

Screen Production for Education: Digital Disruption in an 'Ancillary' Market

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Submitted to Media International Australia April 2016. Published online 14 November 2016

The thoroughgoing digital disruption of the entertainment-based screen industries has now been well documented (Cunningham and Silver 2013; Holt and Sanson 2014; Curtin, Holt and Sanson 2014). But the factors that drive digital disruption are in no way unique to mainstream media industries. The distribution and use of screen content in education – whether that content is produced for educational use in the first instance, or whether it has been produced for entertainment or other purposes and is repurposed or reused in educational settings – in many ways parallels the experience of the broader screen industries. Just as traditional entertainment platforms, particularly broadcast television, cinema and DVD, are being challenged by new online services, so too traditional modes of distributing and accessing screen content in education are being disrupted by new online services.

The huge volumes of global content available on new digital platforms, especially YouTube, and the ease of access to that content in formal education (despite the proscriptive efforts of some education authorities¹) have created both challenges and opportunities for content producers. The advent of digital technologies in classrooms coupled with changing theories of literacy and learning have facilitated increased use of screen content in formal education.² New forms of content and new practitioners are emerging to service the growing demand, while existing producers and distributors, lacking up-to-date platform affordances and data analytics, often remain ignorant of how much of their work is used in education, where or how it is used. In Australia, the education sector could offer new opportunities for screen producers as the series of laws and regulations that have mandated the availability of locally produced and sourced screen content on television are coming under pressure from technology change and service innovation. Rules requiring minimum amounts of Australian content on commercial television, justified on social and cultural grounds, have been in place since 1960. Currently Australian content on commercial television is regulated by the Broadcasting Services Act 1992, by Television Program Standard 23 (which requires that Australian-produced advertisements make up at least 80 per cent of annual advertising time on commercial free-to-air television), and by the Australian Content Standard. The latter instrument

¹ In the United States, many school districts imposed blanket bans on YouTube, fearing that they would fall foul of the Children's Internet Protection Act (2000), which requires schools or libraries that receive federal funding for technology or technological services to block or filter websites that may contain obscene or offensive material (FCC 2014). Many districts subsequently dropped or modified the bans, as discussed below in more detail. In Australia, the Queensland State Education Department permits teachers to access YouTube, but explicitly bars student access, as discussed further below (DET 2012).

² In particular, 'multimodality' and understandings about the ways of understanding education through multi-modal texts including in particular audio visual texts, have been key here. See for example Anstey and Bull (2006), Kress and Van Leeuwen (2001), Kress (2003, 2010).

requires commercial free-to-air television broadcasters to screen a minimum of 55 per cent Australian content across the broadcast day. The Standard also imposes a set of sub-quotas requiring the screening of minimum amounts of first release drama, childrens, and documentary. A different, expenditure-based set of rules apply for certain subscription television channels, but ‘over the top’ online services such as YouTube and new subscription video on demand services (SVOD) such as Netflix (which commenced operations in Australia in 2015) are not subject to the Australian content rules. The Australian public service television broadcasters ABC and SBS are also exempt from the Australian content rules, although the Charter of each organization outlines a set of expectations about the kinds and origins of programming that they screen that effectively increases the volume of Australian content on broadcast television. This has led to increasing lobbying on competition and financial grounds from commercial free-to-air television interests for the easing or removal of rules that apply only to them. The excision or watering-down of these rules could reasonably be expected to adversely affect the sustainability of existing producers and distributors. For this reason, the education sector could offer new opportunities. This is what originally motivated the research project on which this paper is based.³

Several factors have contributed to the rising use of online screen content in education. Classrooms across Australia are today nearly universally digitally capable. While access to high-speed broadband varies, an increasing number of schools are able to stream and download video content for classroom use. University staff and students typically have access to a vast array of online video content through their institutional libraries. The phased roll out of the Australian Curriculum in schools is increasing demand for quality audiovisual content, and providers of such content have multiplied. In universities, the ‘flipped classroom’ model in which “students gain first exposure to new material outside of class, usually via reading or lecture videos, and then use class time to do the harder work of assimilating that knowledge, perhaps through problem-solving, discussion, or debates” is slowly becoming more common (Brame 2013). Lecturers are increasingly setting online video as primary and supplementary learning materials. The growing popularity and availability of Massive Open Online Courses (MOOCs) is also a factor, with video-recorded lectures and other video content commonly used in online education.

