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EMPOWERING THE FUTURE OF EDUCATION

HOW NEWTEK AND NDI® ARE AT THE FOREFRONT OF AV SYSTEMS FOR THE EDUCATION SECTOR

In association with

NewTek™

FUTURE

source: Matt Ferguson

EMPOWERING EDUCATION

Utilising NewTek and NDI® for next-generation connectivity and workflows

It is only in the last few years that there has begun to be parity between technology geared towards entertainment and that which is developed with education in mind. This is something that can be observed in the whole trend towards not only remote hybrid learning but also 'edutainment', where technology is a critical enabler of experiences that blend fun and learning to keep pupils engaged. As the impetus to incorporate high-quality video (and audio) into teaching sessions, lectures and presentations has grown, the crossover between these areas has intensified. Increasingly, organisations in the education space are turning to affordable broadcast-grade solutions to engage with students and ensure that they remain attentive and responsive.

Even before the dramatic events of recent years, The solutions being chosen within education needed to be supportive of collaboration and remote access. Enabling contributions from participants elsewhere on campus and off-site had become increasingly important to educators – and, consequently, a determining factor when it came to investing in video and communications systems.

COVID-19 has only served to accelerate a trend that has clearly found favour with the majority of students; indeed, a recent 2021 round-up of statistics by Mark in Style indicated that 82 per cent of students preferred a blend of in-person and online teaching to a classroom-only approach. Increasingly, 'hybrid' is the buzzword as educational institutions look to move more rapidly into the online learning world. Consequently, as they contemplate the next round of investments, they are bound to be placing more emphasis on technologies that support flexible, 'next generation' workflows.

This is something to which NewTek can attest to as its presence in this market – spearheaded by NDI® technology – has expanded considerably during recent years. Increasingly, educational customers have turned to NDI® and a growing ecosystem of compatible, software-defined products to communicate, deliver and receive high-definition video – all while maintaining low latency and frame accuracy without any reduction in quality.

In this eBook, we will explore the new possibilities for learning enrichment that are being opened throughout education. From schools to universities, we will show how NewTek, and NDI together are empowering teams everywhere to reach beyond what was previously thought possible. In the process we'll demonstrate that when it comes to video in education, the best is yet to come.

82 PERCENT
of students preferred hybrid learning over traditional
Mark in Style

NEWTEK AND NDI BROUGHT TO LIFE:

University of East Anglia (UEA), UK

NDI enables 'intuitive and simple' CAD review for students

Based in Norwich, England, the University of East Anglia (UEA) is known for world leading research, encompassing four faculties and 26 schools of study. In 2019, UEA announced that it would be establishing Productivity East – a new regional hub for engineering, technology, and management. With investment from UEA and a grant of £4.5m from the New Anglia Local Enterprise Partnership for Norfolk and Suffolk, Productivity East was designed to provide students, academics, and businesses with a base from which "to explore new ideas to develop prototype designs and create innovative products and services."

Delivering this ambitious facility required the UEA – and key project partners New Anglia Advanced Manufacturing and Engineering (NAAME) and TechEast – to negotiate a series of technical obstacles, including the provision of an AV solution for the facility's CAD teaching studio. One of the primary requirements was for students to be able to review detailed CAD models presented by the academic or session tutor while sitting at their own workstations.

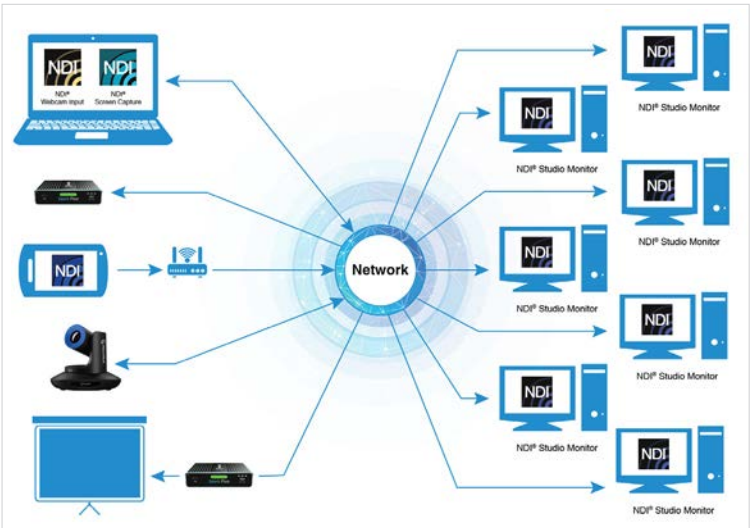
The design teams decided that they needed to find a way to deliver presentation content to student workstations in an "intuitive and simple" manner. According to Matt North, Head of AV Solutions (ITCS) at UEA: "While we didn't require lossless compression of the content, we did need to ensure that the resulting image delivered to the student desktop was of high quality to ensure students could discern the detail of the presented content."

