Stakeholder views on enhancing calf welfare using AI technologies: outcomes from a design-thinking workshop

Laura Palczynski*

lpalczynski@harper-adams.ac.uk

Co-Authors David Rose*, Holly Vickery*, Lisa Morgans**, Joanne Sharpe*, Catherine Carlton***, Iris McCormick**, Emma Bleach*

* Harper Adams University ** Royal Agricultural University *** Innovation for Agriculture

UKRI Biotechnology and Biological Sciences Research Council

AWRN ANIMAL WELFARE RESEARCH NETWORK

Harper Adams University

Background

CALVES

HEALTH & WELFARE

FARMERS

BUSINESS PERFORMANCE

MANAGEMENT DECISIONS

LABOUR SHORTAGES

WIDER INDUSTRY

DATA INSIGHTS

ADVICE

TRACEABILITY & TRANSPARENCY

LIMITED OPTIONS

GREATER FOCUS ON MILKING HERD

LOW ADOPTION RATES

WHY?

Introductory Talks:

- What really matters in calf rearing
- Designing technologies with animals in mind
- Designing & developing technology with and for farmers
- 6 Tech company lightning pitches

Workshop Activity

Group Discussions

How can technology play a role?

What do calves want/need?
- Good Health, biological function
- Naturalness – behaviour, environment
- Experience – stress, comfort, interest, choice

What's a good indicator for this?
- How the calf looks e.g. shiny coat
- Calf performance e.g. growth
- Calf behaviour e.g. play, feeding, nesting
- Environment e.g. dry, deep straw

How do we currently provide/ observe this?

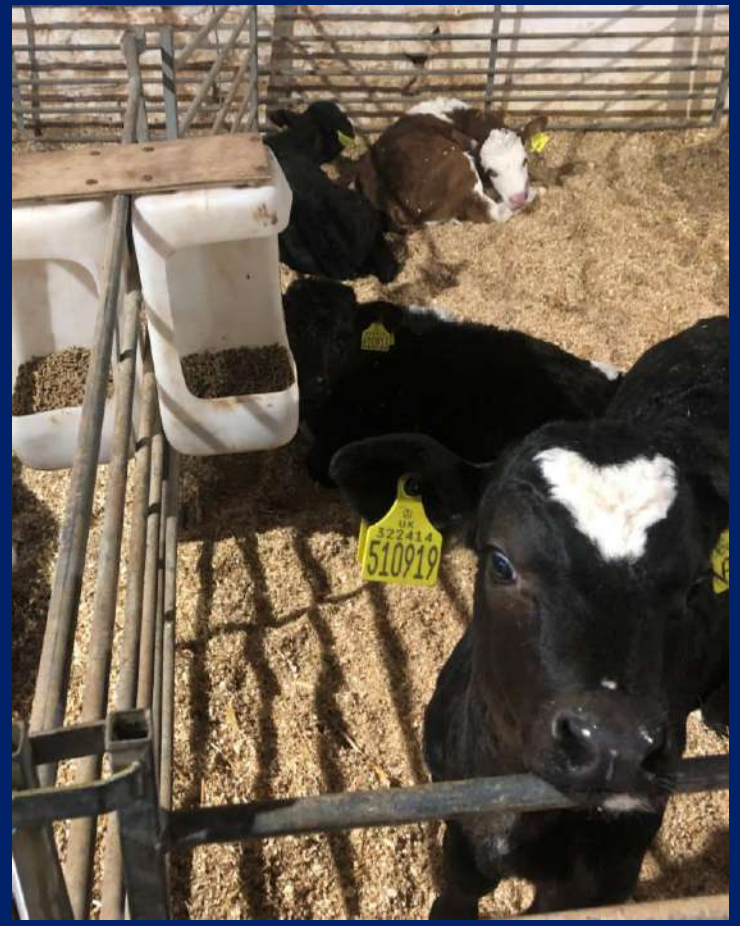
How could technology help?
- Is technology the best solution?
- Who would use the tech? (Calf rearers, farmers, advisors, etc.)
- What do users want/need? Why?
- What to users NOT want/need? Why?

Are there existing solutions?
- From tech developers/research
- On-farm innovations – high/low tech
- No-tech options e.g. stockperson training

Calf Want/Need	Indicator	Current Actions	Role for Tech?	Existing solutions
Fed good food	Weight gain	Random use of weigh-band	Automated weight collection and recording with actional insights	Automated weigh scales,…
	Feed intakes	Observe feeding	Not really, maybe cameras but what to do with that data?	Automated milk feeders,…

Who took part

Actor Type	Count
Farmer/calf rearer	18
Calf industry rep	12
Veterinarian	9
Agri-tech rep	13
Animal welfare rep	10
University students	2
TOTAL	**64**



65% of 98 registrations
Approx. 16 per room, 3-4 groups

Calf Wants and Needs

PHYSICAL SAFETY

Environment

- Temperature & Humidity
- Air Quality, Light, Space
- Clean & Dry Bedding

Nutrition

- Milk, solid feeds & water
- Colostrum for immunity

Health and Comfort

- Genetics, pain relief

EMOTIONAL SAFETY

Limit stress

- Consistency/predictability
- Positive associations

Social Contact

- Other calves and older animals
- Stockperson(s)

Natural Behaviours

- Enrichment and space
- Feeding and agency

AGENCY

Opportunities for Choice

- Different spaces available
- Equipment and enrichment

Opportunities for Control

- Interaction - outcome

The Calf Tech ‘Wishlist’

Integrate systems and data	Insights from various data sources Track animals from birth to end of life
Automate data collection & records	Reduce errors and administrative burden Streamline – one point of access for various reports
Early warnings for disease/production	Behavioural/activity indicators before clinical signs Could positive welfare indicators be useful here?
Assist stockpersons	Boost efficiency and ease monotony Alleviate effects of labour shortages
Water	Cleanliness Individual Intakes

Some considerations…

“A lot of this technology can gather loads of data […] but what’s the farmer then going to *do* with it? If the farmer actually isn’t going to change anything based on that, then does he need that data in the first place? And so does the technology need to be that sophisticated?”

Some considerations…

“Simplicity and affordability. So, we would invest in tech if it was going to bring something to the table that made our cows healthier, more productive, happier, wasn’t so expensive that we have to wait so long to get a return on investment”

Some considerations…

“I think if technology doesn’t improve your life, it’s a waste of time […] you won’t engage with it”

Key Take-Homes

The possibilities are endless, but how can we harness the best one(s)?

Practitioners, researchers and industry have wants, needs and questions – AI is a ‘black box’

Technology salespeople rather than developers in attendance – industry vs technical expertise?

Explore applications for AI in assessing animal-informed welfare

Animal welfare is complex and multifaceted – AI could help draw insights from various indicators

Visual analysis, things animals interact with, sensors, environmental monitoring etc.

Integrating data sources is a key issue for farms and wider industry

Reduce administrative burden of data entry/record keeping and gain practical, useful insights

Lifetime monitoring and data records for animals = transparency and traceability

Thank You

I welcome any questions

lpalczynski@harper-adams.ac.uk