

Use of mobile devices in extension and agricultural production- a case study

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Abstract

Agriculture in Australia is increasingly using new information technology available on the web and via smartphones and tablets. The potential benefits of using smartphones and tablets for communication, learning and efficiency in business have become more obvious for agriculture, more advisors, farm merchants and farmers are taking up technologies with relish as internet speeds and coverage improves across regional areas. The internet, smartphones, tablets and the related apps and social media experience are evolving as a major extension tool for the present and future. The new technology now offers farmers the ability to access information in their own time, in their own way and at a location of their choice. Surveys conducted in 2012 show between 40 and 61% of farmers and advisors own smartphones or tablets. Using NSW Department of Primary Industries (NSW DPI) as a case study, this paper focuses on the use of smartphones and tablet computers to deliver extension information and. indicate the level and type of use of websites and social media such as YouTube by smartphones and tablets.

Key Words

smartphone, mobile devices, tablets, YouTube, applications, agriculture, extension

Introduction

Agriculture in Australia is increasingly using new information technology available on the web and via smartphones and tablets. Surveys conducted in 2012 by NSW Department of Primary Industries (NSW DPI) and other industry organisations have shown that around half of the grain producers and advisers in NSW have adopted smartphones and tablets. However in some areas slow internet speeds and poor network coverage outside regional towns are impeding this trend (Lorimer, 2012). With the National Broadband Network (NBN) beginning to alleviate these limitations in some areas, there is a growing interest amongst the agricultural community in the potential benefits that might be derived from smart phones and tablet computers.

There is a vast range of digital technologies already used in agriculture including precision agriculture, tracking devices, remote management, websites, social media, ebooks, apps and SMS. However, the growing popularity of mobile devices has dramatically changed how this digital technology can be used, enabling applications to be location based, linked to real-time sensors and enabling synchronisation of many devices. A number of commercial businesses, industry organisations, individuals and government extension services are now using and developing a range of digital technology for reaching agriculturalists and other interested parties with their information (Roberts and McIntosh 2012). NSW DPI, for example, is utilising and developing this technology for farmers' benefit with the release of online decision support systems such as CropMate™, apps such as CropMate™ VarietyChooser (Warden and McIntosh, 2011) and the development of topical agronomic videos on the DPI YouTube channel.

Using access to NSW DPI electronic media as a case study, this paper focuses on the potential of mobile devices to deliver extension information in an entirely new way.

Who is using smart phones and tablet computers?

Official surveys of uptake and use of mobile devices amongst cropping and pasture farmers in Australia are scarce. Therefore figures referenced in this paper are sourced from surveys conducted by industry groups or government advisors at meetings or conferences. In order to address this knowledge gap, a nationwide survey is currently underway supported by a number of government and industry groups to gather information on the use of digital technology.

Proportion of uptake of mobile devices amongst farmers varies widely (Table 1), about 40% to 60% of any particular group. The surveys indicate that uptake is higher amongst advisors at 61% and farmers at 40-56%. The variability in utilisation amongst farmer surveys appears to be based around the industry in which they are

involved (the technology that is available in that industry), and the region in which they farm (the ability to connect to the mobile network from their individual business location).

Table 1. Surveys conducted through industry and government bodies of uptake of smartphones and tablet computers amongst farmers and advisors across South Eastern Australia. * Survey question did not differentiate between smartphones and tablets

Survey	Participant No.	Smartphone usage (%)		Operating system (% of mobile devices)			Will in 6-12 months
		Smartphone usage (%)	Tablet usage (%)	iOS	Android	Other	
NSW DPI Jan 2012 (Statewide) (NSW DPI, 2012)	109	40 (smartphone & tablet)*		63	32	6	92
NSW DPI Mar 2012 (Riverina) (Haskins, 2012)	74	46 (smartphone & tablet)*					62
GRDC Advisor Updates, Mar 2012 (ORM Communications, 2012)	578	61	39				78
SEPWA Feb 2012 (Metz, 2012)	57	56 (smartphone & tablet)*		78	22	0	100
VIC DPI/ Outware Dec 2010 (Lorimer, 2012)	34	39 (smartphone & tablet)*		46	15	39	44

Analysis on use of existing NSW DPI websites, CropMate and videos on YouTube shows an increasing demand for an online delivery mode (Figure 1a and 1c). Average access to the NSW DPI YouTube channel from a mobile device has increased by 2% to 8% over a two year period (Figure 1b). Further interrogation of the video usage data indicates that the highest usage by a mobile device on a single video is 20.6%. Higher mobile device viewing appears to correspond with videos released during busy times of the year such as harvest and sowing. Whilst usage of NSW DPIs website by mobile devices is still low at 9.8%, there has been a dramatic growth in access by mobile devices by up to 364% in the last 3 years at a time when non-mobile use is increasing by up to 122% (Figure 1c). This growth and potential future growth needs to be taken into consideration when planning extension projects and web design into the future. The Apple iOS operating system dominates the mobile devices used by agriculturalists, as reported by surveyed farmers (Table 1) and as shown in the analysis of CropMate website usage (Figure 1d).

