

Design Approach of an Extension Program for Best Practice Management of Future Workforce Skills: The SHIFT Project

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Abstract:

This discussion paper reports on the design approach for the Cotton Research and Development Corporation (CRDC) funded action research project, Best Practice Management of Future Workforce Skills: The SHIFT Project. While there is substantial literature on the design and delivery of a range of extension projects in Australian agriculture, the study of strategies that support farmers to address workforce challenges is an emerging field. We share our co-design approach to identify and develop on-farm workforce non-technical skills in the Australian cotton industry. Non-technical skills have been identified as vital for workforce adaptability and as such can be considered skills required for the future. We suggest our approach may be useful for designing employability programs for Australian agriculture tertiary students.

Introduction

Australian agriculture is a vital industry and by conservative estimates employs 2% of the country's workforce, with many more in allied professional roles not currently captured in national labour market data (Bassett et al., 2022). Globally, significant challenges and changes are impacting the jobs that exist within agriculture and the people that perform these roles. The rise of digital agriculture means technology is changing work tasks and people are requiring new technical skills to adopt and effectively use these technologies in their job performance. Volatile climates and seasonal peaks and lows can result in a need to enter and exit different roles within the industry. As heritage links to the industry decrease with urban migration, new entrants to the industry are less familiar with the world of agricultural work than ever before (Cosby et al., 2022). Furthermore, job performance standards are changing with an increasing level of professionalism evident in roles across the industry including those on-farm. Today's agricultural tertiary graduate will need to navigate these conditions and develop the skills required to pursue non-linear career pathways within the industry. The non-technical skills that support individuals to adapt and adjust to the ever-changing work environment and sustain a career in agriculture are essential for job satisfaction and the retention of talent to agricultural workplaces (McDonald et al., 2024).

This article reports on the approach utilised by the CQUniversity Agricultural Education and Extension team to design an extension program that proposes to support workforce development through improving the non-technical skills proficiency of the on-farm workforce. We approach this through the lens of the Vocational Psychology of Agriculture (McIlveen & McDonald, 2019), in particular the Theory of Work Adjustment (TWA; Dawis & Lofquist, 1984). A brief overview of the literature on non-technical skills in agriculture is provided, with

consideration given to the Learning and Teaching Academic Standards Statement for Agriculture (AgLTAS; Botwright Acuña et al., 2014) and what is known about extension efforts to improve workforce development on-farm. We then report on the initial design stages for the SHIFT Project (funded by the Cotton Research and Development Corporation (CRDC)) and discuss the implications and future application of co-design with industry for improving the non-technical skills of Australian agriculture tertiary graduates.

Theory of Work Adjustment

The Theory of Work Adjustment (TWA; Dawis & Lofquist, 1984) is a prominent career development theory that explains the adaptation process that promotes or inhibits person-organisation fit to achieve positive work outcomes for individuals, including job satisfaction and retention. The TWA posits a number of considerations for supporting individuals in their working lives, including that people can achieve satisfaction or satisfactoriness within their work environment such that:

- If people feel dissatisfied at work, they can resolve this tension by either changing their work environment or changing themselves.
- If their job performance is unsatisfactory, they can either increase their skill proficiency or attempt to change the workplace expectations placed on them in their role (Swanson & Schneider, 2020).

As previously described, work in agriculture is changing and this places demands on workers to respond in a number of ways including adapting to the new circumstances, persisting in a manner that is below the new performance standards, or exiting the job/industry. If workplaces are struggling to attract and retain workers that are capable and productive contributors in the workplace, they can either support these people to increase their skill level, change their expectations of the job performance or move workers on from their business. Past research has shown that adaptability resources, such as individuals' non-technical skills proficiency, can improve the positive way workers respond to challenges in the work context (Johnston, 2018). These skills help workers to stay motivated and engaged while cultivating their technical skills in response to changing work tasks or learning new roles. In prior research (McDonald, 2021a) it was identified that non-technical skills were central to the successful work adjustment for a range of cotton industry workers employed on farm, in research and extension positions, and in other professional services roles such as agronomy. Non-technical skills include the skills that help individuals approach the future of work (McDonald, 2021b). The skills that were identified included those relating to (a) social-emotional skills, (b) continuous learning skills, and (c) management of self and the future skills. These are described further in Table 1.

