

1. PROPOSED CITATION

For designing *Sheep Week*: Seventeen years of immersive, experiential, and industry led curriculum, engaging veterinary students in the realities of rural sheep practice.

2. OVERVIEW

Due to its historical roots, economic significance, and vital role in rural communities, sheep production is one of Australia's most essential industries. As the world's largest exporter of sheep meat and greasy wool, Australia's combined industry exports are valued at AUD\$ 7.8 billion (ABS, 2022-2023).¹ Veterinarians are crucial to safeguarding animal and human health within livestock production systems; however, over the past two decades, the proportion of veterinarians servicing livestock has declined both in Australia and internationally. There is a prevailing view within the veterinary profession and sheep industry that graduates lack the practical skills, rural exposure, and in-depth knowledge of farming systems necessary to manage production animals confidently and competently.^{2, 3, 4, 5}

The Bachelor of Veterinary Science (BVSc) at James Cook University (JCU) was established in 2006, with a specific focus on training job-ready veterinary graduates for rural Australia. Regionally located and with entry requirements that de-emphasise ATAR rankings, effectively acknowledging the unequal opportunities for school students in regional Queensland, JCU is committed to broadening participation for students from traditionally underrepresented groups. Consequently, the JCU veterinary cohort is a diverse student body,⁶ with 71.9% from regional or remote areas, 12.4% registered as having a disability, and 65.1% who are the first in their family to attend university (2012–2024 data). Further, the limited number and difficult accessibility of sheep farms in Northern Australia (more than eight hours by road from the Townsville campus) necessitates a proactive approach to veterinary education. In response, JCU established the *Sheep Week* program, a unique work-integrated (WIL)⁷ and experiential learning⁸ opportunity designed to connect students with industry and prepare them for successful careers in rural sheep practice.

We (Mr Chris Gardiner and Dr Sandra De Cat) have led the program since its inception in 2008. Chris grew up on a Merino sheep station and maintains close ties to the grazing sector, recently earning the National Australian Beef Research Council (NABRC) medal for science. Chris's experience ensures *Sheep Week* integrates cutting-edge research into the curriculum. Sandra, a small ruminant veterinary consultant, grew up near sheep farms in regional Europe and spent significant time in lambing sheds, providing a deep appreciation for the industry's role in rural economies. Our team's strength lies in facilitating communication between students and industry stakeholders, ensuring graduates are well-prepared for the evolving challenges of rural veterinary practice by prioritising the needs of those on the front lines.

From the outset, *Sheep Week* has proven to successfully cater for a diverse student body, facilitating a deep understanding of the holistic nature of farming systems exposing economic drivers and societal expectations including the health and welfare of animals. Over the past 17 years we have continuously refined *Sheep Week* based on feedback from students and industry while adapting to an evolving educational landscape. Our teaching philosophy, grounded in decades of WIL⁷ and Kolb's experiential learning theory,⁸ aims to actively engage students in their own learning.^{9, 10}

Our immersive, experiential, industry-led approach to curriculum development is unique among Australian veterinary schools and contributes to systemic change in production animal veterinary training by shifting the focus from 'disease alone' to providing a contextualised whole-of-farm perspective of sheep veterinary practice. The success of *Sheep Week* is evident in the sustained positive student feedback and success rates from over 1250 students and strong endorsements from the profession.

3. STATEMENT ADDRESSING THE ASSESSMENT CRITERIA

3.1. DEVELOPMENT OF CURRICULA, RESOURCES OR SERVICES THAT REFLECT A COMMAND OF THE FIELD

CRITERIA C: The BVSc program at JCU is a 5-year undergraduate course designed as an integrated education model. Instead of the standard four 3-unit subjects per semester, our curriculum features single, semester-long, 12-unit subjects throughout the entire course. In the first two years, students engage with foundational modules covering topics including but not limited to anatomy, ethics, microbiology, parasitology, and epidemiology. By the third year, the focus shifts to the transition from health to disease and the management of disease and *Sheep Week* is strategically placed at the halfway point of the course.

