

User-led content and self-creating communities: history repeating itself?

Understanding 'internet radio' in the context of the development of radio.

John Hartley and Tanya Notley

Queensland University of Technology

Reference: Hartley, John and Notley, Tanya. User-led Content and Self-creating Communities: History Repeating Itself? Understanding "Internet Radio" in the Context of the Development of Radio [online]. In: Radio in the World: Radio Conference 2005; pages: 547-558. Healy, Sianan (Editor); Berryman, Bruce (Editor); Goodman, David (Editor). Melbourne: RMIT Publishing, 2005. > ISBN: 1921166126.

Abstract

Sticky.net.au is an online network of young people that enables content sharing, distribution and collaborations alongside various other forms of communication. Sticky has been developed at Queensland University of Technology, Australia as the online platform for the *Youth Internet Radio Network* (YIRN), a research project funded by the Australian Research Council, Arts Queensland, the State Governments' Office of Youth, Brisbane City Council and QMusic, the peak body for the contemporary music industry in Queensland. Sticky's audio streaming and archive capabilities can be seen as an experiment in 'internet radio'. This paper traces innovation in radio technology and formats and explores contested meanings of what 'radio' means – from the 'golden age' represented by the family gathered around the hearth; to the transistor radio and the mobility it represented; unlicensed pirate radio and its ability to challenge media licensing controls; and community radio and its ability to 'give a voice' to civil society. We explore where technological innovation fits in with the development of radio and in this context will explore related issues of control, access and regulation.

History repeating itself?

Most young people listen to radio because of music and they tune in to a particular radio station because of the music it plays. In this way, audiences form ‘imagined communities’ (Anderson 1983) around music. Today we are seeing these ‘imagined communities’ develop around music tastes away from broadcast radio, in what is often a far more egalitarian way. Networks and communities built around music are forming all over the internet and they are often creating themselves rather than being created by organisations or entrepreneurs. As the Internet continues to evolve and offer new possibilities for sharing and distributing audio (as well as combining the audio repertoire with video and text), we need to consider the value of self-creating communities developing radio on the internet.

We are at a time that in many ways can be compared to the period when radio was first developed 1900-1930. Now, as then, various bodies are starting to call out for regulation and control of a still emerging and developing medium; and so internet radio faces the same challenges. The history of broadcast radio may be a lesson to us.

This paper considers these issues alongside the history and development of radio. It also explores the potential for internet radio in relation to the development of an online youth media network, **sticky.net.au** that has an open and user-led design approach alongside content hosting, audio streaming and archive capabilities.

What is Radio?

‘Radio is the wireless transmission of signals, by modulation of electromagnetic waves with frequencies below those of light.’ (<http://en.wikipedia.org/wiki/Radio>). By this technical definition, ‘internet radio’ or ‘web radio’ would be a contradiction in terms. But

radio has become as much a phenomenon of history as of physics. Since radio has already taken a number of different forms since it began (e.g ham radio, broadcast radio) we can understand that it “is what it is at a given time, in a given context of use and meaningfulness” (Tacchi 2000:292). As a development within the history of radio (never mind the modulation of electromagnetic waves), the concept of ‘internet radio’ has taken hold sufficiently to have been offered its own definition, by Dang Thi thu Huong from the Centre for Broadcasting History Research at Bournemouth University, UK. She suggests this definition:

Web radio is a hybrid of radio and the Internet, featuring professional output including live radio programmes online and/or archived radio programmes online, accompanied and supported by some text and/or images, and interactive communication via the World Wide Web.

http://en.wikipedia.org/wiki/Web_radio

Thus, ‘radio’ has come to be defined by its programming and social uses, rather than by its physical or technical properties. ‘Internet radio’ combines the technical possibilities of the web (e.g. accessing content from anywhere in the world at any time, combining audio with video and text, allowing for interactivity), with broadcasting formats that use ‘announcers’ and ‘djs’ to introduce and discuss both produced and live events and content.

Any historical definition of radio needs to encompass what it is *for*. In other words, simply describing how it is done will never explain what it meant, either for those who sought profit or power by it or those who used it. As a phenomenon of history, rather than physics, radio combines four elements:

1. **technical invention** and continual improvement (e.g. spark-gap radio, the original form of propagation used by Marconi and others, became illegal because it used too much bandwidth);
2. **enabling regulation** (e.g. patents, licensing, anti-trust laws, copyright);
3. **content** (including two-way radio as well as programming formats);
4. **social use** (commercial, public service, interpersonal, cultural).