Table 1. Cotton Industry Worker Adaptability Skills Framework

Social-Emotional Skills	Continuous Learning Skills	Management of Self and the Future Skills
Optimism	General Self-Efficacy	Proactivity
Emotion Regulation	Goal Orientation	Entrepreneurial/Intrapreneurial Orientation
Empathy	Attention Skills	Strategic Thinking and Foresight
Resilience	Self-Reflection	Self-management skills (time/energy/career)
Understanding Individual Differences	Problem Solving/Creative Thinking/Critical Thinking	Ability to work independently
Communication Skills	Research and Independent Learning Skills	
Relationship Building Skills	Apply and adapt theory to practice	
Teamwork		

Non-technical skills for agricultural graduates

Non-technical skills in agricultural work have been found to support employability outcomes, career progression, work health and safety, technology acceptance and adoption, and effective leadership in organisations (Haddad & Marx, 2018; Irwin & Poots, 2015; Coleman et al., 2021). The need for agricultural tertiary students to develop their skills and capabilities has been clearly identified in the Learning and Teaching Academic Standards Statement for Agriculture (Botwright Acuna, 2014). Threshold Learning Outcomes (TLO) for graduates in agriculture explicitly require competencies to be developed that are associated with (a) inquiry and problem solving, (b) communication, and (c) personal and professional responsibility. University programs design courses to develop student competencies in these areas in several ways including team-based projects, work integrated learning experiences, and study-abroad experiences (Sandlin et al., 2018). However, with the diversity of agricultural workplaces that exist, there may be limitations to the preparedness of tertiary students in the range of non-technical skills they require for their chosen career. Past research has found differences in non-technical skills required for job performance depending on the role and organisation (Artavia-Rojas, 2019). Agricultural workplaces will provide graduates with different learning experiences to cultivate these skills. Yet despite acknowledging the importance of non-technical skills for job performance, these competencies are not often considered priority areas for the provision of training by employers (McDonald, Luke & Cosby, 2024). While these competencies are addressed on-the-job through mentoring, there is opportunity for improving non-technical skills development by increasing the non-technical skills awareness and proficiency of supervisors and managers in agricultural workplaces. Information and tools relating to improved farming practices are often conveyed to those in the agriculture industry through publicly funded research extension programs. Extension programs targeting workforce development through non-technical skills education and training may also benefit graduates seeking to build their career in agriculture by setting clear expectations for the capabilities required for individuals to succeed in the workplace.

Developing and Extending Workforce Development Practices from Prior Research

A recent review has noted that while some research has been published on extension topics including human resources (HR) and finance, physical and mental health of the agricultural workforce, and other social sustainability topics including learning how to address controversial issues and social licence, there remains much scope to address education and extension of non-technical aspects of agriculture (Klerkx, 2022). A study of farmers in the USA found that they discussed their education and training requirements in relation to business concerns or communication concerns. One highlight quote from this study reported farmers had a need for training in ‘stress management, business management (and) people management types of things. These are areas we struggle with as an industry’ (Kohn & Anderson, 2022, p.516).

Despite this identified need, past evaluations have found that while advisory and extension services have been effective at improving the acquisition of technical skills by farmers, they have not been as successful at improving entrepreneurial and social skills (Blockeel et al., 2023). Dockès et al. (2019), investigated the nature of advice and advisory roles in relation to work advice on livestock farms across several contexts including Australia. They found that advisors require different strategies to successfully integrate farm work and employee management into their suite of services. When discussing the different roles that advisors could adopt, it is noted that incremental support, in which a farmer has a technical question and the advisor uses tools to issue a direct technical recommendation, is not appropriate for strategic or work issues. Instead, a coaching role, where the advisor observes performance, offers feedback and expert insights and co-constructs solutions with the farmer, is more relevant.

Advisory service activities focused on workforce development are not typical in the wider Australian agriculture industry. However, in one example, a strategic industry initiative to support change management led the dairy industry to invest in the upskilling of consultants with HR qualifications to support farmers’ people management and work issues. For those consultants who engaged in the training, some perceived this as an opportunity to expand their business and offer new services, while others expressed personal preferences not to integrate this as a significant focus area (Nettle et al., 2018). While other research, development and extension (RD&E) initiatives have identified the need to focus on capacity building activities with extension officers to encourage adoption of new practices (Cliffe et al., 2016), this may meet resistance from consultants or extension officers in agriculture as topics such as workforce are perceived to fall outside of the traditional technical production-focused remit of these services.