Sheep Week was initially conceived and delivered as an immersive, week-long field trip to Central West Queensland that emphasised experiential learning over traditional lectures, exposing each cohort, ranging

from 55 to 93 students, to at least five different sheep production systems. The program is uniquely designed to foster connections and brings together staff from all levels of industry, including eight to ten sheep producers, QLD Department of Agriculture and Fisheries field officers, agricultural vocational instructors, shearers, wool brokers, dog trappers, veterinary consultants, graduate veterinarians, and academics, facilitating the integration of sheep medicine into the whole farm system. We strategically employed a mix of interactive seminars, hands-on exercises, and roadside stops to prepare students for farm visits and stakeholder discussions, enhancing their understanding of sheep health issues within a dynamic system.

In response to the concerns of the profession^{3,4} and initial student feedback, we evolved *Sheep Week* by embedding a purposeful clinical training component to enhance student engagement, confidence, and practical skills. The program expanded to include activities such as handling and examining sheep and goats, conducting ram breeding soundness exams, performing venipuncture, collecting faecal samples, and assessing wool and meat quality. Students also perform euthanasia and field post-mortems and participate in paddock walks to identify feed bases and toxic plants. These hands-on experiences not only help students to integrate new and existing knowledge but also to build trust and credibility with clients, which the students find highly valuable: *"Sheep week was one of the highlights of the semester, it was an engaging experience in which we were able to apply our skills in the field"* (Formal Student Feedback (FSF), 2018).

The COVID-19 pandemic forced us to pivot from an immersive field trip to an all-encompassing virtual experience. Our foundational commitment to connecting students with industry and actively involving them in the complexities of farm animal practice were key to enabling our successful transformation, as evidenced by student feedback: *"Despite being virtual, sheep week was super interactive, lots of questions were able to be asked and answered"* (FSF, 2020). From 2021 onwards, post-pandemic financial constraints led us to remodel *Sheep Week* into an integrated on-campus and field-based experience, centring on authentic tasks. This approach fosters a deep understanding of the whole farm system and cultivates industry connections through in-person and Zoom sessions with veterinarians, recent graduates, government employees, and sheep producers. Visits to a northern Australia sheep/goat farm and CSIRO's Lansdown Research Station enrich students' knowledge of rural veterinary practice. Further, using teaching animals on campus provides a safer, more predictable learning environment, encouraging active participation of all students. Over the years, students have praised these hands-on activities using them as a platform to apply experiential learning: *"The practicals during sheep week really helped me link all my knowledge from all my years of vet school!"* (FSF, 2021); *"euthanasia and necropsy were a great opportunity to put our skills into practice"* (FSF, 2023).

CRITERIA A: Over the past 17 years, student engagement in *Sheep Week* has been exceptional, with all enrolled students attending all activities. The average student pass rate for the fully integrated third-year subject exceeds 95%, which is outstanding given our diverse student cohort and the 98% increase in student numbers we experienced from 2012-2021. One station in the objective structured exam, the stand-alone assessment for *Sheep Week*, has demonstrated an indicative pass rate of 96% over the last four years. Students have uniformly praised *Sheep Week* as a positive and valuable learning experience, exposing them and preparing them for rural sheep practice: *"I now feel like I would be more confident heading out to a sheep station for disease investigations. Knowing their areas of focus and their targets for their business will go a long way in a vet being able to provide higher quality care"* (FSF, 2019).

In 2013, and annually since 2018, students have completed a *Sheep Week* survey in addition to formal student evaluations. Our success is reflected in sustained high satisfaction levels and exceptional survey response rates (42%–76%; 55% average), indicating strong student engagement and highlighting the program's positive impact on the overall student experience (Fig. 1). Students highly value the opportunities to engage with future colleagues, which profoundly impacts their motivation and professional identity development: *"Absolutely loved Tim Gole's talk! Gave me inspiration and motivation to finish vet school and have an amazing career after"* (FSF, 2023). When remodeling the program, we intentionally incorporated collaborative and bonding opportunities through activities such as small group activities, career talks, and BBQs, which the students appreciate: *"It was a great chance for the 3rd year students to bond and get to know our class members before 4th year and we all thought this was really good"* (FSF, 2013); *"Getting to know the lecturers and my classmates . . . gave me more*