In the hands of the law

The history of radio is often narrated as if technology was all that mattered. The same applies to the internet (although few histories link the two). But in both cases the decisive developments have been social, legal and cultural. Success depended not only on a workable apparatus but also on defensible patents; not only on good science but also a good business plan; not only on capital investment but also on popular acceptance and social uptake.

The mere invention of apparatus or even a business plan was meaningless on its own, because neither could ensure access to sources of revenue (government, advertising, subscriber). What was needed for that was a legal framework. So despite its global reach, the history of radio was very strongly *nation*-based, using the politico-legal system of each country to invent 'radio' anew. The inventors were those who won the patent. In the UK it was Marconi; in the US Nicola Tesla; in the USSR Alexander Popov; in Germany Karl Ferdinand Braun. The technical pioneers sometimes had to fight each other for patent precedence – Marconi vs Tesla in the USA, for instance (Douglas 1987).

Meanwhile the pioneers of radio *stations* were department stores and manufacturers who wanted to sell radio sets, or newspapers who wanted to extend the reach of their own sales or their owner's opinions. On the business side they soon formed cartels. The BBC was formed in 1922 by a cartel of six radio-set manufacturers. In the USA, NBC was formed in 1926 by a cartel of RCA/Westinghouse and General Electric (set manufacturers), who purchased a content provider from AT&T (which then leased transmitters and cable back to them for distribution). Everyone involved pursued what the BBC's founding head John Reith famously called 'the brute force of monopoly,' either to advance their model of 'public service broadcasting,' or simply for commercial gain, to control audiences, advertisers and affiliates.

While commercial interests pursued monopolistic tendencies via the law, the same law was used to break monopolies. This was the case for NBC itself, which was eventually split into two networks by order of the Federal Communications Commission (FCC) after appeal to the Supreme Court, thereby creating the American Broadcasting Corporation (Barnouw 1968). And interestingly, the early attempt to establish a cartel based on control of the technical patents failed because of the patents themselves. Competitors were able to exploit clauses protecting 'amateurs':

Much to the dismay of the patent allies [GE, AT&T, RCA, Westinghouse], several of the contracts for inventor's patents held clauses protecting 'amateurs' and allowing them to use the patents.

Whether the competing manufacturers were really amateurs was ignored by these competitors.

http://en.wikipedia.org/wiki/History_of_radio#Radio_broadcasting_beginnings

Every stage of development of broadcast radio turns out to be a history of legal outcomes (sometimes backed by public policy) rather than technical invention as such. The national systems of each country took on the hue of that country's ideology – serving commerce in the USA, establishing 'public service' in Britain and other European countries, serving the state in the USSR and Nazi Germany.

Australia started out with a commercial system led by two market rivals, Marconi and Australian Wireless. The two companies amalgamated and almost a decade later in 1922 and the Australian government soon decided to acquire 50 percent of the company. The prime motivation for this was to set up a direct wire with Britain.

The government company first came up with a 'sealed set' model where people who purchased radio sets had to decide which station they wanted to listen to. Listeners paid a subscription fee to the station and their radio sets were fixed so that they could only listen to this station. The result was that only 1400 people signed up in the first ten months of radio in Australia, whilst 5,000 applied for 'experimental licenses' that would allow them to purchase a tuneable set, even though they could not be classified as 'experimenters' (Lapsley 1998). The government responded to the public and changed policy, introducing an open commercial radio system.

It was a full nine years later, in 1932, when a public broadcast system, the ABC, was introduced alongside this commercial system. The then Prime Minister, Joseph Lyons, provided the ABC with the unfortunate advice to, 'walk in the footsteps of BBC and fall in behind Britain' (cited in Lapsley, 1998).

Dance crazes and Democracy

In each case, the establishment of *national* radio systems in those early years (1920-30s) caused collateral damage to two other models of radio, both of which were under active experimentation at the same time – local and interactive:

- Local broadcasters were exterminated with equal enthusiasm by NBC in the US (in order to control the market), by John Reith in the UK (in order to promote his ‘National Programme’ as a cultural institution on a par with the Church), and by Josef Goebbels in Germany (in order to control what the population heard).
- Radio is intrinsically an ‘interactive’ transmitter/ receiver invention.

Manufacturers and governments effectively suppressed its two-way properties, for all except ‘radio hams,’ who were successfully confined to the amateur or ‘hobby’ end of the creative spectrum. The DX community survives to this day but it never became the ‘mass’ peer-to-peer network that the technology actually enabled, much to the regret of emancipationist visionaries like Berthold Brecht (see Hartley, 1999).

