

Digital upskilling required to advance Australian agriculture

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Abstract. Recent reports have highlighted that digital inclusion is still a major issue for regional and remote communities of which a significant proportion work in the agricultural industry. If the Australian agriculture sector's ambition to become a \$100 billion industry by 2030 is to be realised, there needs to be a greater focus on the digital capacity and the digital capability of the workforce in these rural and regional areas. Tocal College, the Registered Training Organisation of the NSW Department of Primary Industries (NSW DPI) is working to improve digital literacy and AgTech adoption by farmers through the delivery of a number of online courses. To support this delivery, NSW DPI also facilitate an AgTech Community of Practice to provide extension and education to farmers in this space on emerging digital research and technology. In this paper we outline what is offered to help provide upskilling opportunities for the agricultural industry.

Keywords: agriculture, digital literacy, AgTech, online education

Introduction

Online education has become a practical alternative to traditional face-to-face settings. The adoption of online learning rapidly accelerated during the COVID-19 pandemic. At Tocal College we have been delivering online learning for over fifteen years to the agricultural sector. What has become evident during this time is that our learners faced significant digital literacy issues, and the reported impact of this on their learning is anecdotal at best (Watson et al. 2001). The Australian Digital Inclusion Index (ADII) shows a substantial digital divide in Australia with 1 in 4 people in Australia still digitally excluded, particularly those from regional locations (ADII 2021). The importance of understanding the rural sectors' digital capabilities and limitations when preparing and planning online learning and assessment is essential to the success of providing a high-quality, personalised, and accessible service. It really is all about improving the digital literacy of our learners and ensuring that our candidates have the right skills to be able to fully engage in the digital world.

Digital literacy is defined as 'the confident and critical use of a full range of digital technologies for information, communication and basic problem-solving in all aspects of life' (UNESCO 2021, Definition). It incorporates the ability to search and navigate, create, communicate and collaborate, think critically, analyse information, and address safety and well-being using a variety of digital technologies. There are many frameworks for unpacking digital literacy, one of which is the Department of Education, Skills and Employment (Department of Education Skills and Employment 2021) Digital Literacy Skills Framework. This Framework identifies six levels of performance and two core indicators, each with two core focus areas:

- Active awareness of self as a digital user
 - connect, communicate and collaborate
 - digital identity and safety.
- Knowledge, use, and application of digital literacy skills
 - digital technologies and systems
 - create, organise, present and problem solve.

These focus areas are then further divided into Performance Features, which provide a detailed description of competent performance at the level and then act as a guide to ensure consistent and reliable interpretation of the indicators at each level. The Digital Literacy Skills Framework highlights that digital literacy skills exist on a continuum with varying degrees of competency required depending on the context.

Digital literacy as a foundation skill

As the digital world is rapidly changing, the individual skills needed to be digitally literate will also change over time. Emerging technologies such as the Internet of Things, artificial intelligence, automation, and robotics will affect the nature and type of jobs available, and the skills and capabilities required to perform both new and existing jobs (World Bank 2019). Joyce (2019) argues that digital literacy skills should be included alongside the foundation skills of language, literacy, and numeracy. Digital skills are becoming 'a new basic skillset in the way reading and writing are today and should be a core component of ongoing workplace skills development' (Committee for Economic Development of Australia 2015, p. 162). This inclusion of digital skills

alongside the foundation skills of language, literacy, and numeracy recognises that digital literacy has become increasingly critical for individuals' participation in the workforce and everyday life.

The Strengthening Skills Review (Joyce 2019) proposes that all adult Australians who have not achieved level 2 on the Australian Core Skills Framework should be given access to fee-free training in Language, Literacy, Numeracy and Digital Literacy (LLND). This new national agreement for foundation skills will be expressly provided through three main delivery models of LLND training across Australia, the first of which is through standard Registered Training Organisation (RTO) delivery of foundation-level VET courses. Therefore, RTOs like Tocal College, an institution whose primary focus is the education and upskilling of the agricultural sector, are tasked with the important role of ensuring that all students have the foundational skills of language, literacy, numeracy, and digital literacy. This basic level of training in LLND skills enables students to be able to participate in further online education and to investigate digital solutions in their workplace to increase efficiency and productivity.

