ESOA
EMEA SATELLITE OPERATORS ASSOCIATION

E-LEARNING VIA SATELLITE

Offering a Window on a World of Opportunities

Education is vital to the development of a productive society, and yet over 121 million children of primary and secondary school age cannot attend school.[1] There are a number of factors that prevent children from accessing education, but one reason – location – can be effectively addressed by the use of satellite connectivity. Satellite connectivity provides unique opportunities for education in situations where terrestrial options are not sufficient or realistic.

The United Nations has established a Sustainable Development Goal of ensuring inclusive and equitable quality education for all by 2030[2], but the lack of trained teachers in many areas of the world will make this "universal education" goal challenging. UNESCO's Institute for Statistics (UIS) has identified that over 68 million primary and secondary school teachers will be needed in order to achieve that ambitious goal.[3] Only satellite connectivity offers the geographic ubiquity that will allow students all over the world to access the most advanced teaching and educational opportunities, giving the whole world's students, both young and old, access to quality education that increases individual earnings, enables financial independence and increases a country's gross domestic product (GDP). Studies have shown that each additional year of schooling raises the average annual gross domestic product (GDP) growth by 0.37%,[4] and even one extra year of schooling could increase a student's individual earnings by up to 10%.[5] This connection between education and GDP makes it imperative that education be universally accessible.

1 https://www.unicef.org/education/bege_61667.html
2 http://www.un.org/sustainabledevelopment/education/
3 https://www.theguardian.com/global-development/2016/oct/05/un-universal-education-goal-fail-69-million-new-teachers-unesco
4 http://unesdoc.unesco.org/images/0019/001902/190214e.pdf
5 http://unesdoc.unesco.org/images/0019/001902/190214e.pdf

Satellite connectivity offers:

Ubiquity

Satellites are capable of providing global coverage with minimal ground infrastructure, allowing broadband to reach remote areas where deployment of purely terrestrial networks would be cost prohibitive. The broad area coverage offered by satellites makes them the ideal providers for networks servicing multiple isolated facilities, such as schools in remote and rural areas.

Quick and immediate access

Satellite coverage is available from the moment a satellite network is put into commercial use. All that is required is a user terminal that can also be used to enable WiFi for local communities. Moreover satellite broadband deployment is simple and quick, with system installation and activation within a couple hours.

Cost-effectiveness

Satellite networks are surprisingly cost-effective solutions. Terminals are easily and rapidly deployed at any location in the world, which makes satellite technology highly competitive when it comes to delivering connectivity to rural and remote portions of a country. Today's variety of satellites can deliver a wide range of services, including real-time communications and high-throughput downloads.

Reliability

Satellites are not vulnerable to natural and manmade disasters on the ground (unlike terrestrial networks), making them critical components at times of crises. Satellite communications are heavily relied on by the UN and NGOs to ensure education for displaced children, for example, in refugee camps. As portable, immediately available solutions, they can be relied on to deliver a continuous, "always on" service that won't be interrupted in the event of weather, emergency, or conflict. Satellites offer a predictable and constant quality of service everywhere, regardless of geographic location.

Quality

Satellite connectivity enables a high-quality classroom experience for students and teachers alike. Teachers can stream video lessons to their classrooms and use conferencing services for instant feedback as students complete tasks. In one-third of all countries, less than 75% of teachers were trained to national standards.[6] With access to the Internet, teachers can find resource materials and lesson plans, as well as receive online training to better address the needs of their students. Students themselves can use connectivity to complete research projects and access resources such as online libraries from different continents. And of course, the reach of satellites allows students to access the most advanced teachers and resources, regardless of location.

6 http://www.un.org/apps/news/story.asp?NewsID=47034#.WiCzr7Q-f-Y

Ubiquitous satellite coverage increases the ability of communities to use e-Learning programs as cost-efficient broadband is available to both the education facility and the student at home. Once a student has an internet broadband connection, s/he can find e-Learning resources online on cloud platforms, as well as access teachers using high quality voice and videoconferencing services. This allows students to connect to tele-education services, providing a high-quality education for those living far from schools or dealing with other issues that prevent access to education facilities.