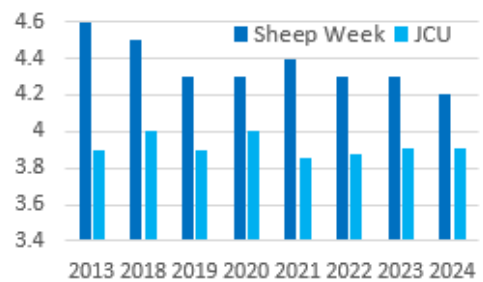


Figure 1: Sheep week Satisfaction (score 1-5)

confidence moving forward" (FSF, 2023).

Sheep Week's position at the halfway point of the BVSc, supports the transition from pre-clinical to clinical years, helping students align with their future careers. This impact is reflected in student feedback: *"It gave me a reason to pick up my study habits and feel a passion about this degree again"* (FSF, 2021). These sentiments were echoed in a Peer Review of Teaching (PRoT) by Prof. Henry Zerby from Ohio State University: *"It was interesting to hear a couple of students confess that they were considering withdrawing from the vet program, but that 'sheep week' reminded them of why they wanted to pursue this career and it reenergized them to the point that they are looking forward to the remaining half of their studies"* (PRoT, 2013).

CRITERIA B: Our curriculum has been peer reviewed three times. In 2013, Prof. Henry Zerby commended our action-oriented teaching approach—*"It was refreshing to see the students actively engaged in problem solving, critical thinking, and experiential learning, rather than watching a clock anticipating the break between the next lecture"*—and planned to adopt our innovative program in his own teaching: *"As a result of having the opportunity to witness the positive impact and development of students involved with this program, I am currently planning a similar program for the Meat Science students at Ohio State"*.

In 2016, Dr David Hucker, former President of the Australian Sheep Veterinarians special interest group, was invited to attend and review *Sheep Week*. In his report he stated, *"This part of the veterinary science course at JCU is unique amongst the Australian veterinary schools and provides students with a much greater level of understanding of how veterinary science is, or needs to be, practiced on extensive livestock properties in Australia. This is particularly invaluable for students who do not come from a rural or farming background and greatly improves their ability to competently deal with farm animal problems involving not only health issues but also management issues"*.

Finally, in 2023, Dr Paul Nilon, 2022 *Small Ruminant Veterinarian of the Year*, joined JCU as a Senior Production Animal Veterinarian. Drawn to JCU by the *Sheep Week* initiative, Dr Nilon, with over 40 years' experience in rural sheep practice, was an ideal evaluator of our WIL curriculum. After participating in *Sheep Week*, he wrote an unsolicited letter of support, praising our holistic on-campus approach: *"Sheep week is an invaluable step in promoting sheep health and production. It provides an excellent opportunity to give students 'hands-on' experience, integrating preclinical disciplines with ruminant medicine through problem-solving and a range of activities from animal handling to a post-mortem examination"*.

In the most recent Australasian Veterinary Boards Council Accreditation report (2023), the JCU Veterinary discipline received commendation under *Standard 9 – Curriculum* for its production animal rotation, which delivers an excellent student learning experience. Additionally, the discipline received a commendation for effectively preparing job-ready graduates equipped to work in rural settings, an accolade which is echoed in alumni feedback: *"Sheep week was great for 'city kids' like me. You don't have to 'fake it until you make it'. Sheep Week gives JCU grads respect from producers upon graduation"* (Dr Erica Kennedy, 2013 JCU BVSc graduate, Graduate Survey (GS), 2023); *"I never considered sheep as a career opportunity when I started my BVSc. A stint in the shearing shed when I left school may have been the introduction but the spark was our weeklong field trip, fondly named 'Sheep Week'"* (Dr Daniel Brookes, Lecturer in Small Ruminant Health & Production, Melbourne University, 2013 JCU BVSc graduate, GS, 2023).