The education sector therefore appears, on the surface, to offer new or enhanced opportunities for media producers. Success, however, is neither straightforward nor guaranteed. Both the complexity and specificity of education, and the double-edged sword of digital disruption, pose a series of challenges to screen producers and allied service providers. Apart from generic challenges and opportunities afforded by digital affordances in education (Buckingham 2007; Howard 2013; Ito 2010; Jenkins 2009; Sefton Green 1998), the new nationwide Australian Curriculum’s three cross-curriculum priorities – the lives and cultures of Aboriginal and Torres Strait Islander people, Australia’s relationships with Asia, and sustainability – implicitly require the use of Australian resources. As screen

³ (Detail to be added after blind refereeing)

content use increases in education, the potential for new and repurposed Australian screen content may therefore also reasonably be expected to grow. The dynamics of the education sector are however complex and complicated; use is poorly understood, and the facilitation of Australian content for education is not straight-forward. In this paper we seek to tease out these dynamics and broaden understanding of a significantly under-researched sector of media production and distribution.

From education to 'educative': some history

In schools, programs broadcast on free-to-air and subscription television continue to make up a substantial proportion of content used in classrooms, although only a very small percentage is viewed at the time of broadcast. Traditional 'educational broadcasting' has been thoroughly disrupted through the emergence of new players and providers, and with the increasing use in schools of 'educative' as distinct from 'educational' content. This is principally – but not exclusively – a story of the disruption of public service broadcaster provision of content for educational use. Programs broadcast by the Australian Broadcasting Corporation, the largest Australian public service broadcaster, continue to earn the lion's share of royalties paid out under Part VA of the Copyright Act 1968 – the Statutory Broadcast Licence that permits educational institutions to make off-air copies of television programs. But the majority of content accessed in schools is not 'educational' in the traditional sense; that is, the majority of content was not made specifically for educational use, but was rather produced for general audience consumption and broadcast outside the traditional morning educational block of programs on the ABC's main television channel. The ABC has dubbed this content 'educative' as it seeks to fulfill its Charter responsibility to provide 'broadcasting programs of an educational nature' (Australian Broadcasting Corporation Act 1983 s.6[1][a][ii]) despite no longer screening more than a few hours of educational programs per week on its television channels.

For sixty years, the ABC has been the principal producer and distributor of television programs for schools. The public service broadcaster did establish an education portal, Learn Online, as early as 1998, but for a variety of reasons the ABC did not embrace digital disruption until a decade later. At the turn of the century, the ABC's online education presence was very much subsidiary and supplementary to television and radio programs, with a focus on the creation of complementary websites for educational programs with attendant teacher resources (Burns 2004; Martin 2007). Educational elements were incorporated in to special web projects such as the 2002 *Winged Sandals*, "a state of the art website about ancient Greek myth and classical culture, consisting of interactive games, animation and educational material" (ABC Annual Report 2002-03 p.80), but digital provision remained sporadic. The slow pace of change can be put down to a number of factors: institutional inertia, limited funding, and the lack of an holistic vision, but there were also practical limitations in the education sector itself. Computers, let alone Internet access, remained luxuries for many schools, while poor download speeds and bandwidth issues plagued the first-