The SHIFT Project

The CRDC have invested in a program of research that has included various projects investigating workforce challenges over the last decade with the goals of addressing workforce attraction, development, and retention in cotton farming businesses and the wider industry (Moffatt & Nettle, 2014; Kuehne et al., 2016; Kotey et al., 2017; Dickinson et al., 2016; Simpson et al., 2017; McDonald, 2017; Coutts & Stone, 2019; McDonald, 2021b). That these challenges persist and are currently major pain points for cotton growers may cause some to question the value of research to address workforce problems. However, this would be remiss, given that workforce challenges are classified as a ‘wicked problem’. A wicked problem is one that involves many interdependent factors that interact in complex ways, a diverse range of

stakeholders such that no single group owns the problem, and dynamic conditions with competing and changing requirements (Rittel & Webber, 1973). These challenges are unlikely to ever be solved but can be managed. The past CRDC-funded research projects are valuable investments as these capture how common workforce issues are experienced in the cotton industry context. The findings provide contextualised evidence of different factors that positively support or negatively impact good workforce outcomes, and the role good managers play in employees' work engagement, job satisfaction, reduced turnover intentions, and motivation to aspire to and persist in a chosen career. These projects test theories and ideas, enabling them to be adapted in a way that connects with the lived reality of people who work within the cotton industry. The SHIFT project seeks to translate this evidence into practical solutions and strategies that growers can use to employ best practice to manage the wicked problems of workforce attraction, development, and retention in the cotton industry.

Currently, no initiative exists in the cotton industry to upskill extension officers or consultants to tackle workforce issues with their grower clients. However, there appears to be a growing appetite for the topics to be addressed through agricultural education and extension to include workforce development practices. As work and workforce challenges have not traditionally been considered as a core business for advisory and extension services, there is much to learn about the successful strategies to support adoption of good practice associated with this topic.

Design Process for the Development and Extension of a Non-technical Skills and Workforce Development Program: The SHIFT Project

With a clear aim identified—to translate evidence into practice and design an effective extension program of resources that can support workforce development on Australian cotton farms—the project considered the following in the design process:

1. Engaging cotton growers in the project can be challenging as they have multiple job demands and priorities in their businesses and finite time and energy resources to attend to these demands. The project team need to consider how the project is delivered, considering the time imposition and priorities of cotton growers.
2. Past pilot programs relating to workforce development in the cotton industry such as the myBMP Farm Managers course did not persist past initial pilot programs (myBMP, 2014). The project team needed to consider how the SHIFT project can have legacy impacts past the current project funding cycle.
3. Non-technical skills are a broad field, with many potential topics that can be addressed. The project team need to narrow focus so the resources or tools designed and delivered through the SHIFT project can be considered useful, easy to use and adoptable in the work context.
4. Concepts and ideas explored in the research need to be translated into language and communications that are accessible for cotton growers and make sense to them in their day-to-day operations.

With these in mind, it was apparent that a two-phase approach to co-designing the project would be required. A co-design approach is a strategy used to identify, develop and extend relevant and socially acceptable solutions (Burch & Legun, 2021). Prost et al. (2017) identify objects or techniques of agriculture that are designed, noting management of “manpower” as part of the cropping or livestock farming systems. The design of farming systems often focuses on the technical aspects of production. In contrast, the current project sought to address workforce challenges in the farming system by (a) identifying priority workforce issues negatively impacting farms today, (b) trialling new approaches in the farm work environment,

and (c) taking a participatory approach with key stakeholders in delivering and implementing workforce solutions, strategies, tools and resources.

The two phases of the design process sought to engage with the two key groups to inform the project. Phase one would engage with a range of people involved in disseminating information, education or training to cotton growers that may be considered relevant pathways to delivery for The SHIFT Project. Phase two would engage directly with cotton growers and their teams in activities to develop generic and/or site-specific solutions for workforce challenges, noting the challenges that exist for farmers to translate general theories, ideas, and strategies into day-to-day practice with their teams.

