

## Chapter 4

# Education on Screens: Histories of Co-innovation and Convergence between Audiovisual Media and Education Sectors

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### Abstract

This chapter introduces the topic of cooperation and co-innovation between the audiovisual media and education sectors. It first discusses the emergence of educational film approximately a hundred years ago – together with a new institutional framework, industry media, rulebooks, etc. It then discusses the ways public service media have addressed educational programming over the decades, including developing complex cross-media strategies and educational content databases more recently. The second half of the chapter is dedicated to the emergence of educational digital games, with their own institutional setups, production cultures, and training programmes. The chapter points, however, to a relative lack of cooperation between commercial game producers and educational institutions to date.

*Keywords:* Educational film; educational TV programmes; public service media; educational games; digital learning games; cross-innovation

### Educational Film and Television

“What kind of pictures do you prefer?” a questionnaire asked Chicago school children in 1919. One child wrote, “I like educational pictures best, especially those with Charlie Chaplin” (Moulton, 1920). This quote tells us many things. First, that educational uses of screen content are almost as old as cinematography



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itself. Second, as all cultural texts are ‘open works’ in Eco’s (1989) sense, they can, indeed, all be used for learning about the ways of life. This understanding is widely in use today, as much of the content used for education in formal learning contexts may also have been originally produced for other purposes. Lastly, we need to notice that this quote appeared in the opening issue of the journal *Visual Education*, published in 1920. Other journals with similar names and purposes (*Educational Film*, *Educational Screen*) emerged at the time, in the United States especially. These resulted, in fact, from the formation of multiple thematic organisations such as the National Academy of Visual Instruction, the Visual Instruction Association of America, and the Society for Visual Education. This suggests that public concerns about the effectiveness or the functionalities of screen-based learning were also very quick to emerge. Indeed, the potential risks as well as the potential benefits associated with non-theatrical films being shown in classrooms and in other educational contexts have been battled over ever since (Orgeron, Orgeron, & Streible, 2015). This also led to a quick codification of the practices of producing such films in the form of various kinds of hand- and rulebooks (see for instance Hollis, 1926). In larger countries, the production of how-to books that established the rules for the genre continued throughout the twentieth century (for instance Herman, 1965). All this suggests that ‘educational film’ started to auto-communicate and build itself as an autonomous domain rather quickly and continued to do so until the emergence of the Internet (see discussions on autocommunication in Chapter 2 in this volume).

What we recognise in these descriptions from 100 years ago is the excitement similar to what we, perhaps, also encounter today in the context of digital media being used in classrooms and elsewhere for learning purposes. Film was the new and modern medium then as digital gadgetry is now. There were and are talks of high potentials and associated risks. There was also the heightened urgency to organise; institutionalisation happened quickly, including for content production industries. Yet, as described by Orgeron et al. (2015), the industry built itself with the hope for the future growth (‘once all classrooms have projectors, the market will be a lot bigger than theatres’) that, however, never materialised. The reasons were similar to those of today: schools struggled with resources and with training teachers; the distribution market for educational films was complicated; while production was cheap compared to theatrical films, they were still relatively expensive to make and the market itself was unavoidably limited – films needed to target specific grades only, etc.

But if the market already had scalability issues in one of the biggest national markets then it was even harder for filmmakers in smaller countries. Yet, in terms of governance, the countries in northern Europe’s approached the issue a bit differently. As Jönsson (2016) discusses, the early showings and discussions on educational film started in Sweden about the same time as in the United States (around 1910), and by 1922 the country’s leading film production company Svensk Filmindustri (SF) launched its dedicated production unit *skolfilm* (school film). On the one hand, and similarly to the United States, the role of educational films was at the time to give film a more serious function and as such to save it from accusations of having demoralising effects on adolescence. Yet, soon after,

the leaders of the *skolfilm* unit changed their discourse when talking about their films – they started talking about ‘cultivation’ (*bildning*) and used this term to address the development of the whole nation. That is, educational films were seen as instruments for cultivating the nation. In parallel, while SF was in principle a private company, it was closely associated with policy makers and its funding for making educational films came mainly from the national government – the then emerging model of Nordic welfare state started to take shape.

Soon after, it settled everywhere that educational film is mainly a public good and as such a responsibility of the public sector. Yet, it has remained an ancillary service for filmmakers in much of the world. Documentary makers, in particular, have relied on commissioned educational films or on returns from the secondary usage of their films in schools (Goldsmith, Cunningham, & Dezuanni, 2017). Still, with the emergence of television, it was the public service broadcasters (PSBs) that took over the role of coordinating the production and distribution of educational audiovisual (AV) content. Most public broadcasters in Europe and elsewhere have had a remit to produce educational content regularly, sometimes directly related to national curricula. Similarly to the rationales of SF in Sweden, the early educational programming of other European public broadcasters was also paternalistic, aimed at cultivating exemplary citizens (Oswell, 2002).