Awareness of NDI as a leading protocol in this field as well as its functionality, intuitive software, and suitability for use on the UEA network meant that it was soon determined to be the most appropriate solution. Once specified, NDI was demonstrated to dispel any lingering concerns about "the practicalities of a software to desktop solution," while

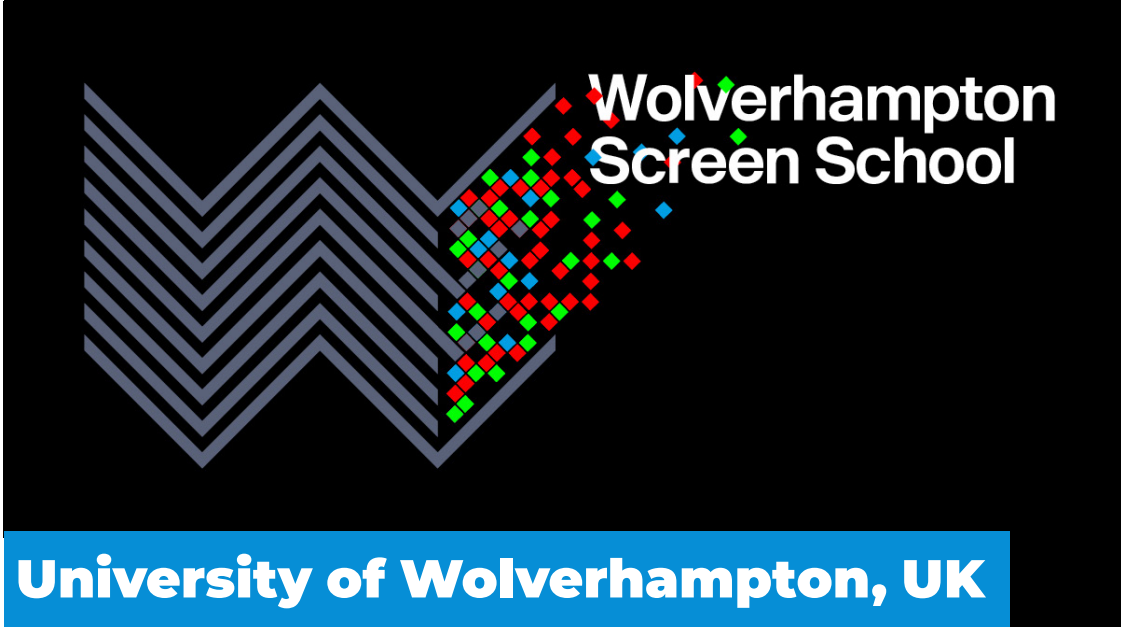
NewTek and UEA's own network team were able to find a quick resolution to some early issues involving managed device firewalls.

The end-result is that the CAD studio now has a very effective software-based solution that is popular with staff and students. It's also resulted in significant cost savings especially given Studio Monitor received at every student desk is a free application, like the rest of the NDI Tools suite.

Whilst the initial deployment revolves around a simple workflow, thought is now being given to extracting more value from the solution by improving opportunities for collaboration by sharing desktops and content across all the workstations. In the meantime, **NDI has already been enlisted at another UEA facility to provide additional functionality, with North adding that he is "now comfortable in selecting this technology as a solution for the right scenario**."



NDI Tools based classroom can dramatically reduce cost and equipment.