Phase 1: Exploring pathways to delivery

Prior research conducted by Simpson et al. (2017) investigated cotton grower decision-making throughout the season. It was found that beyond one-to-one advice there are multiple sources of information that cotton growers use to expand their knowledge and make decisions within their businesses. In terms of information sources that were utilised in grower decision making across the season, these could vary depending on growers' social contexts. Influential sources of information included immediate stakeholders in the farm business (primary social context), relationships with people surrounding the business (e.g. other growers, agronomists, chemical suppliers, bank managers, extension officers). These could be face-to-face or maintained through digital communication channels (secondary social context). Social experiences without a relationship (field day events, workshops, short courses, social interactions on social media) (tertiary social context) could also have an impact on grower decision making if they were considered trusted sources of information.

Of particular interest to the current research project was that growers reported a high prevalence of information overload. For example, a grower subscribed to multiple sources that disseminated information via email reported being overwhelmed to the point that these communications were deleted before the contents were read. In terms of information dissemination, there are several competing organisations vying for the finite resource of growers' attention. Furthermore, the availability of easily accessible, high quality information in large quantities does not necessarily mean that it is trusted by the grower. Growers cannot attend to everything and so need to prioritise and evaluate sources in terms of value to their business and can feel left behind as they struggle to navigate volumes of information. Clearly, traditional strategies for dissemination of information in newer areas of extension (such as good practice for workforce management), including building informative websites, email communications, podcasts, articles, or flyers, can add to the volume of noise. Furthermore, communications may lead to some level of general awareness of a topic but not lead to the detailed cutting through of information in a way that is meaningful or impactful. Highlighted by Simpson et al. (2017) was the importance of delivering information in a way that feels familiar and makes growers feel comfortable to engage. Furthermore, information that comes from a credentialed source (i.e. academic, government etc.) is at risk of being undermined if "boots-on-the-ground" experience runs counter to the messages being conveyed. Other projects have found that ongoing communication between different actors in the extension system is vital for the adoption of new practices (Bennet & Cattle, 2013). Thus, this first stage of the project sought to identify different pathways to delivery and seek feedback and thoughts from actors in the system on the extension of best practice to manage future skills for cotton farms. The potential pathways that were considered included:

- CottonInfo Extension and Communications Team
- Cotton Australia Regional Managers

- Cotton Grower Associations
- AgSkilled Training Program
- People in Ag website
- myBMP program
- Skills Passport systems

Phase 2: Co-design of content, resources and activities

Three objectives were identified for the SHIFT project:

- (a) Building awareness,
- (b) Increasing acceptance, and
- (c) Integrating evidence-based workforce development practices and non-technical skills development as ways to improve workforce attraction, performance, and retention on Australian cotton farms

In Phase 2, it was important to test assumptions made by the project team about workforce problems and better understand the strategies currently employed by cotton growers (Iverson et al., 2012). The SHIFT project is a researcher-initiated co-design project aiming to develop and extend prior insights into tools and strategies for best practice workforce development, and as such it is not a “ground-up” co-design project. Instead, the project team looked to a co-design process called farmer-centred design. Farmer-centred design has been described as a continuum where farmers can be involved in various stages of the design project, such as at the early empathy stage where a detailed problem diagnosis can be made, in the design stage where solutions are generated, and in the ongoing engagement stage that can involve piloting of prototypes (Eastwood et al., 2022). An additional gap in expertise was noted in the form of facilitators/consultants who support workforce capability development in the Australian cotton industry. Therefore, a workforce development practitioner with deep industry knowledge was engaged to contribute to the learning design and consider implementation strategies for the project. Thus, the researcher-practitioner-grower co-design model was established.

To gain initial grower feedback on priority workforce development topics, a presentation was given at the Australian Cotton Conference that introduced the SHIFT project. A video was screened that utilised findings from past Cotton Grower Practices Surveys to highlight recent workforce challenges and highlighted the 5 key themes (forming the acronym SHIFT) that the project team sought to address: (a) Social sustainability, (b) Human sustainability, (c) Innovative workplaces, (d) Future focused farms, and (e) Transformational leadership. At the end of the presentation, cotton growers were invited to complete a short survey that asked them to indicate their interest in learning more about a range of 11 pre-determined workforce development topics. The findings of this survey gave the project team a list of 6 priority topics (i.e. leadership, communication in teams, psychological safety, developing staff, wellbeing at work, and improving work engagement) to focus on when building awareness about evidence-based workforce development practices and non-technical skills through a series of articles in the Australian Cotton Grower Magazine.