In the end, despite all the legal manoeuvring, competitive pressure and state intervention, it was radio’s *popular uptake* that most decisively determined how inventions, business plans, and public policy goals would turn out, for without demand there was no business to defend. Demand shaped development, resulting eventually in a stable industry where what people liked and wanted did count, while consumers were also constantly tutored to demand what commercial or state providers could in fact supply.

However, even without local and personal transmitters, the popular ‘uses’ of broadcast radio were not entirely in line with the purposes of scientists, manufacturers,

shareholders, broadcasters and legislators. For the popular audience, radio stood with other mass media like cinema and the press as a source of entertainment and information, a means to connect with and imaginatively to create communities. Broadcast sound became part of citizenship. It supplemented and sometimes supplanted cultural forms rooted in class, racial, occupational or local cultures. Very quickly the things one heard on the radio became part of the stuff of both private life and national identity – dance crazes and democracy. People certainly put up with more on radio than they may have chosen for themselves, such as owners’ opinions, commercial messages, high-culture programming, political propaganda. But the net effect of this was everywhere to produce a pronounced preference for non-coercive fare – music, comedy, features about everyday life, soap opera. The interests of owners and regulators on the one hand and audiences on the other were never fully aligned. In the middle grew up the entertainment industry.

Two-Knob Technologies

Already it is clear that the early days of radio share important similarities with the early years of the internet. In both cases a technological invention, which was itself constantly refined, required legal, state and commercial frameworks on which to grow and take shape. But the similarities between the two forms don’t end there.

Both technologies were difficult to use and accessible only by a minority. The internet – with all of its capabilities – is still very much in its defining years technically. Despite having become far more user-friendly in the past decade, it still requires a reasonable amount of computer literacy to explore and use the internet. And like radio in the early days, the medium is still inaccessible to most because access remains too expensive.

Marconi was famously responsible for the first wireless transmission over water in 1897, but both before and after Marconi's early breakthroughs, a number of inventors and innovators were responsible for the development of radio both as we know it today and as it might have been. In the early 1900s it was mostly hobbyists who experimented with radio. They built crystal set receivers that used a tiny wire (a 'cats' whisker') to connect to a detector crystal. Their experimentation developed the medium, very much in the same way that computer geeks and pioneers have developed new platforms, search engines and other software to advance the reach and potential of the internet. In other words, both radio and the internet were 'pro-am' or user-led inventions.

Further, in both instances, early content was difficult and time consuming to find. While contemporary radio and television have consistency in programming, the internet remains a daunting medium for many because it takes time and skill to search and find sources and it's often hard even to know what the medium offers. There remains a significant divide between those with access *and* the necessary literacy to consume content online and those without; and an even greater gap between them and those who have the ability to produce content and submit it online. The early crystal-sets were usually made so that the wire could be adjusted to find a sensitive spot on the crystal which was then able to pick up mostly local broadcasts. It could take hours of adjusting the crystal to pick up a station some fifty or so miles away and there was no guarantee that the next time the radio was turned on the settings would be the same, given that tuning changed depending on factors such as temperature and weather, and that broadcasting stations came on and went off the air without any warning. It took a dedicated hobbyist to stick with radio in this form and it's not surprising that many of them, mostly young men, began to form clubs and societies to network themselves together to share their dedicated discoveries

and developments. Again this development is comparable with the new and emerging online networks of internet pioneers and enthusiasts. It wasn't until a full twenty years of radio's development – at the end of the 1920s – that radio had developed beyond the point of requiring a significant amount of skill, patience and determination to use. Even then the instruction list given out by the Australian Broadcasting Company to listeners in 1930 indicates clearly that skill and patience was still required for some time:

DON'T run your aerial parallel to other aerials near by.

DON'T connect your earth to the same point as that used by your neighbour.

DON'T try to communicate with your neighbour by making your receiver howl.

DON'T use a longer aerial than necessary if you have strength to spare.

DON'T vary your strength of reception by distuning your receiver. It spoils the quality and is liable to increase interference in your set.

DON'T try to work a loud-speaker from a plain single-valve set.

DON'T fiddle with your set if the results are satisfactory.

DON'T forget that it is impossible practically to get true reproduction when receiving in the 'silent point'.

DON'T forget that when you oscillate you are running the risk of having your licence cancelled.

DON'T use a super-heterodyne receiver on an ordinary aerial. A frame aerial is essential.