University of Wolverhampton, UK

NDI and TriCaster deliver next-generation media training

With three campuses across the West Midlands in Wolverhampton, Telford and Walsall and facility in Burton, Staffordshire the University of Wolverhampton has at its foundation the values of innovation and opportunity. The values are combined in the University's many high-tech sites, including a recently modernised facility that makes use of NewTek's NDI and TriCaster solutions for the teaching of broadcast, corporate and esports production.

The new University of Wolverhampton Screen School has been transformed to create state-of-the-art teaching facilities and equipment with the aim of boosting skills in the digital arts and media industries.

Students will benefit from a new production space, an equipment media store, a video studio with movable partitions and a large multipurpose studio. There are also new Mac labs, edit suites, staff offices and a production base room.

The new industry standard facilities include a green-screen, three-camera TV studio with an adjoining production gallery. There is also a new radio studio which reflects the layout of BBC local stations. News readers have access to a second bulletin studio and the technical kit and software will enable the replication of the workflows of national news journalists and the running orders of professional news programmes.

The core courses taught at the Wolverhampton Screen School are animation, computer games design, film and television production, multimedia journalism, computer science, cyber psychology alongside proposals for a new course in visual effects.

The unification of these disciplines reflects the remarkable crossover of technologies that now takes place in many areas of broadcast production. For example, the specification of systems for corporate media – such as streaming presentations – frequently entails the use of what might be termed 'broadcast-grade' solutions.

So, it made perfect sense that for its recent broadcast training facility upgrade at its Wolverhampton City Campus, the focus was on providing support for more flexible contributions. According to a spokesperson "The aim of this project was to update the existing facility to include more functionality as well as the ability to input sources from mobile phones, studio cameras and location cameras."

As an existing user of NewTek products, the company was always in prime consideration for the facility upgrade. As an affordable and multi-faceted media production solution, TriCaster covered a lot of bases for staff and students. In particular, the facility was keen to utilise Live Story Creator, which is a powerful feature that offers a new way to make productions more streamlined and efficient using Microsoft Word and Google document-based NDI - teleprompter and automation.

The selection of NDI for versatile connectivity was also an integral element of the upgrade – not least in allowing its production spaces to be used more flexibly. As the spokesperson notes: **"NDI offered us the flexibility and connectivity to develop our facilities and bring together the two previously separate TV production areas into one facility."**

The provision of "excellent training materials" enabled staff and students to get up-to-speed with the latest equipment. Subsequently, the new technology has given the department all the anticipated new flexibility – and more. Examples of increased production opportunities include the ability to take live camera feeds from areas surrounding the campus and execute production tasks in other University premises.

UNIVERSITY OF WOLVERHAMPTON

Mianyang Teachers' College, China

Leveraging next-level technology to cultivate media talent for teachers

A new 4K/HD All Media Production Centre has been built for the School of Communication at Mianyang Teachers' College. The Centre supports multi-scene, multi-functional practical training, and teaching, 4K studio system, IP-based production process, and multi-person off-site interaction.

The Centre puts together 80+ new smart devices, including 4K camera with NDI converters, a TriCaster centred 4K studio system, NDI management and scheduling system, off-site mobile interaction system, intercom system, lighting control system, fresh air system, teleprompter system, and interactive telestration system.

The Centre is divided into zones such as virtual live streaming, seated interview, standing interaction, anchor dialog, off-site interaction, and classroom observation. It is complete with IP transmission, transcoding, calibration, recording, virtual set studio and social media live streaming. It can also be input from an existing baseband such as SDI, HDMI, NDI source, cell phone, and computer NDI sources.

Much of this was done using a NewTek TriCaster® TC1 with its advanced production capabilities. The TriCaster TC1 enables a full IP workflow including signal programming, conversion, scheduling, and recording, as well as virtual studio and live streaming outputs.

The project answers the need for talent training among communication schools in the context of media convergence. All-media multi-channel live program production allows news broadcasts, virtual broadcasts, and interviews, among other sorts of programmes.

The 4K UHD (Ultra High Definition) programs, shows, activities, and athletic events may be produced live, and native 2160P videos can be viewed at 60 frames per second.