movers. For most schools, broadcast television continued to provide the bulk of video content. The ABC broadcast almost 800 hours of educational (as distinct from educative) programs in 1997-98, the year that Learn Online was launched. This comprised 8.91 per cent of total annual broadcast hours, although this figure may well be incorrect as it was out of line with the figures for both the previous and following years (1576 and 1414 hours respectively). Indeed, 1997-98 was the only year between 1988-89 and 2000-01 in which fewer than 1000 hours of educational programs were broadcast. From this point on, however, the total plummeted, with the number of hours dropping by over a third year on year in 2001-02, and by over half in 2002-03. In 2003-04, citing government budget cuts, the Corporation did not commission any new schools programs, and axed its children's news and current affairs program *Behind the News*, which had been a mainstay of its educational offerings since 1969. A public outcry and a government backflip on funding allowed the program to be re-launched in 2005 with a new website. While ostensibly continuing the ad hoc policy of building supplementary, program-related websites, this move provided the first signs of a new response to digital disruption.

The simultaneous transition of the ABC's attention from 'educational' to 'educative' television programs, and towards the primary provision of online educational content accelerated following the appointment of Mark Scott as Managing Director in July 2006. Scott established an Innovation Division within the Corporation in March 2007, with responsibility for much of ABC Online. In the same month, one of the Corporation's national radio networks, Radio National, launched a series of podcast-only educational stories called Edpod. Later that year, the ABC Advisory Council prepared a discussion paper on 'Education and the ABC' for the ABC Board, and commissioned research into the use of ABC television and online content in schools. The development of an online education portal was also listed as one of the targets of the ABC's Corporate Plan for 2007-2010. The Annual Report for 2007-08 signaled the beginnings of a major shift in its discussion of these developments, noting: "In light of rapid technology changes, the ABC believed it necessary to re-assess the current and future needs of schools in relation to education content and the Corporation's role in its delivery" (p.41). This was in part a response to the new Labor federal government's announcement in 2007 of a major policy innovation termed the 'Digital Education Revolution' under which all students at state high schools in years 9-12 would be provided with a laptop, and all schools would have access to high speed broadband.

Recognising an opportunity to further the Corporation's Charter responsibility in education, the ABC Advisory Council recommended proposing to the federal government that the ABC's new catch-up television service, initially known as ABC Now and subsequently renamed ABC iView, be installed on every laptop provided to school students under the Digital Education Revolution plan. Although this bold proposal was not taken up, our research shows that ABC iView is now widely used in schools. ABC iView is an online streaming service, and therefore does not fall under the statutory licence scheme that permits educational institutions to copy and screen programs broadcast on television. While entirely legal, schools' use of iView potentially deprives the ABC and other

rights holders of royalty payments that would be paid had the programs been accessed via one of the services licenced to provide access to broadcast material such as ClickView, DVC and Enhance TV. Although unintended, this is another way in which a digital service is disrupting traditional arrangements for use of screen content in education.

The contemporary digital supply landscape

Where once the ABC reigned supreme in educational broadcasting via its daily block of schools programming, today an assortment of content suppliers and service providers are active in the education space. The use of YouTube is widespread, but YouTube is by no means the only source of content. A complex mix of suppliers includes commercial operators like Clickview, DVC and Kanopy, not-for-profits such as the Campfire Film Foundation and Australian Teachers of Media (ATOM), subsidiaries of not-for-profits such as EnhanceTV and Informit EduTV as well as providers of free content such as the ABC (through its catch-up television service ABC iView and its online education portal ABC Splash) and Australia's other public service broadcaster, SBS. Not all are prospering in the variegated education market, with only a few successfully developing sufficiently robust, user-friendly, relevant and scalable platforms. Traditional business models and service offerings have been disrupted both by the emergence of new players with quite different approaches and business models from those of traditional players, and by the adaptations made by existing players.

One notable development is the emergence of non-screen sector organisations that are involved in the provision of educational screen content. Many of these organisations employ or partner with screen sector firms. Most produce or commission specialized content tailored to particular elements of the Australian Curriculum. For example, the Sydney Opera House runs a digital education program alongside its program of performances for schools. The digital education program includes a 'digital tour' of Bennelong Point, the site of the Opera House, and its Indigenous history. Teacher resources accompanying the tour align it to specific curriculum outcomes in English, Science, History and Human Society and its Environment, as well as outlining suggested pre- and post- tour activities.