Later, with the arrival of commercial TV channels airing popular family entertainment and especially with the launch of new dedicated children’s channels, PSBs have faced a challenge to their education-oriented remits. As the challenge grew with the arrival of the Internet and videosharing platforms, the typical PSB response has been to develop their cross-media universes targeted to children (D’Arma, Enli, & Steemers, 2010). The content of these channels (for instance, CBeebies and CBBC in the United Kingdom, NRK Super in Norway) and especially their web portals is, however, visibly different from the pedagogical approaches of the previous era. Much of this content provision is gamified, with learning turned into an almost unnoticeable and pleasurable process. In Europe, as highlighted in Chapters 1 and 3, PSBs tend to be the eminent innovators in cross-media content and this often includes collaborations with the developers of (educational) games. PSBs are notable drivers of educational game development in Europe and it is mainly in their cross-media environments that the 100-year-old traditions of educational film, educational broadcasting and the newer domain of educational gaming meet. Yet, as will be demonstrated in Chapters 5 and 6, gamification of learning experiences is one of the main ‘rules,’ in Dopfer and Potts’s (2008) sense, that drive the ongoing development of the educational technology (EdTech) sector. Let us, therefore, discuss the nature of ‘learning games’ in more detail.

## **Histories of Digital Learning Games**

Digital learning games (DLG), or digital educational games, are video, computer, mobile or web games that are specifically designed for fulfilling educational

objectives: teaching a particular discipline, changing students' behaviour, and so on. Gamification refers to the use of game elements in non-game environments and does not necessarily involve producing a full-fledged game (Deterding, Dixon, Khaled, & Nacke, 2011). Game-based learning (GBL) is the use of any games in a learning context (Simões, Redondo, & Vilas, 2013). It may involve digital or analogue (e.g. tabletop) games, and the games themselves do not, strictly speaking, need to be educational: the learning goals may be achieved, for example, through a discussion of the playing experience. A narrower subset of GBL is digital game-based learning (Prensky, 2007). Serious games is a broader concept that denotes digital or analogue games designed to fulfil any non-entertainment purpose, from advertising, to advancing a political agenda, to collecting scientific data (Djaouti, Alvarez, Jessel, & Rampnoux, 2011). Digital learning games are thus a subset of serious games.

Despite games and learning sometimes being seen as a binary opposition – a perception originating in the industrial era (Svahn, 2009) – games and play have been an integral part of education since time immemorial. For centuries, chess, *go* and various other tabletop games have been used for both formal (Kersey, 1980) and informal (Adams & Edmonds, 1977) education across the globe. Following the advent of computer technology, it was inevitable that digital games, too, would be adopted for the purpose of education. The first such applications were developed for the US military, where warfare simulation games such as *Hutspiel* (1955) and *NEWS* (1958) were used for training purposes; however, these were not widely available and are mostly known through declassified military documents (Djaouti et al., 2011, p. 29).

A better-known and more influential example is Logo, an educational programming language developed by Daniel Bobrow, Wally Feurzeug, and Seymour Papert in 1967 (Games & Squire, 2011). While not a game per se, Logo was designed to create a playful experience, easing children into the world of mathematics and programming through a 'conversation' with the computer using commands resembling natural language (Games & Squire, 2011). The original implementation of Logo ran on PDP-1, a 730 kg 'minicomputer' primarily sold to universities and research laboratories, which is also known as the platform that the first mass-distributed computer game, *Spacewar!*, was developed for in 1962. Many subsequent implementations of Logo have been created, and its success has inspired numerous programming games whose content ranges from abstract visual programming (*LightBot*, *Kodable*) to using actual programming languages to complete levels (*CodeCombat*, *Screeps*).

One of the first examples of a full-fledged educational computer game was *Oregon Trail* (1971), a text-based strategy game developed by three history majors from Carleton College in Minnesota to teach US geography and history to school children. The game was additionally notable for being distributed by the Minnesota Educational Computing Consortium (MECC), an early state-owned organisation aiming to provide computer services and increase computer literacy in schools. Thanks to the efforts of MECC, *Oregon Trail* found its way on school computers throughout the United States and was subsequently remade multiple times, receiving a commercial release in 1985 (Djaouti et al., 2011, p. 32).

The advent of home computers in the 1980s created a mass market for educational games, pioneered by the aforementioned MECC, alongside such private enterprises as Brøderbund Software and The Learning Company (Shuler, 2012). Many games produced during that period are best characterised as ‘edutainment’, as they both contained educational content and targeted the entertainment market. Notable among these were reading game *Reader Rabbit* (1983), geography-teaching detective adventure *Where in the World Is Carmen Sandiego?* (1985), and city-building game *SimCity* (1989). All of these spawned successful franchises, with *Carmen Sandiego* in particular growing into a large transmedia franchise including video games, board games, a popular television show aired between 1991 and 1995 on PBS, as well as an upcoming animated series by Netflix. As such, *Where in the World Is Carmen Sandiego?* set an important precedent: an educational game going beyond the realm of digital computing and being adapted into a television show by a major public broadcasting channel.