The four-channel virtual studio enables high-quality virtual keying, video composition, and VR program production. Furthermore, an unlimited number of HD NDI feeds can be transmitted across the campus network to all classrooms, and all camera signals can be relayed from the campus network to the studio.

Interactive program creation, teaching, and internships may all be conducted remotely showcasing a truly hybrid learning environment.

The 4K/HD All Media Production Centre is outfitted with cutting-edge technology alongside a robust and comprehensive system and workflow, it lays the basis for convergent media construction and future teaching. As informatisation moves more deeply into education, larger steps are required in reforming teaching, optimising teaching administration, and innovating teaching models.

MIANYANG has future-proofed its studio to prepare the next-generation of teachers across China, with the most advanced, hybrid technology.

source: Matt Ferguson

Guildhall School of Music & Drama, UK

Enabling greater flexibility of production in the pandemic era

Based in London, the Guildhall School of Music & Drama has an extraordinary track-record for producing some of the most enduring creative talents in the country. Amongst its many famous alumni in the music world are Beatles producer and pianist Sir George Martin, classical trumpeter Alison Balsom and opera singer Sir Bryn Terfel, while Hayley Atwell and Damian Lewis are just two of its more recent drama alumni.

source: Matt Ferguson

But it was in the music department where the Guildhall's most significant recent technology update took place. Prior to the pandemic, the need to capture up to 8,000 recordings per year as part of regular assessments of students' progress in orchestral music and performing arts – as well as many live performances and other events – was putting a strain on the existing audio infrastructure. With logistics becoming even more challenging once COVID had arrived, head of recording & audio-visual Julian Hepple was invited to consider what improvements might be made.

"When COVID-19 hit, the school asked if there was anything it could do to the digital infrastructure to support us through this pandemic, as well as improve our teaching and learning facilities for when we opened up again," he recalls.

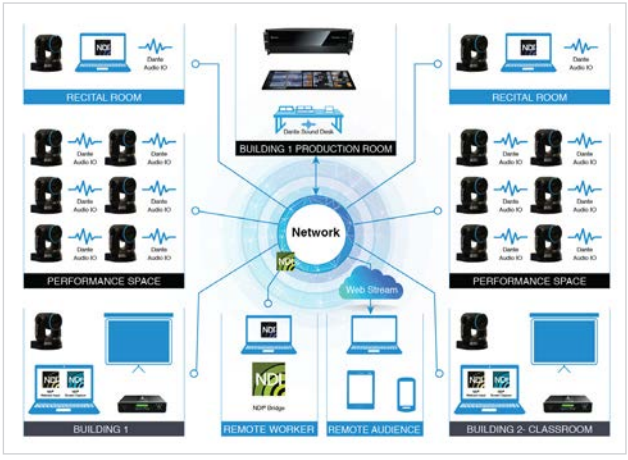
With social distancing rules meaning a huge reduction in the number of performers that could play in the concert hall at the same time, and the need to accommodate more streaming productions and remote collaboration than was previously the case, the emphasis for the new infrastructure was firmly on versatility and flexibility. General efficiency of operation and ease of use were also paramount given that, on some days, the team might have to record and stream as many as five separate performances.

This challenging blend of requirements ultimately led to the specification of a workflow based around NDI and Audinate's Dante media networking technology. In terms of actual production equipment, a NewTek TriCaster® is at the core of the set-up, while there are also multiple other components using the NDI protocol – including BirdDog NDI PTZ cameras and SDI-to-NDI converters and upgraded existing Panasonic PTZ cameras.

The campus-wide NDI network was devised by a team led by Guildhall recording and AV – network and systems manager, Sam Ziajka, with help from NewTek and technology solutions reseller and workflow design team Altered Images. The network covers a total of four buildings in different parts of the campus and works seamlessly with the existing, now expanded Dante network. Staff configure the IP video workflow to suit their requirements through NewTek's LivePanel browser-based interface enabling control of the NewTek TriCaster by even inexperienced users, for up to four separate events simultaneously.

The NDI KVM function on TriCaster enables direct control through the free NDI Tools Studio Monitor application from anywhere on campus, even off-site. As a result, says Ziajka, **"we can log into any machine on our network and route the picture and sound to where we need it. We got latency down to about two frames on the devices across the network."**

The new system was in place and fully operational ahead of September 2020's Gold Medal Final – an event that has taken place continuously for more than a century. Since that time, it has been used to produce two full seasons of digital content involving multi-camera, multi-room performances.



