



Better Connected: building connectivity skills towards technology adoption to support rural, regional, and remote business and community.

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Abstract

Connectivity Literacy encompasses all the knowledge needed by a consumer to understand how to get connected and stay connected to equitable, affordable and reliable voice and broadband internet services that meet their needs and budget. It is a precursor to Digital Literacy and incorporates the knowledge needed to navigate through choice of telecommunications providers and technologies, and to understand terminologies, plans and equipment. Connectivity Literacy is challenging in rural, regional, and remote (RRR) Australia and does not have any demographic barriers such as age, gender, location, or education level.

A mixed methods approach using thematic and secondary data analysis was conducted using ten years of data collected to understand the use and understanding of internet services by women, farmers and small to medium enterprises in rural, regional and remote regions across Australia. Surveys, reports and submissions provided quantitative and qualitative data. Thematic analysis was performed on open-ended questions within the data sets, written text and through documented case studies. The findings were overlaid with the Diffusion of Innovation model and considered the extended theory of the Crossing the Chasm to help identify barriers to the adoption of internet-based tools.

The analysis has identified the difficulty that consumers and businesses are having navigating rural, regional and remote internet connectivity. It has established a baseline understanding of a new phenomenon identified as 'Connectivity Literacy' (understanding how to get and stay connected), which is a pre-cursor to Digital Literacy (understanding how to use different devices, software, and operating systems).

Understanding and applying the concept of Connectivity Literacy provides the opportunity to build critical mass around internet connectivity knowledge and understanding that can advance adoption and innovation in rural, regional and remote areas.

Introduction

Access to internet connectivity in RRR areas of Australia has improved in the past four years (Australian Government, 2020, 2021, 2022, 2023). However, for many people and businesses living in RRR areas, the ability to get connected, stay connected and use that connection remains difficult. Previously, a lack of connectivity in RRR areas has been attributed to a lack of access, expense, education level, available infrastructure and policy and operations (Curtin, 2001; Freeman & Park, 2015; Park et al., 2019; Saleminck et al., 2017). However, as newer technologies and a greater choice in RRR connectivity emerges, a lack of connectivity success can also be attributed to an individual's level of connectivity ability (Deursen & van Dijk, 2010; Park et al., 2019). Whilst connectivity literacy plays a large role in the success of getting connected and staying connected, other barriers to connectivity such as adequacy, affordability, consumer guarantees, redundancy and reliability also factor into connectivity problems in regional telecommunications, all of which underpin the need for sound connectivity literacy.

Connectivity Literacy (understanding how to get and stay connected) focuses on the knowledge needed to access telecommunications services, particularly broadband and voice, which includes understanding available technologies, navigating provider options, selecting appropriate plans, and managing equipment. It addresses the practical aspects of getting connected and staying connected, including the factors that affect connectivity quality and availability. Digital Literacy (Gilster, 1997; Heitin, 2016) (understanding different types of hardware, software, and operating systems) assumes a person already has access to reliable internet and emphasises their skills to effectively use digital tools and platforms. It involves the ability to operate devices, navigate software, and engage with digital content, fostering safe and productive digital interactions. It is measured by frameworks like the Australian Digital Inclusion Index (ADII, 2021), which evaluates digital inclusion through access, affordability, and digital ability. As shown in Figure 1, Connectivity Literacy is a precursor to Digital Literacy and a barrier to digital participation.

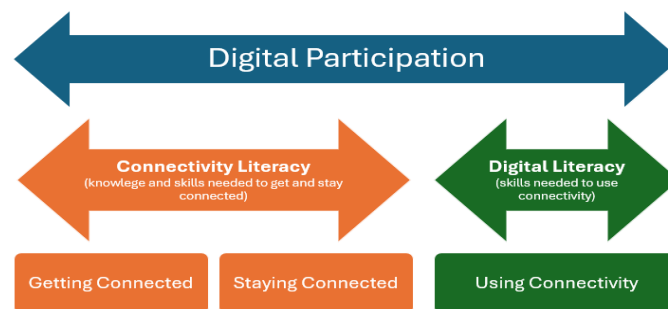


Figure 1: Connectivity Literacy is a precursor to Digital Literacy

Due to the complexity of using digital connectivity technologies in RRR areas, residents are having to develop new types of knowledge and skills that those in major cities do not have to acquire (Park et al., 2019). This includes knowledge of the numerous technologies available, including infrastructure and devices such as cellular booster, antennas, towers, and repeaters, as well as service plans (Park et al., 2019). However, it is often more difficult for regional Australians to obtain this knowledge (Szeles, 2018), as there is a limited amount of 'on the ground' understanding and independent advice about telecommunications infrastructure that can be used in RRR properties and communities.