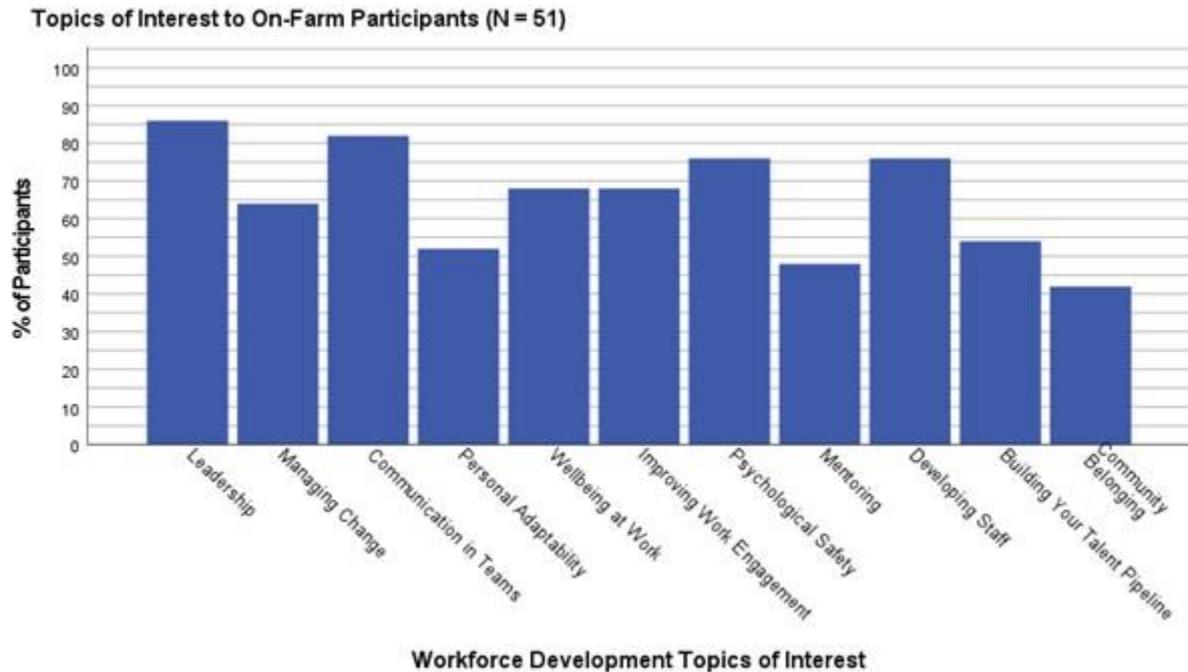


Figure 1. Proportion of cotton growers who indicated interest in workforce development topics. Note. Participants could select multiple responses. The six highest rated topics were (a) leadership, (b) communication in teams, (c) psychological safety, (d) developing staff, (e) wellbeing at work, and (f) improving work engagement.

In seeking to co-design extension resources for acceptance and integration of evidence-based workforce development practices and non-technical skills, a more in-depth process to identify current workforce development “pain points” was followed. This involved a call out for cotton growers to answer a brief survey where they were asked to “tell us your workforce challenge” in an open response box. Following this, eight cotton growers were invited to participate in the SHIFT Solutions Group program over 12 months where the researcher-practitioner members of the project team conducted a number of interviews and farm visits to collaboratively review individual enterprise workforce problem identification, problem clarification, and solution generation. Draft resources, or SHIFT Guides were developed and trialled in two workshops: one with enterprise owner/grower participants, and one with farm manager, supervisors, and aspiring supervisors. These were then refined following feedback from the workshops. Each resource co-written by the practitioner and researcher contained insights from cotton industry research and practice (researcher/cotton grower/practitioner contribution), cotton grower quotes and stories (researcher/cotton grower contribution), and learning activities (practitioner). These were grouped into non-technical skills areas of (a) leadership behind the farm gate, (b) supporting new entrants, (c) clear communication, and (d) team effectiveness.