A single Newtek and NDI environment can span multiple space types, even buildings and geographies.

FOUNDED IN 1915

and surviving two world wars, the school's Gold Medal competition takes place even in the pandemic.

FUTURE-PROOFING EDUCATION AV WITH SOFTWARE-DEFINED SOLUTIONS

By Liam Hayter, senior solutions architect, NewTek

Over the last 20 years, we have seen many shifts in the digital space for content creation, distribution, and delivery. Audio and video are no exception. The need to connect remotely and deliver with flexibility, regardless of location, has brought about a wave of change that has been reactive versus proactive.

While AV-over-IP is not strictly new to education facilities, to date these implementations focused on using Ethernet in a very linear, point-to-point fashion that echoes the limited structure of traditional audio and video transmission, typically confined to each teaching space.

The forced move to remotely delivered home working and learning moved us whole-scale from these fixed audio and video cabling and infrastructure in closed locations to embracing the use of distributed AV in more flexible manner, leveraging tools and approaches that would previously have been considered alien to teaching.

During this transition, NewTek has established itself as a leader in IP-centric media production, most notably for the live streaming delivery market and through NDI®, our freely available AV-over-IP protocol. We have evolved to meet the needs of the emerging hybrid space between content creation, AV distribution, contribution, and most recently, video conferencing, to provide powerful centralised hubs for the ever-changing education sector, both now and for the future.

While AV-over-IP is the trend that has sparked the adoption of software-defined solutions, we are beginning to see a shift beyond AV-over-IP to complete AV-over-IT. AV-over-IT, which you may have heard of, and likely will be one of those buzzwords that is inescapable in the near future. AV-over-IT is about complete delivery of audio and visual experiences through entirely software-defined workflows on computers through standard networks. Traditional single purpose AV specific hardware is essentially not needed, particularly if legacy equipment is not desired in the workflow.

Effectively, the crux of the future of hybrid workflow is dependent on a strong network and IP protocol and the move to establish this is ushering in software-defined AV-over-IT. AV-over-IT encompasses NewTek's approach of computer, software, and networks – something which has always been a deep part of our innovation – and these elements all need to work together to enable quality remote and hybrid ecosystems, including in education, to enable collaboration and communication in any situation.

In a hybrid future – convergence of AV and IT is key

Remote working and video conferencing teaching/training are the new normal and will not change in the future. As remote AV users, we are in fact already utilising an AV-over-IT approach on the devices we already have, e.g., mobile devices, computers, software, and networks.

With the likes of software applications such as Microsoft Teams now adopting our AV-over-IP protocol, NDI, in every downloadable instance, video conference is not just for a singular service or one room; it can now seamlessly extend into v ideo production.

Pan Tilt Zoom (PTZ) cameras, originally developed for broadcast, also moved swiftly into the AV market. They enable reduced operator count and a more affordable way to capture in-room activity. PTZ cameras have also adopted software-defined AV-over-IP, and alongside our own cameras, major

SOFTWARE DEFINED
solutions reduce carbon footprint and drive better ROI.

brands such as Canon, Panasonic, Sony and many more now offer NDI as the protocol to deliver this into broadcast and AV verticals simultaneously.

Whilst the ease of sending and receiving AV between end points is a liberating service, it is NDI's ability to be creative with these sources through mixing, recording, delivering, and streaming online that sets this approach apart. This is where NewTek's software and computer defined TriCaster family can take any educator's AV to the next level by providing powerful content creation hubs that can gather sources from baseband, IP, or video conferencing platforms together to be accessed anywhere on the network.

Hardware is only as powerful as its software

The key benefit to an AV-over-IT workflow is robust software. A software-defined approach from the ground up eliminates the need to invest in expensive, specific devices – but instead makes it possible to integrate flexible software with existing devices that educators and students already have. Windows, Mac, Android, and OS can all utilise free NDI tools that enable computers, mobile devices, phones, and tablets to serve as powerful teaching and learning tools.