Methods

Secondary data research (Manu et al., 2021) allowed the researchers to leverage pre-existing data that was originally collected to examine telecommunications delivery and how the internet was used and understood

by women, farmers and small to medium enterprises in rural, regional and remote regions across Australia. Secondary data selected was appropriate because it was relevant to both the population and the phenomenon under study (Silver & Wrenn, 2013), allowing the researchers to derive conclusions about Connectivity Literacy. Thematic analysis (Lyons & Coyle, 2021) was used to identify, analyse and interpret people's views, opinions, knowledge, experiences, or values to derive patterns of meaning (Belotto, 2018) within the qualitative data that supported conclusions aligned to connectivity literacy.

Secondary data sets from three academic mixed methods (Creamer, 2017) research projects provided quantitative and qualitative data (online surveys N=625; focus groups N=27) for analysis (Harrington, 2024; Hay, 2018b; Wilson, 2022). Secondary data from three large consumer surveys (N=4180) (Hay, 2016, 2017, 2018a) were also analysed. In addition, submissions from the past 10 years to government enquiries into regional telecommunications containing lived experience case studies were also included in the analysis (Australian Government, 2008, 2012, 2015, 2018; Glasson et al., 2008; Hartsuyker et al., 2021; McKenzie, 2018, 2021; Shiff et al., 2015; Sinclair et al., 2012; Single et al., 2024; Sparrow, 2015, 2018; Stretton et al., 2021). The final data set was drawn from posts on the Better Internet for Rural Regional and Remote Australia Facebook page, which started in 2014 with approx. 500 members and in 2024 has almost 16,000 members (BIRRR., 2014).

Findings were overlaid with the Diffusion of Innovation Model (Rogers, 2003) and Moore's Chasm (2014), as shown in Figure 2. Rogers (2003) describes how practices spread over time ultimately lead to adoption and Moore (2014) identified a gap between early adopters and the early majority that contain critical barriers to adoption. The findings demonstrate how poor Connectivity Literacy is a barrier to the adoption of internet-based tools.

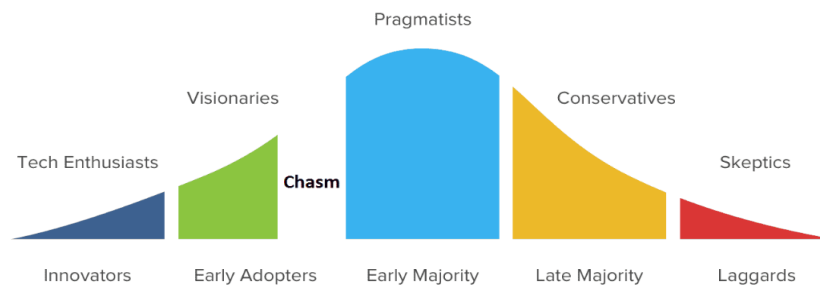


Figure 2: Moore's Revised Diffusion of Innovation Model (2014)

Results

Connectivity Literacy

The data demonstrated that Connectivity Literacy affects all types of consumers and is not limited by education, culture or age, Table 1.

Table 1: Connectivity Literacy Indicators

Topic		The Chasm	Diffusion/Dis-Adoption		
Innovators	Early Adopters	Critical Barriers to Adoption	Early Majority	Late Majority	Laggards
Connectivity Literacy – All the things a consumer needs to know to get connected and stay connected to the internet		How to choose a technology, provider, plan, choosing & installing equipment, troubleshooting a connection, staying connected in an emergency and where to go to get help.	<ul style="list-style-type: none"> • Mums / Dads / Children / Young Adults • Workers / Volunteers / Business Owners • First Nations / Different Cultural Backgrounds • Government (local, state, federal) • Researchers /All Education Levels • Young / Old 		

Functional Literacy

Literacy is traditionally defined as the ability to read, write, and perform basic arithmetic. However, functional literacy extends beyond these basic skills to include the practical application of reading, writing, and math in real-life situations (Nutbeam, 2008). Functional literacy encompasses the ability to understand and use information effectively for daily tasks, such as interpreting graphs, managing finances, and making informed decisions. This broader definition highlights the importance of skills like media literacy, financial literacy, and health literacy, which are essential for navigating today’s complex, high-tech society. While basic literacy is foundational, functional literacy ensures individuals can actively participate and thrive in their communities. In 2001, the Australian Council for Adult Literacy (2001) identified that one in five adults do not have the functional literacy skills to effectively participate in everyday life. In addition, the Australian Bureau of Statistics (2011-2012) identified that only 3% of Australians have the ability to use digital technology, communication tools and networks beyond basic applications such as email and web browsing. The data highlighted functional literacy as a foundation for digital inclusion and its impact on connectivity adoption outcomes, see Table 2.

