economic backgrounds and at all ages.

The Intel Education Initiative exposes Karnataka youth to technology and provides access to technology-enhanced learning, helping contribute towards decreasing illiteracy rates and equipping youth with the skills they need to prosper in the 21st century.

Intel ensures Karnataka's graduates are in-tune with the needs of a technology-based economy while collaborative programs such as IRIS create a platform for Karnataka's students to showcase their talent—providing industry with a ready pool of innovative young talent.

Intel helps Karnataka maintain its position as India's IT and education hub, providing other states with a stellar model to emulate—helping transform Indian education and helping the entire country meet the challenges of becoming a leading global economy.

**Find a solution that is right for your program. Contact your Intel representative or visit the Intel education Web site at intel.com/education.**

### Intel community engagement in Karnataka

Besides Intel Education Initiatives, Intel is actively involved in numerous other community engagement programs aimed at promoting education in all sectors of Karnataka society. In 2006, over 75% of Intel employees in Karnataka were actively involved in community engagement programs.

- Since 2005, large numbers of Intel employees in Karnataka have participated in the Intel Volunteer Matching Grant Program (VMGP), devoting over 20,000 hours to under-privileged students at more than 25 government and five special schools in the state. Besides teaching subject classes, Intel volunteers bring under-privileged children on educational tours. Under the VMGP, the Intel Foundation grants USD 50 for school improvements and learning aids for every 20 volunteer hours. Over USD 50,000 has been donated to participating schools.
- Intel has been actively involved in a literacy development program, donating library books worth USD 10,000 to Akshara Jyoti, an adult literacy campaign. The books were distributed across more than 500 centers in rural districts of Bangalore.
- Intel set up a computer lab at the Devarabeesanahalli Government Higher Primary School to promote ICT learning. Intel employees also volunteered their time as mentors and distributed educational aids to the school.
- Intel established Technology Training Centers for the Intellectually Challenged in Bangalore and Mandya helping the intellectually-challenged create tangible, long-term financial independence. Over 60 special youth have been trained and over 50% of them have been helped with job placements.
- Intel started a dedicated technology lab at Bangalore central prison. New PCs and a customized curriculum enable the inmates to learn and prepare for a new life.



[1] CIA World Factbook 2007
[2] Goldman Sachs, "Dreaming with BRICs: The Path to 2050," Global Economics Paper, No: 99, 2003
[3] BBC News, "Multinationals lead India's IT revolution," January 24, 2007



0507/AUL/PMG/XX/PDF XXXXXX-001US