Teachers' or students' devices can then speak the same protocol as production tools. Displays, e-learning systems and video conferencing can blend and empower users to create engaging learning experiences for remote students.

The ability to add new software onto existing devices helps save on costs but also adds impressive new opportunities. It also enables a more sustainable environment that can update flexibly in the future without the need to purchase expensive kit.

The future of education is AV-over-IT

The next leap in the integration of AV and IT goes beyond interconnected rooms, buildings, spaces, and services. Specifically, it's all about breaking beyond the campus, beyond streaming and beyond conferencing, and bringing all these together on a global scale. We also refer to this as distributed AV, or distributed production.

Distributed models are about much more than moving things to the cloud. Instead, they are about placing endpoints such as PTZ cameras and microphones where they're required geographically, while also providing two-way control and feedback for a richer remote experience. Crucially, this is achieved without having to replicate core processing at every location, enabling collaborative, interactive content creation and distribution in a more cost-effective and energy-efficient way.

We've already introduced the toolkit to permit this – through NDI Bridge and NDI 5. With these capabilities we are pushing what was previously thought possible in hybrid remote learning and delivery.

NDI Bridge provides purely software-defined encrypted gateways that easily and swiftly allow connectivity over Wide Area Networks (WANs) and even public internet. Once enabled, AV-over-IP feeds and AV-Over-IT devices can be shared peer-to-peer as though they were in front of you, on campus, or even at home if desired.

This workflow achieves cooperative learning between campuses and institutions. It connects classrooms, auditoriums, remote and local learners, guest lecturers and more.

In turn, educators and IT/networking teams can rapidly pivot to remote workflows, whilst also amplifying the experience of distance learning to create next-level learning content and environments for the future of the education sector. The result is more impactful engagement without compromising on quality. It's often at a more affordable cost point as well from both OpEx and Capex perspectives.

Education doesn't exist without collaboration

As next generation as these technological leaps seem, and regardless of the power of the technology itself, it's the collaboration that makes it all possible. Success extends right back to the start of an institution's journey into AV-over-IT.

Key stakeholders, educators, AV, IT, and networking teams brought together from day zero on a project with the right system integrators and vendors make these transitions smoother and not just flexible – but also fun and collaborative to achieve, and ensure it's done correctly the first time. So, you've heard the benefits, you've read about it being the future... the question now becomes; do you have the right team to achieve the AV-over-IT future?

ASSEMBLING AN AV-OVER-IP DREAM TEAM

Above all, the case studies and thought leadership within this supplement indicate how it is now possible to produce, stream and broadcast a huge variety of teaching and other educational events – assuming you have taken the time and trouble to assemble the most capable 'AV-over IP-dream team.'

At the most fundamental level, this involves putting in place a networking technology that underpins a comprehensive and extensive product ecosystem. This is precisely what education customers can access by using NDI enabled NewTek solutions, whose surrounding product ecosystem and information resources have resulted in an ever-growing circle of adoption across sectors. Hence, in education, it has been deployed in a broad spectrum of teaching and academic environments – ranging from broadcast-style suites and concert halls to practice spaces and lecture rooms.

NewTek and NDI make it easy to work with AV, with familiar devices and controls, name-based operation and more. But the greatest benefit of a software-defined IP environment is the ability to shape it to your needs as opposed to being tethered to a rigid, limited environment. All of the developments examined in this eBook show that, despite their diversity, educational applications of all kinds require the highest possible quality audio and video. With plenty of emerging technologies set to impact the sector over the next few years at the same time as hybrid learning expands, making a decision now in favour of AV-over-IP and IT deployment is eminently sensible. And by fostering an inclusive approach to technology from the start, schools and colleges can ensure they take their staff and pupils on that journey.

The key though, to success in this remote hybridised world and to embarking on an AV-over-IP and IT deployment requires the right team, empowered by the right technology for success.

To help you audit whether you have the right team in place we've assembled a short checklist:

- Teaching staff and users
- Student representatives
- IT department
- Networking and security departments
- Network vendor
- NewTek certified Channel Partner or Systems Integrator
- NewTek Professional Services

NDI is a technology that brings the AV and IT worlds closer together, meaning that however your operational team is configured – for instance, whether your AV and IT departments are separate or combined – there will be no major learning curve.