DON'T compensate for the running down of your batteries (both high and low tension) by increasing reaction. If you do this your set may oscillate when switched on after standing idle for a few hours.¹

When will the Internet come up with something like radio's eventual ease of use – its 'two-knob technology' – to allow people to use it without a lot of patience and skill? Who knows exactly, but already we can see networks of computer geeks and enthusiasts as well as corporations developing tools to do exactly that.

¹ The Australian Broadcasting Company Year Book, 1930 p47 (cited in Lapsley, 1998)

Another clear similarity between the internet and the early days of radio is that the required apparatus is as an expensive luxury item. It wasn't until at least the 1930s that average households in Australia, Europe, UK, and the USA could actually afford to buy a radio set. This is not to speak of developing countries where it took longer still, although radio was not slow to take hold in the third world – for instance Sri Lanka holds an important place in radio history as an 'early adopter'. Now of course radios can be purchased for as little as a few dollars. We have even reached the stage where radio is a functionality that may be built into other consumer items as an effectively free add-on, notably in portable music players, clocks and cell phones. The price of computers and internet access in these early days, remains a barrier for many in rich countries let alone the vast majority of the population in developing nations. However, given the experiences of telephone, radio and television, we can be quite confident that the price will fall and the medium will become affordable for most.

In many ways the current period of audio on the internet or internet radio is similar to radios' early years. The medium is still developing technically, socially and physically. Mass audiences are yet to be lured by accessibility, comfort-ability and simplicity; they haven't found a *use* for the internet and may not until it becomes a 'two-knob technology.' The ultimate possibilities and capabilities for audio online may only be realised when the medium develops adequately to address all of these issues and becomes more inclusive. Like radio hams, today's computer geeks and pioneers are working feverishly on the problem as they experiment and innovate on the internet.

Regulation: an enemy to innovation?

Radio began with the possibility of many-to-many user-led interactivity – as is now the case with the internet. In those early days of radios in the 1920s, Berthold Brecht for one spoke of the possibility for two-way democratic participation, where the medium would be ‘capable not only of transmitting but receiving, of making the listener not only hear but also speak’ (Brecht, 1979/80:25). Brecht argued that radio could be used to engage the public rather than establish itself as dedicated to light entertainment. His vision for radio promoted the idea that it offered the perfect opportunity for building a public sphere that was engaged, inclusive and transparent. This sort of two-way communication was technically possible for radio, but regulation of the airways meant that it was a potential never fully realised beyond the early radio amateurs; and later perhaps by the ‘pirates of the airways,’ determined to challenge the limitations of government regulations.

Today, the very same opportunity and threat exists with internet radio. The USA has been the first to decide to control and regulate internet radio. The way they did it took hundreds of online stations and bedroom experimenters off the web (<http://www.kurthanson.com/archive/news/062102/index.asp>). That is just what happened with radio. Should and will other countries follow suit?

In 2002 an estimated 10,000 internet radio stations were experimenting or broadcasting online in the USA. One of these was Soma FM, a listener supported, commercial-free internet radio station, run from a basement in San Francisco. Soma FM had moved from having one online radio ‘channel’ to eleven in just three years(<http://www.somafm.org/about>). The DMCA Copyright Arbitration Royalty Panel (CARP) ruling meant that it was required to pay \$500 a day in royalties to record companies or get off the air. The ruling established that internet-radio stations operating

in the USA would now be required to pay \$0.0014 per performance to the Record Industry Association of America (RIAA). For a 24-hour broadcast that has 500 listeners, this meant that the annual fee would be \$90,000. Soma FM led a campaign to protest the ruling, encouraging listeners and others in the same predicament to write and fax Congress, who finally responded to the public backlash with the Small Webcasters Amendment Act. While the SWAA would allow Soma FM to go back on the air (instead of \$500 per day they would only have to pay \$2000-5000 p.a., plus \$6000 in back fees), it was too late for many commercial, not-for-profit stations and hobbyist webcasters – the costs and the somewhat complex and potentially expensive regulatory framework meant that many were off the web for good (<http://somafm.com/carp/>).

In Australia the Australian Record Industry Association (ARIA) have been playing it quiet on how they plan to regulate royalty payments online. We have repeatedly asked them while researching this article, but their official line is: ‘we’re working on it’. They have given us no reason to presume that they might take a different path to the USA.