Further data from anonymous surveys of JCU's graduating classes (2010-2022) were collected as part of the JCU Veterinary discipline's outcomes measures in 2023. Analysis using the Modified Monash Model (MMM 2019)¹¹ shows 42% of graduates are practicing outside metropolitan and regional centers, validating the success of the discipline's focus on rural, remote, and regional preparedness.

While our collaborative, industry-based teaching model equips our graduates to make valuable contributions to rural sheep industries, the community impact of our program is equally far reaching: *"The benefits of this week for Longreach Pastoral College with the interaction with the students will benefit students and their futures from both JCU and LPC as well"* (Mrs Rosemary Champion, Longreach Pastoral College Advisory Board, Stakeholders' Survey (SS), 2018). Furthermore, the capability of our students and the success of our program are recognised by the profession: *"My involvement with sheep week has resulted in students pursuing clinical placement opportunities with me. . . . Their knowledge and interest in the sheep industry was outstanding and it was a pleasure to host them"* (Dr Monica Dickson, Ballarat Sheep Veterinary Services, SS, 2024).

Additionally, *Sheep Week* has been showcased and disseminated at local, regional, national, and international levels through the production of two conference papers,^{12, 13} twelve newsletter articles, two

published video interviews,^{14, 15} as well as an international student blog.¹⁶ Expressions commonly used in support of *Sheep Week* include comments such as, “*Vet students learn on the job*”, and “*There’s some lessons you just can’t learn in a classroom*”.¹⁴ To our great pleasure, in 2023 we were awarded a prestigious JCU Citation for Outstanding Contribution to Student Learning for the *Sheep Week* program and were named overall winners of the category.

CRITERIA D: Our teaching philosophy is grounded in Kolb’s experiential learning theory.⁸ The cognitive and emotive experiences students encounter are central to our educational approach and the intentional design of our learning experiences allows students to create knowledge through successive cycles of transforming real experiences into new patterns of thinking (see Fig. 2). Site visits and industry seminars, for example, provide a foundation for



Figure 2: Kolb's experiential learning cycle⁸ adapted for sheep week.

Interactions with others during breaks unintentionally help to transform these experiences, as noted in one PRoT: “*In the case of sheep week, the break between activities was filled with constructive and relevant conversations about what students just previously witnessed*” (Prof. H Zerby, Ohio State University, PRoT, 2013). Prof. Zerby also noted that subsequent practical tasks and farm trips allow students to examine and expand their newfound concepts: “*subsequent stops demonstrated alternative approaches to wool-based production within the same climate but allowed students to compare and contrast different production and marketing strategies*” (PRoT, 2013). Following the pandemic-induced program restructure, producer case studies have served as a basis for reflection, helping students appreciate the whole farm system by integrating new frameworks into existing knowledge. Subsequent hands-on activities and property visits offer opportunities to actively test this new system approach and have been exceptionally well received: “*The case studies, pracs and talking to the producers forced me to access all my theoretical knowledge and forced me to understand it in a meaningful way, not just rote learning*” (FSF, 2022). Furthermore, the program empowers students to ask questions and initiate discussions, fostering confidence and a sense of autonomy: “*This is why sheep week is so important: we are prompted to ask the right questions and the guest speakers delved into issues at the forefront of primary production. You can do [a] placement and walk away 10 days later just as naive as your first day without the right approach, without asking the right questions*” (FSF, 2018).

In conclusion, the success of *Sheep Week* is a testament to our commitment to experiential learning and industry collaboration, effectively preparing veterinary students for the realities of rural sheep practice. Sustained positive student feedback and professional endorsements validate our active, collaborative approach, which fosters a holistic understanding of farming systems and nurtures practical skills and industry connections. As we continue to refine and adapt *Sheep Week*, we remain dedicated to developing the skills, knowledge, and confidence necessary for future veterinarians to excel in rural sheep practice.