Another example is the Primary Industries Education Foundation Australia, a non-profit organization founded in 2007 to promote and lobby for agricultural education in schools. In July 2014, the PIEFA was awarded \$2 million by the Federal government to develop online resources including videos to support both primary and secondary teachers to incorporate agricultural education in six learning areas including science and geography. In concert with ESA and a South Australian digital agency, PIEFA created 17 units of inquiry and 34 accompanying videos for students from Foundation to Year 10, as well as an app for pre-school and early primary students called George the Farmer. The experience of the Sydney Opera House and PIEFA demonstrates the opportunities that exist for content producers in education if they work with non-screen sector partners. The most successful of these initiatives tend to be those in which educational design thinking is embedded in content production

from the outset. PIEFA, for example, appointed a former Tasmanian school principal as its CEO, and while the Foundation has close connections with ESA, it benefits greatly in its efforts to promote and facilitate the study of agriculture in schools from the education background of its CEO.

One of the affordances of digital disruption of education is the increased availability of informal (or out-of-school) learning opportunities. The fact that ABC Splash was initially announced by government as a service intended for use in the home rather than in school, indicated a desire on the part of the federal government for the ABC to play a leading role in the provision of such opportunities for Australian children. It soon became apparent to those in charge of the portal, however, that the site was principally being used during school hours, and that teachers rather than parents were the key intermediaries. To some extent this mirrors the use of YouTube; many students report using YouTube for educational purposes outside school, but the platform is also broadly accessed in schools.

In the remainder of this paper we profile three companies and services that individually and collectively are facilitating the digital disruption of screen content-based education in Australia. The three companies exemplify key aspects of the digital disruption of education. ABC Splash symbolizes one part of the modification of public service provision of content in education. YouTube represents the user- and producer driven, participatory aspect of screen content use in education that in some ways stands in contrast to the ABC Splash PSB 'tutelage' model. Finally, Clickview exemplifies the expansion of for-profit entities in to the previously non-market driven provision of screen content in education. The profiles also collectively instantiate the three types of content and content use in education:

1. 'Education first' – content and related, supplementary resources produced for specific educational or instructional purposes;
2. 'Entertainment first' – content created for non-educational purposes (eg entertainment) that is studied and used in educational settings in its original form;
3. 'Curated and reversioned' – content usually developed for non-educational purposes that has been segmented or repurposed for educational use, and around which supplementary educational resources have been created.

ABC Splash

The ABC's online education portal, ABC Splash, principally comprises 'education first' and 'curated and reversioned' content. As well as drawing on the enormous archive of material made or broadcast by the ABC since its creation in 1932, much of which was first produced for educational use, ABC Splash has commissioned a range of 'education first' interactive content resources. It is the primary means through which the public service broadcaster is meeting its obligation to broadcast educational programs while responding to the changes and challenges wrought by digitization. Along with *Behind the News*, Splash is the principal conduit for the ABC's provision of educational (as distinct from

educative) content to schools. Splash has its direct origins in the ABC's Triennial Funding Submission for 2009-12. Since 1989, these three-year plans have provided the rationale for the on-going government appropriation that remains the principal source of funding for the ABC. The 2009-12 Submission included a proposal for "enhanced online delivery and additional content, including archival information for education" (ABC Annual Report 2008-09, p.76).

The digital utilization of the ABC's extensive content archive had been an early priority for ABC Innovation, and the potential for collaboration in education was swiftly identified. Schoolteachers were surveyed and interviewed about the kinds of media content they were using in class, and what they were looking for. Short form and Australian content were popular requests. In December 2011, the federal ministers for Communications and Education jointly announced the provision of special program of funding for a digital education portal that could demonstrate the value and capacity of the National Broadband Network in education. In partnership with Education Services Australia (ESA), a national not-for-profit company owned by all Australian education ministers with responsibility for supporting delivery of national education priorities, the ABC was allocated almost \$20 million over three years to develop ABC Splash.

