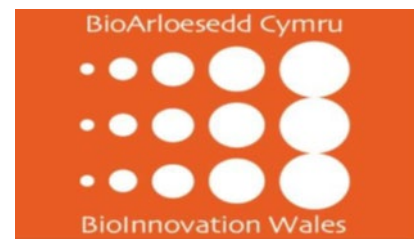




**BiInnovation Wales**  
**West Wales & the Valleys and East Wales**  
**Final evaluation report - April 2023**  
v1.1



## Contents

Glossary of Terms .....	4
Executive Summary.....	5
Acknowledgements .....	11
Note on confidentiality .....	11
1. Introduction .....	12
2. Methodology.....	16
3. Process findings .....	19
3.1 Programme rationale.....	19
3.2 Programme design.....	20
3.3 Programme governance .....	21
3.4 The programme partnership.....	22
3.5 Programme resources .....	24
3.6 Promotion and engagement .....	25
3.6.1 Events .....	25
3.6.2 Website and social media.....	26
3.6.3 Personal recommendation .....	30
3.6.4 Passive and active referrals.....	31
3.6.5 Other approaches .....	31
4. The participant and employer experience.....	33
4.1 Motivations for joining the programme.....	33
4.2 The pre-course experience.....	35
4.3 The learning experience.....	36
4.4 Student support.....	40
5. Progress towards outcomes .....	43
5.1 Outputs.....	43
5.1.1 Participant outputs .....	43
5.1.2 Enterprises collaborating outputs.....	45
5.1.3 CCT outputs.....	47
5.2 Results .....	47
5.3 Outcomes .....	49
5.3.1 Outcomes at the individual level.....	49
5.3.2 Outcomes at the wider level.....	56

---

5.4 Legacy .....	57
5.4 Value for money.....	61
<b>6. Progress towards cross cutting themes and case level indicator targets .....</b>	<b>63</b>
6.1 Operations integrating sustainable development into awareness raising, education and training programmes .....	63
6.2 Resource efficiency measures .....	66
6.3 Equal opportunities and gender mainstreaming .....	67
6.3.1 Positive action measure – women.....	67
6.3.2 Activity supporting female participation in STEM.....	70
6.3.3 Activity supporting speakers of the Welsh language .....	71
6.3.4 Positive action measure – older workers .....	73
6.4 Tackling poverty and social exclusion - Organisations paying the living wage ..	74
6.5 Developing / engaging CCT Champions .....	74
6.6 Contribution to the goals of the Well-being of Future Generations (Wales) Act 2015.....	75
6.7 Progress towards other cross cutting theme targets.....	81
<b>7. Conclusions and recommendations .....</b>	<b>83</b>
7.1 Conclusions.....	83
7.1.1 Rational, design and processes.....	83
7.1.2 Characterising participants and CCT progress .....	84
7.1.3 The experience .....	86
7.1.4 Progress towards outcomes .....	87
7.2 Lessons learned and recommendations.....	89
<b>Annex A – BioInnovation Wales logic model and key assumptions (2018/19).....</b>	<b>94</b>
<b>Annex B - Research framework.....</b>	<b>96</b>
<b>Annex C – Module-level student feedback.....</b>	<b>99</b>
<b>Annex D – Breakdown of people from Black, Asian and minority ethnic backgrounds by Welsh county.....</b>	<b>101</b>
<b>Annex E – Breakdown of Welsh speakers by Welsh county.....</b>	<b>102</b>
<b>Annex F – Participant enrolment mapped onto triannual intakes .....</b>	<b>103</b>

---

## Glossary of Terms

Blended learning	Teaching delivered by a mix of in person and online modes
CCT	Cross Cutting Theme
ESF	European Social Fund
EW	East Wales
MOOC	Massive Online Open Course
Programme	Used to refer to the two operations BioInnovation Wales WWV and BioInnovation Wales EW
STEM	Science, Technology, Engineering and Mathematics
WEFO	Welsh European Funding Office
WWV	West Wales and the Valleys

---

## Executive Summary

### Introduction

BiInnovation Wales was supported by the European Social Fund within Priority 2: Skills for Growth, Specific Objective 3 until April 2023 for West Wales and the Valleys (WWV) and East Wales (EW) operations. Support started for the WWV operation in May 2018 and for the EW operation in February 2019. The programme aimed to address high level and technical skills shortages within bio-based businesses, while increasing research and innovation in such businesses to increase their competitiveness. The results of a final independent evaluation by 20 Degrees Consulting Ltd are presented here.