4. REFERENCE LIST

¹Australian Bureau of Statistics. *Statistics*. <https://www.abs.gov.au/>; ²Frawley, P. T. *Review of Rural Vet Services*, <https://tinyurl.com/29c48b34>; ³Scott, H. *Rethinking vet educ: Securing Australasia's future in biosecurity, food production, One Health and animal welfare*, <https://tinyurl.com/yzn4hyk3>; ⁴Heath, T. J. & Mills, J. N. *Aust Vet J* 78, 312-316; ⁵NSW Parliament. *Inquiry into veterinary workforce shortage in NSW*, <https://tinyurl.com/32rncrn5>; ⁶De Cat, S. & Emtage, N. *HERDSA Qld Branch Mini-conference, Townsville, 2015*. ⁷Billett, S. *Stud High Educ* 34, 827-843. ⁸Kolb, D. A. *Experiential learning: Experience as the source of learning and devt*, Prentice-Hall, 1984. ⁹Prince, M. *J Eng Educ* 93, 223-31. ¹⁰Bransford, J. D. *How people learn: Brain, mind, experience, and school*, <https://tinyurl.com/5ed3yf2v>. ¹¹Aust Govt Dept of Health & Aged Care. *Modified Monash Model*, <https://tinyurl.com/23e66e9d>. ¹²De Cat, S. *Ruminant Teaching Workshop*, Melbourne, 2013. ¹³De Cat, S., Gardiner, C. & Fitzpatrick L. *Aust Vet Assoc Ann Conf*, Perth, 2014. ¹⁴Walker-Campbell, M. *Sheep week in the west*. JCNN, <https://tinyurl.com/4nam8hhs>. ¹⁵Longreach Plus More. *Longreach Regional Report*, 10 May 2016. ¹⁶From OSU to JCU. *Sheep Week Days 1 & 2*. <https://tinyurl.com/yzdhy7f>.

JAMES COOK UNIVERSITY SHEEP WEEK

Team Statement of Contributions

NAME	POSITION	KEY ROLES	INPUT %
Dr Sandra De Cat	Senior Lecturer, College of Public Health, Medical and Veterinary Sciences JCU	<ul style="list-style-type: none"> • Co-developer of <i>Sheep Week</i>; • Developed and implemented learning resources, support tools, assessment items and evaluation tools; • Transformed the learning model from a field-based structure to a virtual and subsequent on-campus experience; • Established partnerships with producers, consultants, private practitioners, and recent graduates; • Developed and disseminated the theoretical framework via conference presentations; • Veterinary Learning and Teaching Committee and Curriculum Review and Assessment Committee member; Lecturer (Small Ruminant Medicine and Production). 	50
Mr Christopher Gardiner	Senior Lecturer, College of Public Health, Medical and Veterinary Sciences JCU	<ul style="list-style-type: none"> • Co-developer of <i>Sheep Week</i>; • Established partnerships with local producers, expert staff, and recent graduates; • Managed all property visits; • Developed and implemented learning resources, support tools and assessment items; • Promoted the learning experience through liaising with government departments and local newspapers; • Lecturer (Pasture and Animal Grazing Management). 	50

17 July 2024

Re: JCU Citation - Outstanding Contribution to Student Learning

To Whom It May Concern,

I am writing in my capacity as Head of Discipline in strong support of Dr Sandra DeCat and Mr Chris Gardiner's nomination for a *Citation for Outstanding Contribution to Student Learning*. I have witnessed first-hand the operation, challenges, and success of Sheep Week from its inception in 2008 and can attest to the immense value this learning experience provides to students and the overall aspirations of our program. Additionally, I have observed Sandra and Chris's remarkable ability to adapt to numerous challenges and changes over the years.

Sandra and Chris's design of Sheep Week provides an immersive educational experience developing essential competencies required by the veterinary profession. They inspire students through interviews with recent graduates working in rural environments, up-to-date knowledge from leading veterinary experts as well as progressive producers who are physically or virtually embedded within the program. This multi-stakeholder approach allows students to enhance their overall understanding of both production systems and the issues faced by producers in a vital Australian industry. As noted in 2023, our accreditation body commended the Discipline for creating a cohesive and supportive student body and for the tremendous enthusiasm and energy dedicated to preparing job-ready graduates equipped for working in rural settings. Sheep Week is a critical component by which the Discipline achieves these goals and enhances the student experience.