Table 2: Functional Literacy Indicators

Topic		The Chasm	Diffusion/Dis-Adoption		
Innovators	Early Adopters	Critical Barriers to Adoption	Early Majority	Late Majority	Laggards
Functional Literacy - encompasses the ability to understand and use information effectively for daily tasks, such as interpreting graphs, managing finances, and making informed decisions (Nutbeam, 2008)		<ul style="list-style-type: none"> • Lack of practical skill set needed to get connected and stay connected to equitable, affordable and reliable voice and broadband services • Inability to function effectively online • Insufficient functional literacy, which is a core foundation to digital inclusion 	<ul style="list-style-type: none"> • 44% stay with provider that does not meet their needs • 63% prevention from adopting new technology • 70% negative impact on business operations • 57% negative impact on productivity • 37% negative impact on customer service “makes me look unreliable” • 48% have not changed their provider in the past 3 years • High transactional costs: administrative time, time to learn new technology, troubleshoot issues 		

Digital Apathy and Misinformation

The data shows that consumers are experiencing digital apathy caused by various factors including fear of the unknown, a lack of exposure or experience with technology, lack of time or a reluctance to change or try new things. A state of digital apathy can also be caused by people trying their best to solve their connectivity problems and ‘giving up’ as it becomes too difficult and takes too much time. Adding to digital apathy, widespread misinformation is often confusing, disruptive and causes consumer fatigue and

frustration. Digital apathy makes it incredibly difficult to engage consumers including RRR users, industry, government, media, and researchers in understanding how to get connected and stay connected. The data highlights digital apathy and misinformation as significant barriers to connectivity adoption, as summarised in Table 3.

Table 3: Digital Apathy and Misinformation Indicators

Topic		The Chasm	Diffusion/Dis-Adoption		
Innovators	Early Adopters	Critical Barriers to Adoption	Early Majority	Late Majority	Laggards
Digital Apathy - an indifference or a deliberate lack of enthusiasm or interest towards digital technologies such as the internet, smart phones, computers, and other digital devices, that results in a genuine fatigue towards technology		<ul style="list-style-type: none"> • Lack of experience and exposure • Fear of the unknown • Negative messages from the bush grapevine, social media, the media • Negative past experience • Consumer fatigue/Cognitive overload • Inertia (tendency to do nothing) and status quo bias • Historical RSP practices 	<ul style="list-style-type: none"> • “BUT there is only one provider, nothing else to choose from” • “Current plan restricted by sky muster” • “Don't think there are any other options” • “I don't know if I am locked in” • “I think we have just changed by default” • “There's no choice in what I can compare to as I really have one plan to choose from” • “We were waiting for Starlink to arrive, no other alternatives” • “I can't get NBN, I live remotely” 		
Misinformation - false, inaccurate or misleading information; and Disinformation - information that is covertly spread deliberately to deceive or influence (O'Connor & Weatherall, 2019)		<ul style="list-style-type: none"> • Lack of dedicated rural regional and remote tech support • Lack of independent advice • Myths and furbphies • Industry is profit driven not results driven • Industry undermined by scammers and misleading and deceptive practices, creating distrust 	<ul style="list-style-type: none"> • Consumer confusion/mental burden • Consumer fatigue and frustration • Geographical narcissism “People in cities think what we do is less valid” • Lack of understanding from urban stakeholders – “if you're not happy why don't you move [to town]” • Constant change is disruptive and creates further barriers 		

Discussion

Telecommunications have become an essential service, yet unlike other utilities (e.g., water, power) RRR consumers are expected to be intricately involved in the complexity of installation, delivery, and success of that service. Consumers lack personal resources and understanding to compare and match available technologies to their broadband and voice needs resulting in Connectivity Literacy issues. Poor connectivity literacy creates barriers for RRR consumers to get connected and stay connected resulting in negative experiences with technology that are difficult to overcome resulting in digital apathy causing people to give up, and ultimately to put up with substandard connections and ongoing issues. This is not only a significant safety concern but also creates lost productivity, affects education and mental health, and exacerbates social isolation for remote consumers.

A vast amount of industry and academic adoption literature fails to recognise functional connectivity literacy (getting connected and staying connected) as a precursor to digital literacy (using your connectivity) as a barrier to adoption. While connectivity infrastructure has considerably improved access over the past four years, it has resulted in a confusing landscape of connectivity options. There are also misconceptions about the availability of national broadband (nbn) services and alternative suppliers. To increase adoption of internet-based tools, health and education resources and land/animal business management tools, consumers need support to navigate and utilise the connectivity landscape that provisions internet access

(Get Connected) to troubleshoot their connectivity (Stay Connected) and to support adoption of internet-based tools (Use Connectivity).

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