Examples of eLearning via satellite from around the world

S. Africa	**Intelsat** has partnered with a non-profit called Mindset to deliver educational content across **South Africa**. Mindset generates different channels of video content ranging from health to education, and then broadcasts the programming over a wide area using capacity on Intelsat 17. The videos cover substantive content for students as well as provide instruction for teachers and district officials.[7]
Pakistan	**Yahsat** has partnered with TeleTaleem to bring connectivity to schools in **Pakistan** through the Ilm-On-Wheels program in 2012. Using a satellite-equipped van called School Garee, TeleTaleem brought connectivity to schools that lacked basic infrastructure necessary to benefit from such eLearning programs.[8]
S. Africa	**ESA** has launched a project called Space4education in 2012 to demonstrate how satcoms can help farmers, voters, and educators in rural Africa. This project has provided local teachers in **South Africa** with interactive training and qualification via satellite, thus assisting local communities by raising the quality of teaching in difficult-to-reach schools. The system was also used to open up the Internet to local communities outside of school hours.[9]

7 http://www.intelsat.com/wp-content/uploads/2017/02/5376-CS-Mindset-2016.pdf

8 http://www.teletaleem.com/?q=node/215

9 http://www.esa.int/Our_Activities/Telecommunications_Integrated_Applications/Satellites_improving_lives_in_rural_Africa/(print)

Jordan	**SES and SOLARKIOSK** launched a first-of-its-kind "Connected Solar School" in 2016 to deliver electricity, educational tools, and broadband internet connectivity to an education center run by UNICEF and Relief International in the **Zaatari refugee camp in Jordan**. At the time, the camp was home to more than 80,000 refugees, about 25,000 of whom were school-aged children who could benefit from quality e-learning materials sponsored by UNICEF.[10]
Papua New Guinea Galapagos Islands	The MEO (medium earth orbit) fleet operated by **SES Networks** provides connectivity to the **University of Technology in Papua New Guinea**. Faster internet speeds have helped students get access to a larger range of media formats and sizes, allowing them to complete in-depth research more efficiently. The same technologies have also improved the quality of video and voice services in the **Galapagos Islands**, allowing for easier communications across the archipelago.[11]
Brazil	**Hughes** has used **VSAT** technology to counter school attendance issues in **Brazil** through a program called **SEDUC-AM**.[12] Satellite video conferencing was used to transmit classes to 1,000 classrooms throughout the state of **Amazonas**, an area where the regional topography and lack of infrastructure made accessing schools difficult. The SEDUC-AM project covered all 62 municipalities in the state and benefitted over 30,000 students.[13]
Kenya and Tanzania	**Avanti** has established several educational projects in Africa, notably Project iMlango which has been deployed to schools across **Kenya** and benefits 150,000 children, 68,000 of which are "marginalised girls" [14]. Another Avanti project, **iKnowledge**, focuses on training teachers across **Tanzania** with the ICT and digital literacy skills needed to bring the classroom into the digital era. Thanks to the project, African children can Skype with their Irish counterparts to discuss science experiments. Avanti's ECO initiative aims to deliver 500,000 connected communities across sub-Saharan Africa by 2020.
Kenya	**Inmarsat** together with the **UK Space agency** and the **Open University in Kenya** has worked on a project providing connectivity to different rural schools that benefited from the OU's Open Science Laboratory, a virtual laboratory that allows students to conduct scientific experiments on-screen, manipulate scientific apparatus and analyse the results as they would in an actual physical laboratory.[15]
India	**Hughes** has also used satellites combined with medical training software to help doctors pursue post-graduate education in **India**. The Delhi Academy of Medical Sciences and Dr. Bhatia Medical Institute use satellites to reach remote areas, enabling doctors to attend lectures from their own towns. Not only does this save doctors the expense and time of traveling to metropolitan areas for instruction, but it also allows them to continue their current practice while receiving further training.[16]
Saudi Arabia	**Arabsat** partnered with **Saudi Netlink** to provide a "Connected University Platform" by delivering live video lectures conducted at Jizan University and distributed across the country on Arabsat satellites. Further educational activities were carried out by providing video conference connectivity between Bisha's Education Department and six rural areas of **Saudi Arabia**.

Conclusion

New generations of satellites are providing high throughput, low latency connectivity in areas that cannot be supported by terrestrial means. Not only does satellite connectivity benefit students with access to online courses and research databases, but it also provides training and programming for more effective teaching.

Satellites are necessary to achieve the UN's goal of ensuring inclusive and equitable quality education for all by 2030. Governments and policymakers are well advised to make best use of this immediately available technology.

10 https://www.ses.com/press-release/ses-and-solarkiosk-bring-power-and-internet-education-centre-jordanian-refugee-camp
11 https://www.ses.com/case-study/unitech
12 http://www.hughes.in/CaseStudies/HUGHES_-_CASE_STUDY_-_SEDUC.pdf
13 http://www.hughes.in/CaseStudies/HUGHES_-_CASE_STUDY_-_SEDUC.pdf
14 https://www.gov.uk/government/news/uk-tech-companies-deliver-e-learning-to-kenyas-marginalised-girls
15 http://www.open.ac.uk/alumni/sites/www.open.ac.uk.alumni/files/files/OpenMinds2016.pdf
16 http://studylib.net/doc/8824370/wireless---south-asian-wireless-communications#