Added to this, we might ask whether and how Australian government policy seeks to support the public role of the internet. In the very early days of radio the Australian Broadcasting Corporation (ABC) led the way in pioneering educational broadcasting, both for the community at large and specifically targeting young people in schools. Again, it’s the case in Australia that the national broadcaster – especially via Radio National, Triple-J and ABC Newsradio – is leading the way with exploring what the interactive capabilities of the internet may offer to radio. For example Triple-J’s website (<http://www.abc.net.au/triplej>) combines both live and searchable archived radio content. It enables listeners to subscribe to weekly podcast programs and the website’s interactive

capabilities (email, message-boards, festival blogs) are frequently integrated into live broadcasts. Government support for the public broadcasters to lead the way in exploring what new combinations of internet and radio can offer audiences in Australia remains imperative.

The Youth Internet Radio Network Project

New media technologies are thought to be significant tools for enabling creativity and innovation while the internet and online community networks are seen to have the potential to encourage community-building and communication across (and despite) physical, cultural and social barriers. Such claims echo the rhetoric that generally surrounds the introduction of new technologies, just as it did with radio (see Spinelli 2000).

The Youth Internet Radio Network (YIRN) project provides us with an opportunity critically to examine these familiar ideas about the emancipatory and democratic potential of the internet. Through the YIRN project and its website, www.sticky.net.au young people are able to create, upload and download creative content; video, audio, text etc. They can comment on their own and other people's content, chat with one another, tell their stories and have discussions. They can decide how they want their content to be used.

When uploading content they are asked series of questions. If they agree that the content they are uploading is their own work they can choose a copyright license that suits them by answering some simple questions. We are using the Creative Commons Copyright license system developed in the USA. Creative Commons can now be used under

Australian law, thanks to the work of a project in the Law School at Queensland University of Technology (<http://www.creativecommons.org.au/>). So the questions we ask include: ‘Do you want others to be able to use your content for commercial purposes or non commercial only?’; ‘Do you want your name to be attached all future use of the content?’ If young creators do permit others to use their work, it becomes a downloadable file. If they do not, it is put into a stream on the site that is not downloadable.

We have invested a lot of resources into developing a flexible copyright system for the project that gives users the control to decide how they want their content to be used but also establishes a network that allows for the possibility of collaborations and the remixing of content that media technologies now enable while automatic copyright licensing laws currently don’t. But copyright is a complex and very difficult issue on the internet. APRA is the body that collects and distributes Australian and New Zealand copyright royalties for music creators and publishers. While we were able to get an APRA license there are no copyright licenses available for internet radio stations from ARIA – the Australian licensing body for the record industry. There are also no one-off license fees available for copyrighted video and images. This means that we have had to develop a very complicated monitoring system to ensure that we do not infringe copyright for visual material. The site is also at risk of being shut down if ARIA decides at any point to introduce exorbitant licensing fees or complicated licensing structures – as noted above, this is certainly a possibility if they follow in the footsteps of the equivalent US body.

The point of YIRN is that we want to create a network that is open, flexible and responsive to the young people who participate on it, very much in line with an ‘open

architecture approach' informed by the notion of the 'internet commons' or the 'innovation commons' as articulated by Lawrence Lessig (2001). Lessig believes that innovation on the net prospered because of the very nature of the internet. Its open-ended architecture ensured that creativity and ideas could emerge and flow freely. Similarly we could say the same applied in the early days of radio. We want to create a network that can be built up by its uses, that engages young people and allows them to be creative with their own and others' content. We want to create a space for innovation – where things we can't imagine can happen, do happen; a space for experimentation.

The value of YIRN as research is that it allows us to test the extent and capabilities of the generation dubbed 'digital natives' by Rupert Murdoch.² We're learning about the actual process by which young people form digital networks, and also revealing the impediments they face in trying to make the most of their creative talents.

While we begin to observe how the project's website, **sticky.net.au** develops with input from the young people participating in our workshops, we are starting to consider how online networks like these may be challenging the traditionally understood separation of producer and consumer, and how creativity and participation can be encouraged through the use of new media technologies. Does this type of interactivity and participation offer challenges for the traditional one-to-many radio broadcast model? What new modes and

² 'Speech by Rupert Murdoch to the American Society of Newspaper Editors.' Washington, 13 April 2005. newscorp.com/news/news_247.html. The terms 'digital natives' and 'digital immigrants' were coined in 2001 by Mark Prensky: *On the Horizon*, NCB University Press, Vol. 9 No. 5, October 2001 (marcprensky.com/writing/Prensky%20-20Digital%20Natives,%20Digital%20Immigrants%20-%20Part1.pdf). Murdoch used the terms to point out that entertainment and news media were losing touch with young demographics. Subsequent purchases of various online companies by Newscorp indicated that in this speech Murdoch was signalling his intention to colonise those natives. See 'Bring Me Your Huddled Murdochs' by John Hartley: <http://www.onlineopinion.com.au/view.asp?article=3384>

styles of communication, and social relationships, are offered by this medium, and what are the implications for the now-traditional broadcast model?