Over many years, I have consistently heard students and graduates speak highly of their learning experiences associated with Sheep Week. At the mid-way point of the course, Sheep Week includes valuable social time where both staff and students can interact in a collaborative environment. The value of building and cementing relationships among students, and between staff and students, cannot be underestimated. The relationships forged between staff and students during Sheep Week and their collective experiences promote the development of lifelong support networks, and critically, a positive attitude towards working in rural and remote communities with production animals.

In 2020, Sandra and Chris faced the restrictions imposed by the pandemic and pivoted to online delivery. They successfully transformed what was predominantly a field-based, hands-on learning activity into a successful online activity. This was a very difficult task, but as evidenced by student satisfaction, it achieved satisfaction scores equivalent to the 2019 field-based experience. Budget constraints from 2020 also necessitated a change from a fully supported, week-long field trip to an immersive experience based at JCU. Satisfaction scores have remained higher than JCU and most Discipline means.

Sandra and Chris have led, adapted, and consistently provided an exceptional learning experience. Their efforts to foster a cohesive student body who have a realistic understanding of industry challenges has been unrelenting. I unreservedly commend them for recognition of their outstanding and sustained commitment to authentic learning, supporting the next generation of rural veterinarians.

I accept the Privacy Notice provided by the nominee.

John Cavalieri

John Cavalieri BVSc MEd PhD DACT,
Professor and Academic Head, Veterinary Sciences, James Cook University.



Reference for James Cook University's Sheep Week Prog

July, 2024

Professor Maxwell Bruce Allworth

BVSc (Hons), MVSc, PhD, FANZCVSc, Registered sheep veterinary specialist
Professor in Livestock Systems and Veterinary Production Animal Lead,
School of Agricultural, Environmental and Veterinary Sciences, Charles Sturt University

I am delighted to act as a referee for the 'Sheep Week' Program led by Dr Sandra de Cat and Chris Gardiner from James Cook University. I am well placed to comment on the uniqueness of this initiative as I have led the Fred Morley Centre and taught veterinary students at CSU's Wagga campus since 2009 until the present, with my main area of teaching being ruminant disease management and sheep medicine. Additionally, I am a past president of the Australian Veterinary Association (AVA)'s Sheep Interest Group, and a mentor and examiner for both the Membership and Fellowship examinations for the Australian College of Veterinary Scientists. I was the inaugural Chair of the Sheep Sustainability Framework and am a wool industry representative on the Consultative Committee on Emergency Animal Disease (CCEAD). I am an AVA appointed independent auditor of Australian Wool Innovation's Flystrike Research Development and Extension program. I also operate a sheep and beef property in southern NSW, and provided veterinary consulting services to sheep and cattle producers from 1988 to 2009.

Given the above, I am acutely aware of both the importance and challenges of educating veterinary students on how to be able to provide effective veterinary services to sheep producers, and I consider the "Sheep Week" Program an unparalleled effort to effectively deliver engaging, high quality teaching in an industry orientated environment. Traditionally much of the veterinary services to sheep producers have been delivered via government or quasi- government organisations, but increasing there is a demand for private services in addition to existing government services. Given the shortage of rural veterinarians, it is critical that we encourage, enthuse and equip our veterinary students to enable them to effectively deliver the required veterinary services.

I have visited JCU to examine 4th year students and have interviewed staff involved in the "Sheep Week" program. This Program strongly integrates the need to understand the production system the students are dealing with (in this case sheep) with the veterinary aspects, and provides the necessary link to both disease occurrence and productivity impacts. Importantly, it has a strong industry focus and connection, despite the obvious possible limitations for that occurring, given the relative isolation of JCU to sheep farms. The inclusion of industry experts provides a strong industry connection directly relevant to undergraduate veterinarians, ensuring content delivery remains relevant and up to date. Establishing an effective environment for student learning is one of the key attributes of the program. Sheep Week is an excellent initiative and I give my unconditional support for this strongly industry focussed program and congratulate JCU for their efforts to provide such authentic learning experiences to veterinary students.

I accept the Privacy Notice provided by the nominee.