From the outset, ABC Splash was intended to support the implementation of the Australian Curriculum, although the government envisaged it principally being used at home rather than in schools. It quickly became evident to the project team, however, that teachers would be the main conduits for content to reach students and parents. This has been borne out by usage data over the site's first three years, which demonstrates that the site is principally used during the school day (**reference to Splash report**). In terms of content provision, initial focus fell on English, Maths, Science and History, the first four learning areas to be developed for students from Foundation (pre-Year 1) to Year 10. With ESA providing pedagogical guidance as well as writing metadata and supporting material, the Splash team began mapping content from the ABC Archive to the curriculum. This highly articulated, detailed approach has been the bedrock of the site over the course of its life, with subsequent commissioned content receiving the same oversight and linking to the Australian Curriculum as the archival material.

ABC Splash is in some ways an example of Cunningham's argument (Cunningham 2015) about public service media organisations as drivers of innovation. In this case, ABC Splash is setting standards for digital education, experimenting with content provision, and innovating in areas that commercial competitors would not enter. This, Cunningham argues, is part of the invaluable Research and Development role of public service media organisations like the ABC. The development of content for the site has involved several ABC Divisions, as well as partnerships with external organisations. For example, the Splash Live pilot program 'Making the News' combined the expertise of ABC Innovation, Television and News and Current Affairs, and the Australian Centre for the Moving Image in Melbourne, to connect four NBN-enabled primary schools in four states to develop news stories over a six week period culminating in a collaborative video streaming event.

ABC Splash also commissioned ten flagship interactive projects, including games and data visualization initiatives. By the end of 2014, the site contained over 2000 videos, almost 600 games, and over 120 audio clips, and was recording around 10,000 visits per school day. Our research shows that the site is principally used in primary schools, but also that many teachers remain unaware of its existence despite the extensive efforts of the Splash team to connect with schools and promote the site. In part this may be because teachers have access to several alternatives, including Scootle, a national digital learning repository developed by ESA, and in Queensland, C2C (Curriculum into the Classroom), a digital resource developed by the state Department of Education and Training.

In sum, ABC Splash is perhaps the most significant Australian initiative in the provision and popularization of digital content in education. It represents the digital extension of the ABC's Charter obligations on educational broadcasting. It also in part represents the ABC's commitment to public education, which Michael Tracey argues is one of the fundamental principles of public service broadcasting (Tracey 1992, p.18). In pedagogical terms, ABC Splash combines social constructivist and directive approaches, and evidences public service media as a unifying force, forming a public and serving its interests. It embodies the persistence of public service broadcasting ideals of education, access and equity in the digital space.

The ubiquity of YouTube

YouTube is an enormously important source of screen content used in education. The video sharing site has over one billion monthly users, and is the second most commonly used search engine behind Google. The use of YouTube videos in a range of educational fields at tertiary level is well-documented, and there is an ever increasing number of educators posting videos on the site for both student and general consumption. There is however still a relative paucity of scholarship on the use of YouTube in schools, something that our project in part is addressing. In terms of the three types of content use in education, 'Entertainment First' and 'Education First' are most common on YouTube although there are also many thousands of videos that repurpose entertainment content for educational purposes.

Today, the widespread use of YouTube in Australian schools belies the heavy-handed approach taken by some Australian education authorities shortly after the service launched in February 2005. The site was blocked in South Australian and Queensland state schools in 2005, in NSW state schools in 2006, and in Victorian state schools in 2007, principally in response to concerns about the content that students might access, and specifically to the posting of videos in which students were bullied by their peers (Colley 2007: 27-28). In the United States, several school districts have removed or modified bans on YouTube (Strom 2012), although high proportions of students interviewed by the Berkman Center for Internet and Society in greater Boston, Chicago, Greensboro (North Carolina), Los Angeles and Santa Barbara in 2013 reported some form of restriction on their access to YouTube (Cortesi et al 2014). Like some of their

American counterparts, most Australian authorities have since dropped or modified restrictions on YouTube in response to pressure from teachers and students.