A significant opportunity lies before us with the next wave of internet radio development. Moving images, television, film, video, audio can now all migrate from traditional media to the online medium. Technical developments like mobile MP3 players, podcasting and multi-function mobile phones pave the way for radio ‘on demand.’ The potential for more user-friendly participation in audio production and distribution is now ripe. Indeed all of these emerging hardware and software developments do suggest there is great potential for the democratisation of the creative process, where there are increasing opportunities for participation – individual and collective – in a range of online audio-visual projects.

But what we are realising is that this space needs to be protected, it needs to be given the space and time to experiment and develop. And yet it is vulnerable to policy and regulation which could effectively shut down its potential.

Early days and lessons to be learnt

What might people want from internet radio, assuming it will go on to achieve ‘two-knob’ ease of use and society-wide uptake? At time of writing, YIRN’s research findings arise more from the content creation workshops we have conducted across metropolitan, regional, remote and Indigenous Queensland than from the operations of the Sticky.net.au network itself, which is still being tested and developed. But already our workshop interactions tell us what many others are finding, which is that there is strong demand from young people to use the internet for four purposes that also characterised early radio

– a demand that in the end broadcast radio was unable to deliver on a society-wide basis.

These demand-led uses are for:

- **Interactivity** – peer to peer conversations and communication .
- **User-led (DIY) content** – ‘make it, don’t just take it’; strong demand for education that is interesting and relevant and appropriate to developing innovation and creative industries, e.g. Digital Storytelling, photography, music, DJ-ing, editing.
- **Self-created ‘imagined communities’** – citizenship expressed as voluntary affiliation with communities of choice.
- **Entertainment** – ‘two-knob technology’; ease of use, accessibility.

The history of radio shows that despite the best efforts of governments, entrepreneurs and even inventors, the decisive influence on the development of a new medium is popular acceptance by consumers, participants, citizens and users. But popular demand can only be used as a reliable guide to development if it is given a chance to play with a new medium in order to establish what it might be for. The internet is in exactly this stage of its development at present; now would be a very bad time for governments and corporations to impose strict regulation based on outmoded provider-controlled business models. The lesson of radio is that while regulation, commercialisation and state intervention are inevitable, they also forever alter what a medium could have been or could become. If their regime is imposed too soon or without care, the potential of the medium to attract widespread popular acceptance and social uptake may be permanently impaired.

References

- Anderson, B. (1983) *Imagined Communities: Reflections on the Origin and Spread of Nationalism*. London. Verso.
- Baneouw (1968) *History of Broadcasting in the United States: The Golden Web: 1933 to 1953*, Vol. 2. New York, N.Y : Oxford University Press.
- Berthold Brecht (1979/80) 'Radio as a means of communication: a talk on the function of radio.' *Screen*, 20 (3/4), 24-28.
- Crisell, Andrew (2002) *An Introductory History of British Broadcasting*. 2nd ed. London: Routledge.
- Douglas, Susan J. (1987) *Inventing American Broadcasting 1899- 1922*. Baltimore, MD: Johns Hopkins University Press.
- Hartley, J. (2000) 'Radiocracy: Sound and Citizenship.' *International Journal of Cultural Studies*, 3 (2), 153-59.
- Huong, Dang Thi Thu (2005) 'The position and characteristics of Web radio in mass media system.' *MeCCSA Postgraduate Conference*, Cardiff School of Journalism, Media & Cultural Studies, 23-24 June
(http://www.cardiff.ac.uk/jomec/library/doc_lib/meccsa2005conferencefinal2.pdf)
- Lapsley, A. (1998). 'The origins of educational broadcasting in Australia.' *Australian Journal of Educational Technology*, 14(1), 1-24.
- Lessig, L. (2001). *The Future of Ideas: The Fate of the Commons in a Connected World*. New York, Random House.
- Spinelli, M. (2000). "Democratic rhetoric and emergent media: The marketing of participatory community on radio and the Internet." *International Journal of Cultural Studies* 3(2), 268-278.

Tacchi , J. (2000). “The need for radio theory in the digital age”. *International Journal of Cultural Studies*, 3 (2), 289-298.