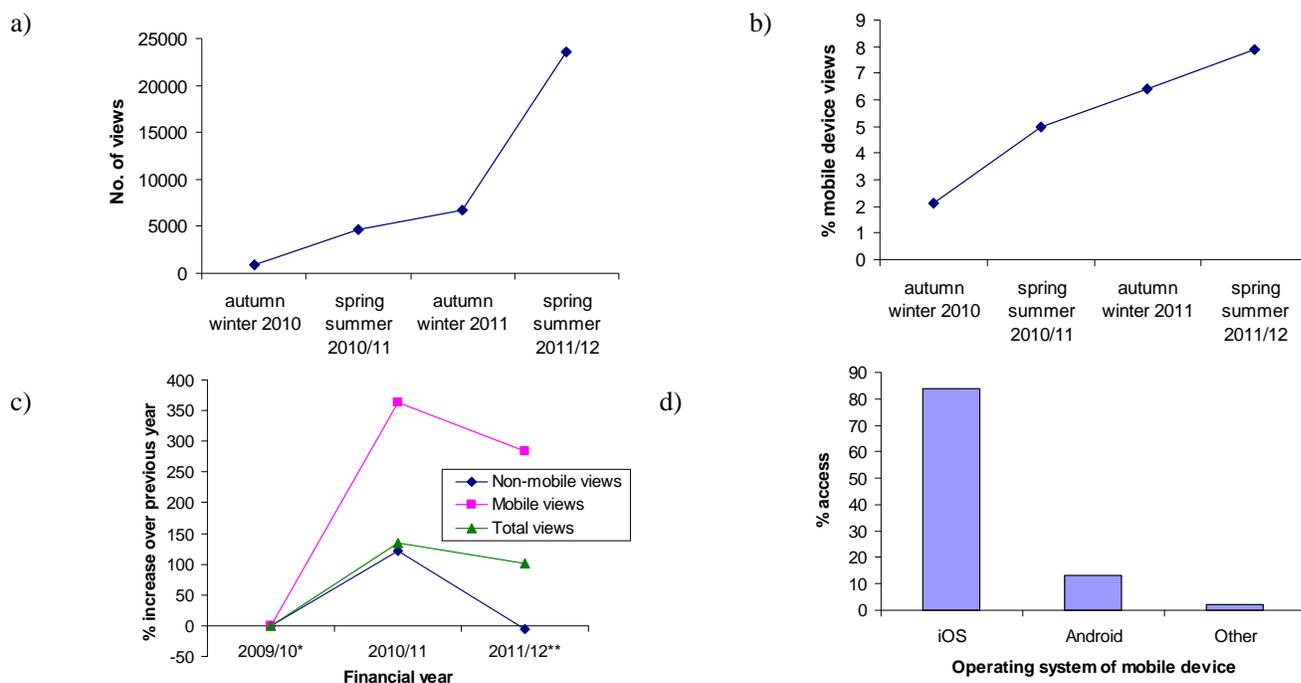


Figure 1. Mobile device visits on a range of NSW DPI sites. (a) Number of visits to videos on the NSW DPI (NSW Agriculture) YouTube channel (b) Percentage of visits videos on the NSW DPI (NSW Agriculture) YouTube channel by a mobile device (c) Percent increase in visits by a mobile device to the NSW DPI website (* Sept 2009 to June 2010, ** June 2011 to April 2012) (d) Operating system of mobile devices accessing CropMate in a 12 month period (sourced YouTube Analytics and Google Analytics, 2012).

How are farmers using mobile devices in their businesses?

Agriculturalists tend to check the weather and emails and access grain marketing information the most frequently on their mobile devices (Metz, 2012) (Lorimer, 2012). However, there is a growing use of the devices for precision agriculture, record keeping and accessing agricultural news and technical information (Lorimer, 2012).

The use of many of the newer technologies such as ebooks, RSS feeds, and blogs, are limited by knowledge of what these products actually do and NSW DPI and other organisations have been assisting growers to gain knowledge of these areas (Roberts and McIntosh 2012). Although currently limited in availability, agricultural ebooks and PDFs, such as DPI's management guide series, allow the collection of a library on one device without carrying many books around, an advantage for advisors who are continually referring to a range of references when giving advice. RSS feeds allow continuous updates to be sent directly to a subscriber, reducing time spent checking numerous individual sites. Blogs are often used to comment on immediate issues being seen on the farm and are being used to communicate with groups of farmers in an instant, interactive and visual manner.