Our research shows that some teachers make YouTube available to their students even when they have been directed not to, or where YouTube is blocked. One teacher was willing to provide his students with his password so students could conduct research using YouTube. Another teacher simply passed her laptop to students to allow them to look up clips. More than one teacher told us they turn a blind eye to students using their smartphones to access YouTube clips for learning in class. Several others explained that they provide students with YouTube URLs to look up videos for homework. All the teachers who provided their students with YouTube access argued in interviews that they believe it is an important educational resource and that it does not make sense to restrict students' use of it. Several of the teachers passionately defended their position, when presented with contradictory policies.

Many of the students who have participated in focus groups during our research have reported independently and regularly going to YouTube to reinforce their classroom learning and to undertake personal, interest-driven learning. While the students in our project are far less numerous, our findings broadly align with those of the latest Speak Up National Research Project on flipped learning in the United States. The results of the third annual report, released in February 2015, show that of the more than 430,000 students in K-12 who took the online survey, "40 percent ... stated they found videos online (eg. YouTube and Khan Academy) to help with homework or studying" (Project Tomorrow 2015). In the Speak Up survey, only 4.5 per cent of students reported that they never used YouTube, while 44 per cent said they used the service "all the time". As the researchers note: "Video is the means for youth to access social media in their free time so it goes that they are very comfortable using video for their formal and informal learning" (Project Tomorrow 2015).

There are several reasons for the widespread use of YouTube in schools. First, the vast and ever increasing amount of content on the service has made YouTube a default video search engine for many teachers. Although teachers typically have access to online or locally-stored digital video services to which their school or education authority has subscribed (often at significant expense), and notwithstanding the efforts of many education authorities to bar its use in the classroom, YouTube has become the go-to source for video content on all kinds of topics. Teachers report being able to access screen content that they have never previously been able to find for classroom use.

Second, YouTube clips are typically short (under ten minutes). Duration is a key determinant of the use of screen content in schools; where in the recent past, screening a video was a significant occasion because a special trolley containing the television set and video player had to be booked for use in a classroom, and therefore longer screenings were common, now screen content has become a part of the relatively seamless flow of a lesson, and shorter clips can be more readily incorporated.

Third, arguably, teachers may favour the use of YouTube clips over pre-curated content despite the fact that much of the latter, such as that available on ABC Splash, is also short form, may be tailored to a particular element of the curriculum, and is often accompanied by supporting teacher resources or bridging materials. Teachers are increasingly curating screen content along with a variety of other resources themselves as a significant expression of their professional identity and in order to tailor their own lessons to the particular needs of their students.

Fourth, students are often connoisseurs of YouTube in their own time, and in broad terms students report responding positively to the style of clips on the service. Typically, short, humourous, fun, fast paced, and above all recent clips are most likely to retain students' interest. This gels with the shift from 'educational' to 'educative' television content, where the latter is typically guided by entertainment aesthetics and values rather than a more formal, instructional, educational mode.

Clickview

This aspect – the importance of entertainment in facilitating student engagement with screen content in education – is well understood by some of the newer services that specialize in the provision of screen content for education. ClickView, primarily a distribution platform for pre-broadcast and specialist content, bought the production unit of Video Education Australasia (for many years, a major traditional source of educational Australian screen content) in 2013, and now makes approximately 1500 minutes of new content per year principally for school use in Australia, New Zealand and the UK. ClickView straddles all three types of content use in education. Its production arm produces 'Education First' content, often heavily informed by entertainment values in order to maximize its appeal to students. As a licenced Resource Centre, ClickView provides schools with access to broadcast television content, much of which is 'Entertainment First'. And through the efforts of both its own content development team, and of teachers and teacher librarians who are able to customize and add content and resources to the service, ClickView is a major repository of repurposed and curated content.