NewTek University and continuing personal development

It is likely that in some cases, the use of NewTek and NDI will initially be limited to a specific project or campus. Individual sites may then wish to start using the technology once they have become acquainted with its benefits or may see the value in being applied to other campuses or facilities.

To support both initial and subsequent implementation, NewTek provides a wealth of information resources and training opportunities through NewTek University. NewTek University has awarded thousands of diplomas and hundreds of certifications to over 319 distributors, systems integrators, partners, and other solutions specialists. These courses and complimentary training materials can be used to develop the understanding and awareness of staff and students alike, ensuring that everyone's knowledge keeps pace with the technologies they are using, including many courses on NDI and building a video over IP network.

For more information, visit www.newtek.com

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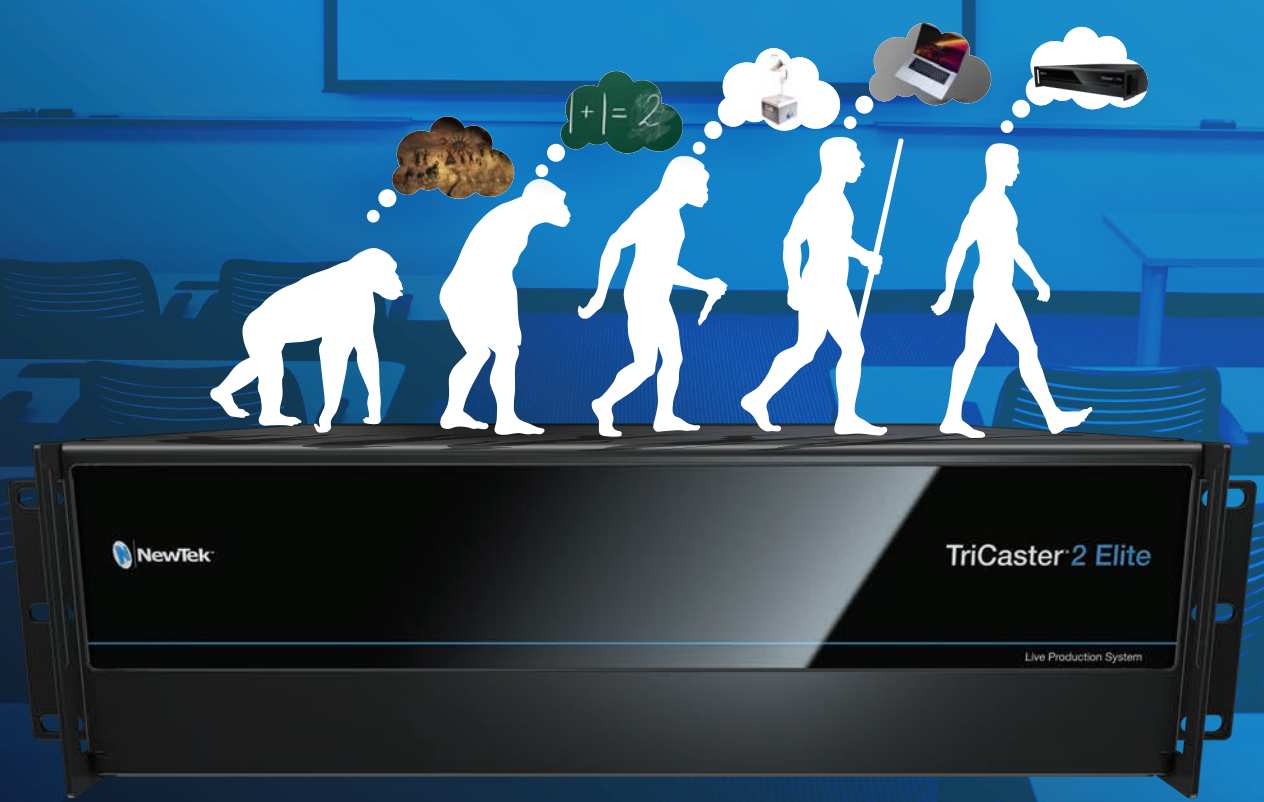

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