The importance of digital literacy for Australian agriculture

Agriculture plays a significant role in Australia, occupying over half the country's land (ABARES 2023). The National Farmers Federation and the Australian Government have set a target for a \$100 billion agricultural industry by 2030 (National Farmers' Federation 2018) and the adoption of AgTech has been identified as a key component to achieving this. Digital technology is central to the future of Australian agriculture, and it has been estimated that digital agriculture could add \$20 billion to the value of the sector. One of the recommendations by the Growing Australia Inquiry (Parliament of the Commonwealth of Australia 2020) is that the Department of Agriculture, Water and the Environment implement an Innovation Adoption and Extension program to promote the adoption of digital technologies by Australian farmers. This program could involve activities such as targeted events, small-scale grants, or the provision of information online. The program should also support and build upon the work currently being undertaken by industry groups, producer networks, and institutions like Tocal College, to build digital literacy and disseminate information on beneficial digital innovations.

In agriculture, digital literacy goes beyond basic computer skills and involves understanding agricultural software, data analysis, precision farming technologies, and utilising IoT (Internet of Things) devices. A digitally literate workforce in agriculture can make informed decisions, access real-time data, and optimize farming processes to achieve better yields and resource efficiency. In 2017, the Accelerating Precision to Decision Agriculture (Precision to Decision) program completed its investigation into the potential of digital agriculture in Australia. The program was led by the CRDC and undertaken in collaboration with the other 14 RDCs and seven other research entities. Summarising the key findings of the Precision to Decision program the CRDC states that a digital skills gap exists across the sector and digital literacy skills are required to realise the full potential of digital agriculture (Leonard et al. 2017).

What is Tocal College doing for digital literacy?

To deliver our online courses we use the Learner Management System, Canvas, which is an online learning platform specifically designed for teaching and learning in the online space. We have developed an online course called Canvas101 which all students are enrolled in when they first begin learning with us that helps guide them through using the online platform to undertake their learning. Tocal has several courses that are specifically designed to increase digital literacy and the uptake of AgTech among our students. These include Drones in Agriculture, Farm Mapping and Data Collection, and our recently developed Farms of the Future course, which aims to build knowledge on AgTech devices and connectivity solutions for farmers. Through the delivery of these courses, we are building the digital capacity of thousands of farmers and stimulating the uptake of AgTech on farms. However, students do not need to undertake a specific course to improve their digital literacy, as simply learning online with us builds their capacity and knowledge of operating in the digital space.

We are also currently developing a basic digital literacy course which will be freely accessible to all our students. Not specifically targeted at using the LMS for learning, this course is designed to be more generalised and focusing on moving students through the six identified levels of performance defined in the Digital Literacy Skills Framework (Department of Education, Skills and Employment 2021). This includes being familiar with the range of digital devices available and how to use them, but also integrates problem-solving, and learning to work with and around problems that can arise with the use of technology. Another key area in digital literacy as discussed by Summey (2013) includes Locating and Filtering which is how to use the internet effectively for research, and how to be able to judge the reliability and validity of internet sources

used for learning. It is through teaching these foundational digital skills that we enable and empower students to further their learning online and take these learnings back to the workplace.

To support our students and the wider agricultural community on AgTech research and innovations, NSW DPI has also developed an eXtensionAUS Community of Practice (CoP). eXtension AUS is a digital platform, which is shared in partnership by NSW DPI and AgVic and facilitates CoP websites to meet the needs of rural and regional Australia by bringing together scientists, academics and practitioners to collaborate, share information, knowledge and research, create ideas and provide solutions. The AgTech CoP comprises a panel of experts in the field who publish regular articles on digital technology in agriculture on the CoP website and stimulate discussions around the topic on social media channels. The CoP website also has an Ask an Expert feature, where members can have direct access to the expert panel to ask their questions relating to implementing AgTech for their farming enterprise.

Conclusion

With the Australian government's target of \$100 billion dollar agriculture sector by 2030, the importance of a digitally literate agricultural workforce is clear. This workforce needs to have the skills and capabilities to operate in an increasingly digitised world and be ready and willing to adopt new and ever-evolving forms of AgTech, to increase output and increase efficiencies. Tocal College is one of many stakeholders who support and are involved with meeting the recommendations put forward by the Growing Australia Inquiry (Parliament of the Commonwealth of Australia 2020), and supports the efforts of the Department of Agriculture, Water and the Environment to promote the adoption of digital technologies by Australian farmers. We are working with those in the agricultural sector to improve digital literacies and accelerate the uptake of AgTech through the online programs we provide, but also through delivering online training across Australia. It is through operating in the digital space that we educate Australian farmers in digital literacy and provide a space where they can learn to be digitally self-sufficient and thrive in the increasingly digital world in which they are required to operate.

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