ClickView is a prime study of a 'born digital' company that through its business model and service offerings has dramatically changed video purchasing and use practices in schools. The company was founded in 2003 by education publisher Matthew Sandblom, current CEO of 3P Learning Tim Power, and software engineer Evan Clark, who is currently CEO of ClickView. Clark had written a thesis during his university studies that outlined a method of buffering video content on a local area network that substantially reduced the computer power necessary to push video across the network. In 2004, Clark filed a US patent comprising library software and a player enabling the storing and efficient

distribution of media files in a local area network. From the outset, this system was specifically intended for school use.⁴

The chief innovation was the use of a system entitled 'predictive chapter buffering' whereby media content is 'chapterised' and delivered to the player on request, one chapter at a time, with the next chapter requested, transferred and received in time to play as soon as the current chapter has finished playing. The method differs from streaming video either from a server on a local network or from a server in the cloud, wherein video is pushed to a client computer in small packets at the same rate that the video is being viewed. This requires considerable power on the server side, and limits the number of clients that can be served simultaneously. The capacity of the network cable further limits the number of clients who can be served simultaneously.

By contrast, in Clark's system the 'Library' application that enables encrypted digital video files to be stored and served can be installed on any computer, and can use the computer on which it is installed as a server, so that it can then transfer files to any other computer on the local area network that has the 'Player' application installed. The 'Player' allows users to search for, browse, request and view video files that are then temporarily cached on the client computer, allowing this computer to serve the video to other computers on a network. Typically the video files are delivered as 'pre-chunked' chapters rather than streamed or delivered whole (both of which require more computer power and limit a user's ability to immediately review and replay a file). The file sizes of the videos can also be reduced via compression technologies, so that each file uses less bandwidth and more computers can receive the files. Compressed files also reduce the load on the computer on which the Library is installed, and allows for higher quality files to be transferred. The method of 'chapterisation' and the use of smaller video files was perfectly suited to the tendency (noted above) for teachers to use shorter video clips in the classroom. The videos in ClickView's libraries are on average twenty minutes long, but are broken into discrete six minute chapters.

ClickView's initial business model involved a school purchasing a hard drive containing about 1000 videos that was then installed on the school server and, using the patented software applications described above, that was then accessible on all computers in the school's local area network. Over the last twelve years, the content library available via ClickView has grown considerably as the company has purchased archives, and entered agreements with other distributors, and since ClickView was approved by Screenrights as a 'resource centre', meaning that schools could access free-to-air television content through the service. The model of selling a hard drive, and then charging an annual subscription fee comprising a base price supplemented by a cost per student, has proven much more attractive to secondary schools than to primary schools, as the latter often have much more limited IT infrastructure and support, and also have lower library budgets.

⁴ Detail in subsequent paragraphs is taken from the Patent Application 'Media Storage and Distribution in a Local Area Network', US Patent Number US 20070260742 A1. Available at: <https://www.google.com/patents/US20070260742>. Date accessed: 30 October 2015.

At the end of 2015, ClickView reported 48 per cent of secondary schools (around 850 schools), 37 per cent of K-12 schools (around 450 schools), and 3 per cent of primary schools (around 200 schools) subscribed to their service, with an annual renewal rate of 94 per cent. The company is moving to serve its subscribers from the cloud, and new subscribers no longer purchase a hard drive of content. In part this move has been prompted by the lack of good analytic data on use from the school server-based system. Subscribers access the service via ClickView's website, as well as dedicated desktop, tablet and mobile apps that allow a range of data to be collected, with the intelligence generated informing content development and production strategies.

Over the last three years or so, ClickView has turned its focus to the production and distribution of its own content, as well as the distribution of content from third party suppliers. In 2013, the company purchased one of the largest Australian suppliers of educational content, Video Education Australasia (VEA), in the process acquiring an archive of approximately 2500 titles, and a production unit based in Melbourne. For approximately six months after the VEA purchase, ClickView's team of content producers and teacher consultants worked through the archive to map the content to the Australian Curriculum, looking for gaps that could be filled with the company's own, newly produced work.