Growers in the SHIFT Solutions Group also provided feedback on how best to be engaged in learning about the newly identified non-technical skills and workforce development learning areas. This expanded the researcher-practitioner-grower model into the design of online grower forums: SHIFT Virtual Farm Catchups, delivered over the next 6 months. In these online forums, the co-design of learnings and transferable insights regarding each non-technical skills domain were presented in real-time. This involved the researcher interviewing a panel of cotton growers while the practitioner facilitated online participation for attendees. Cotton growers provided case studies through descriptions of non-technical skills in practice, while the researcher and practitioner highlighted the evidence base behind successful or unsuccessful

strategies, drawing out the concepts and factors that promote successful workforce development outcomes from real-life accounts of teams on cotton farms. These ‘live’ co-design panels provided the space for growers attending to reflect on the information being discussed and identify some practical behaviours or strategies to further develop their own non-technical skills with regards to managing their teams on farms or identify non-technical skills that they may need to focus on supporting their team members to develop.

Reflections from the Project: Right Industry. Right Time.

Several contextual factors that may have contributed to the ability to co-design The SHIFT Project included (a) the acceptance by the funding body of a research design that required milestone variations and amendments to expected outputs, (b) successful engagement of cotton growers as collaborators, and (c) an existing body of workforce research to inform the development of the resources/tools to be utilised by the cotton industry workforce. At the start of the SHIFT project, the research was designed to determine how any intervention could best be developed and delivered to achieve the objectives of supporting the widespread adoption of non-technical skills training on cotton farms. This required an agile and responsive approach to the findings of the co-design process, including refocusing potential outputs to address cotton growers’ priority workforce issues. Not all research project tenders are designed to accommodate the iterative design required of the SHIFT project. The trust that the Cotton Research and Development Corporation placed in the current project team enabled an approach that was genuinely responsive to the end user.

Trust was also extended by cotton growers involved in the research in terms of their willingness to disclose information to the research/practitioner team. Both the researcher and practitioner have long standing relationships with the cotton industry and through the professional development program, the Australian Future Cotton Leaders Program, they were able to engage cotton growers who were primed to deeply investigate workforce challenges. Seven of the eight cotton growers involved in the SHIFT Solutions Group had participated in past leadership programs facilitated by the practitioner. While this was a positive for engagement of cotton growers, it may also create issues in the co-design process through the utilisation of people who frequently engage in capability building activities or provide their teams with capability building opportunities and who may not represent the typical population of cotton growers (Moll et al., 2020). There may be limitations in the further engagement of cotton growers and their teams that do not have this cohort’s experience. Further research is required to better understand the widespread value and acceptance of the strategies, resources and activities that were co-designed as part of this project.

Finally, there exists a culture of valuing workforce research in the cotton industry with a considerable history of investment of cotton growers’ RD&E levy dollars in people capacity and capability research projects. For the current project, the findings from past research meant a strong evidence-based platform from which to co-design workforce solutions with cotton growers. The ongoing national challenges that agriculture faces with regards to workforce attraction, development and retention can be experienced differently by different producers. Whilst workforce capability and capacity continues to be a cross-RDC priority as evidenced by the inclusion of workforce as one of four priority areas for collaborative investment (Australian Government, 2023), there is value in RDC’s investigating the workforce challenges specific to their commodity sectors to ensure any further workforce development interventions are considered relevant, useful, and adoptable by the farmers they support.

Conclusion

The CRDC-funded research project “Delivery of Best Practice to Manage Future Workforce Skills: The SHIFT Project” concluded in September 2024. This paper has outlined and argued for the project design and findings from the phases of the research will be more widely disseminated in future publications. The focus of the project has been on the on-farm workforce, and while only approximately 10% of graduates may be expected to take up roles in farm production (Pratley & Crawley, 2018), the SHIFT project may offer insights for tertiary educators to consider in the co-design of learning materials that can support agriculture students to develop the non-technical skills required for many different careers paths in the industry. There are opportunities for agricultural educators to conduct further research with employers to identify non-technical skills priorities for work adjustment that occurs specifically for entry of agricultural graduates to the workforce. Utilising co-design processes may help develop and provide context relevant resources across the university agriculture education academic networks to integrate non-technical skills development into tertiary courses, particularly those skills relevant to the Threshold Learning Outcomes identified in the AgLTAS.

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