A whole range of agricultural apps and software for smartphones and tablets now exists or is being developed, although apps specifically for Australian agriculture are still limited. Some examples include tracking and managing livestock, monitoring calving, managing water points, managing irrigation, talking between machinery, remote performing of roles such as unloading grain, monitoring sensors in crops, marketing produce, estimating and mapping yield, performing as substitute tools (such as spirit levels), calculating area, mapping soil types etc (Roberts and McIntosh, 2012). The capabilities of the smartphone and the fact that your phone is always with you means that it has the potential to act as a data logger, and controller for a range of roles instead of having individual units on each item eg livestock scales, pumps, weather units etc. This has the potential to offer more convenient control and also significant costs savings in the equipment required for each task.

Agribusiness is also taking up smartphone and tablet technology as it allows staff such as field agronomists to enter data and generate reports that are then sent to the farmer and back to the store on the spot. This offers a significant reduction in time spent double handling data, and also allows the store to have orders ready for farmers when they come into the store and more easily track and reorder supplies.

Social media

Mobile devices have contributed to the success of social media, increasing its accessibility and immediacy. Agriculture has a growing presence in social media both in video such as on YouTube and in discussion forums such as Facebook and Twitter. Social media has proved to be a powerful medium in influencing public opinion and there is also a growing use of Twitter and Facebook amongst farmers on a technical basis, with Twitter streams such as AgChatOZ holding regular forums and online groups of farmers discussing issues with advisors on Facebook.

As a source of information, YouTube functions as the second biggest search engine in the world. This is reflected in local Parkes farmer surveys indicating that 60% of social media users (66%) utilise YouTube as a source of technical information. Timely release and a short high quality relevant message has considerable impact on the success of the extension message. A key example is a NSW DPI video entitled "Fleabane management in fallows". This video provided farmers and agronomists with a short but informative visual message that they could watch whilst driving headers, waiting in queues at silos or briefly at the end of the day and hence proved very popular, resulting in a large spike in views at harvest of more than 1200 views in 1 week from an average of less than 300 views in late December 2012.

Discussion- building the technology into extension

The uptake of smartphone technology by farmers demonstrates the huge potential of mobile devices in extension and agricultural production. Digital technology will never fully replace traditional methods of service delivery but has to compliment and expand their impact in a time poor environment. A key component to ensure successful online delivery is the relationship between the farmers and the information provider. Traditional networks and relationships are often still required in this changeover period to expand the reach and target audience for extension messages in a cost effective and time efficient manner. The technology allows research and extension to be visually seen and benefited in other areas of the state without costly and

time intensive field trips. Online presentations of trial data, meetings and discussion groups and the use of Twitter, Facebook, blogs, YouTube, ebooks, podcasts and apps along with online decision support systems delivered through websites and online surveys hold significant potential for industry and extension staff. However, further understanding of how new information technology tools and traditional extension (such as field days and fact sheets) can be best integrated is required in order to increase participation from farmers who are younger and communicate in the 'new' technologies, and cater for others who lack the time or inclination to attend traditional days. This will mean that farmers can pick and choose their messages at a time and in style that suits them.

Obstacles to overcome

Despite all the positives of this technology there are a number of obstacles to overcome. For some extension staff the change in communication style can be challenging and take time to learn. In most cases, the key to the communication style of social media is to trigger the interest and awareness of the recipient rather than to ensure their understanding. Messages must be short, timely and of high quality. There is so much information available to recipients from a range of sources, that anything not meeting these requirements is likely to be instantly disregarded or ignored.

Supply of quality, purpose built apps is limited and can be a barrier to adoption as developers perceive agriculture as a small market and have little understanding of its complexity (Lorimer, 2012). Better co-ordination and collaboration between government, agribusiness, industry bodies and developers is required to overcome this.

Internet speeds and phone reception in rural areas are one of the biggest obstacles in adoption of the technology for many farmers. These problems and the potential possibilities of the NBN rollout need to be given careful thought when considering how tools are developed and which extension methodology is used to ensure messages can reach a range of audiences and can take advantage of advances in technology.

Conclusion

New technologies offer agriculture some significant opportunities in increasing on farm efficiency, information gathering and networking with people essential to the farm business. Mobile devices are contributing to this potential and this needs to be taken into account when designing tools and extension strategies. Extension providers are utilising the new technology to expand the reach of their message, increasing the efficiency of delivery and targeting audiences previously disinclined to participate. Extension staff and farmer training is being undertaken to ensure that use and adoption of digital information technology occurs more rapidly, extensively and efficiently. Training in basic digital technology will allow more effective integration of these technologies into extension projects. The effectiveness of these tools for extension will be the subject of further evaluation.

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