This shift towards content production has been prompted in part by the increasing level of competition from other online services, so that original (and exclusive) content development becomes both a point of difference from competitors who tend to be limited to distribution, and a selling point for ClickView. The shift has also been driven by the company's recognition that much of the existing content available to schools is becoming dated, and can be less well-suited to contemporary pedagogy and classroom practice. The former VEA production unit currently makes approximately 1500 minutes of new educational content per year, although the 'Australianness' of the work is often downplayed through the use of presenters or actors with 'neutral' accents in order that the content may also be used in the UK and New Zealand, where ClickView also operates.

In addition to its pivot to content production, ClickView is notable for several recent innovations on its digital platform that have further disrupted the educational content space. First, ClickView has developed a 'digital curriculum specialist' known as Albert. Essentially a sophisticated search engine, Albert enables teachers to search for content in the ClickView libraries by subject, by year group, by strand, by curriculum code, by keywords and by tags. Teachers are able to add their own links, tags and keywords to video content, as well as rating the links' relevance to the curriculum outcome to which they are aligned. Links are rated on a scale of 0-5 stars, with any content rating 0 being automatically flagged for review by ClickView's content development team and curriculum consultants. Links rated five stars can then also be prioritized in future search results. Android and iOS native ClickView apps for mobile devices

allow teachers and students to record content and upload to ClickView, with content only accessible to other users from the same school.

In this way, ClickView has added a degree of ‘futureproofing’; as students move increasingly towards production of their own content for assessment and class work, ClickView has positioned itself as the repository for such work. A further innovation has grown out of ClickView’s role as a resource centre through which schools can access free-to-air television content. Five data centres located around the country record all free-to-air channels twenty-four hours per day, seven days per week. The main innovation of this service (ClickView 24-7) is the indexing of the subtitles that accompany the content streams. This allows teachers to search on words spoken in a program, and locate a specific reference to the exact moment of broadcast. Finally, ClickView has created a free service, ClickView TV, under which the content development team curates approximately twenty programs per week from free-to-air television, along with selected pieces of ClickView’s own content. This teaser service is available to all teachers, whether or not their school subscribes to ClickView. In addition to building up ClickView’s own content library, the service functions as a promotional tool, advertising ClickView to prospective subscribers.

Conclusion

This paper is part of a wider study of both supply and demand in a media sector – screen content developed for or used in formal education settings – that is significantly different from the majority of media sectors. At the same time, though, this sector is being disrupted by digital technologies, services and affordances in similar ways as other media sectors. New services, new business models and new approaches to production and distribution are challenging previously settled arrangements and requiring established players to adjust their strategies and offerings. Formerly the terrain of Australia’s main public service broadcaster, the educational component of the “Reithian trifecta” (Spigelman 2013, p. 48) – to inform, educate and entertain – is an increasingly contested and innovative media space. Some of this innovation directly flows from the ABC’s response both to the broad digital disruption of traditional media, as well as the specific disruption of the education sector. These factors and developments, exemplified in the profiles of four companies and services that make up the final part of this paper, have not to date attracted substantial attention from media scholars. It is our contention that this sector is deserving of detailed attention from media industries scholars interested in the formal or informal educative function of the media, and in the public and prosocial value of media production. The production and distribution of educational (and educative) screen content are characterized by different sorts of complexity than we media industries scholars are attuned to, but the ways in which the most successful services and companies are negotiating this space have strong parallels with how producers and distributors are navigating digital disruption in media industries more generally. Given the challenges to the previously core and largely unchallenged position of the ABC as the principal source of screen content in education in Australia, and given the similar position occupied by

many PSBs in many other countries – particularly those modelled on the British system – this sector will be of great interest to PSB scholars examining the future of such services. More broadly, as our focus in media studies increasingly extends beyond mainstream entertainment or public service media, the production, distribution and use of media content in non-core media sectors such as education should become a more significant object for scholarly attention. As screens and screen content are now virtually ubiquitous, the particularities of their deployment and use in specific settings such as education, as well as their pedagogic applications, further emphasise the importance of studies such as this for screen and media studies.

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