This was the first of many examples of the interaction between the digital game industry and public broadcasting. In the years that followed, public broadcasters in North America and Europe became increasingly cognisant of the popularity and potential of digital gaming, which was also growing ever more accessible thanks to CD-ROM technology and the Internet. As a result, the BBC and National Geographic, among others, began to commission short browser-based games to complement their main content (Prensky, 2005).

More recently, major players in the video game industry, including Nintendo and Microsoft, have stepped up their interest in the edutainment game market for personal computers and game consoles. Nintendo, for example, published a number of educational games for its consoles: the *Kids Learn* series, covering subjects from math to music; *Letter Quest Remastered* (2017) for vocabulary training and word analysis; and others. Microsoft’s most notable contribution has been publishing *Minecraft* (2011): a multi-player action-adventure sandbox game which, among other things, invites players to collaborate on crafting their own environments and game objects. The game became not only immensely popular, but also lauded for its creative and educational potential, and has been used to teach subjects as diverse as language, informatics, social skills and chemistry (Nebel, Schneider, & Rey, 2016).

Over the past few years, much innovation in the digital learning game market has been associated with the development of virtual and augmented reality (AR) technology. Virtual reality (VR) is now used widely in medical training where it has been found to improve surgical performance (Larsen, Oestergaard, Ottesen, & Soerensen, 2012); its other notable applications include language-learning (*Mondly: Learn Languages VR*) and mathematics (*Number Hunt*). AR, with its capacity for blending virtual objects with a real-life environment, has most notably been used to teach history through reconstructing historic events and places (Kysela & Štorková, 2015). At the same time, the relatively brief history of VR and AR in learning games has not yet seen many truly

breakthrough successes; it appears that the full potential of these technologies is yet to be harnessed by educators and game developers.

The growth of the field of educational games (and serious games on a wider scale) has led to the establishing of various academic organisations, such as the international Serious Game Network (SeGaN), and numerous academic conferences and journals. Professional organisations have emerged, too, albeit on a more local scale: consider, for example, the Learning City project in Espoo, Finland, which brings together digital/AV companies and public organisations including schools. A number of educational game design frameworks and methodologies have been also created (Ibrahim & Jaafar, 2009). These developments indicate a progressive institutionalisation of the field.

Throughout much of the history of digital learning games, the Baltic Sea region largely stayed on the periphery of the movement, compared at least to its major driving forces: the United States, the United Kingdom and, to some extent, Japan. However, since the turn of the century numerous developments in the region have received international attention. The German political strategy game *Ecopolicy* (2009) was translated into four languages and was tested at schools and universities on three continents. In 2013, the Viktor Rydberg school in Stockholm, Sweden garnered international attention after becoming the first school to introduce a compulsory course based on *Minecraft* (O'Brien, 2014). In 2015, Estonia's Tallinn University became the first institution in Europe to inaugurate a Master's programme in digital learning games. Thus, thanks to a growing number of regional developments, as well as international collaborations, the Baltic Sea region looks poised to make a meaningful contribution to the field of digital educational games.

## **Future Prospects of Digital Learning Games**

Throughout their history, digital learning games have been frequently criticised due to their perceived failure to integrate learning and 'fun' (An & Bonk, 2009). This perception has been fuelled by the abundance of low-quality games designed without the expertise or the resources necessary to produce a game that is both truly engaging and effective as a learning tool. Yet there are many games that accomplish just that, a number of which are discussed above. The recipe for success is generally the same: a deep and meaningful integration of player actions and game challenges on the one hand with learning content on the other (Franzwa, Tang, & Johnson, 2013).

As discussed above, since its early days the digital learning game movement has been propelled by two parallel forces. On the one hand, many educational games have originated from the public sector: universities, public broadcasters and educational consortia, driven by their mission to contribute to the public good. These organisations have also been instrumental in developing a better understanding of the role and potential of digital games; the MECC, for example, produced numerous studies on computer literacy in the

1980s, while the BBC funded a highly influential 2005 study on digital gaming in the United Kingdom (Westecott, 2009). On the other hand, much of the momentum behind digital learning games came from the commercial video game industry, where edutainment was seen as an extension of the general game market and, thus, mainly as a source of revenue. The unfortunate side effect of this was that many games positioned as educational were not in fact based on any existing curricula or academic standards (Klopfer & Osterweil, 2013).

The recent resurgence of interest in public–private partnerships offers a solution to this challenge, bringing game companies together with schools and public institutions, which allows to combine the skills of professional game developers and educators, as well as connecting game studios to their target audiences and customers (as discussed in Chapters 5 and 6). Such partnerships can also lend greater agency to schools, which previously often remained in the relatively passive position of adopters of educational games, as opposed to active contributors to their development.

On a technological level, the emergence of consumer-grade VR and AR technologies has marked another important development for educational games. While both technologies have already found highly meaningful applications (e.g. the use of VR in medical education), their potential is yet to be fully explored and put to use in the classroom (as discussed in Chapter 6).

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