### Methodology

A multi-method approach was adopted to produce a rigorous evaluation. This included:

- Desk research to explore policy fit and compare findings with wider research
- Qualitative research, primarily semi-structured interviews with participants, employers, business intermediaries and members of the BiInnovation Wales team
- Quantitative analysis of monitoring information (and qualitative analysis to a lesser extent)
- An autoethnographic study of the participant journey
- Case study development – filmed and written.

### Process findings

The rationale for the BiInnovation Wales programme held throughout the lifetime of the programme. There was good alignment with Welsh Government policy and addressing sector skills shortages across the UK. There was no evidence that the programme duplicated other provision nor displaced commercially available provision.

The findings suggested on-going efforts to ensure the design, content and mode of delivery were demand-led (employers and employees) and built on demonstrable expertise, including learning from previous programmes. Multiple channels existed to capture student feedback. The findings indicated the programme team acted on learning from that feedback to modify and improve content and processes for future cohorts.

Governance of the programme was fit for purpose, with clear linkage to senior managers at Aberystwyth and Swansea universities. Representatives of participants,

---

bio-businesses and support organisations were embedded within the governance structure.

A positive working relationship was apparent between the two universities, particularly at the academic level. Mutual benefit from the partnership was demonstrable. However, a recurring theme of the findings was the potential to streamline registration (enrolment) and finance practices for participants, particularly those participants that studied modules from both universities.

Gaps in the staff complement were apparent at various points in the programme's lifetime. These slowed module development and recruitment in the early stage of both operations and again slowed recruitment from April 2022 onwards.

The findings suggested multiple means of promotion were effective, including:

- Direct engagement with potential participants / employers at physical events
- Provision of a website
- Use of social media, particularly using filmed content on Facebook where potential participants were targeted through profiling and pay-per-click advertising
- Personal recommendation, with the role of line managers featuring highly in the importance of recommendations translating into enrolments
- Radio and TV advertisements.

### **Characterising participants and CCT progress**

BiInnovation Wales had notable success in attracting female participants, with 57% and 61% female participants in WWV and EW respectively.

The programme exceeded its target of attracting participants identifying as disabled people or having work limiting health conditions (7% relative to a target of 5% for each of WWV and EW).

The findings suggested few people from Black, Asian and minority ethnic backgrounds participated in BiInnovation Wales, with very limited progress towards the 4% target for each of WWV and EW.

The programme was designed to support people of working age, ideally not those newly graduated with an undergraduate degree. Most participants fitted this profile, with 83% and 89% being 25 years of age or older from WWV and EW respectively. Moreover, 92% and 91% of participants in WWV and EW respectively were in work.

---

The programme exceeded targets of participants aged 50 years or older, with 21% and 26% in WWV and EW respectively against a target of 10% in each operation. Almost a third of participants in WWV and EW were primary carers of children.

While the programme delivered well against the above targets, this could not be attributed to proactive measures to recruit participants with these characteristics. Promotion tended to adopt an intentionally neutral stance on matters of gender, for example. The findings suggested good programme design was a more significant factor in recruiting participants with minority backgrounds than proactive promotional measures.

Recruitment of Welsh speaking participants was the exception to the above. There was clear evidence of proactive Welsh language promotion within the findings. The result was 42% and 28% of participants being Welsh speakers in WWV and EW respectively, against a target of 25% in each area.

Participants lived in every county of Wales except Merthyr Tydfil, but the majority lived in more rural areas, most notably in Ceredigion, Powys, Carmarthenshire and Gwynedd.

Participants tended to have an undergraduate or postgraduate degree prior to studying with BioInnovation Wales. Nonetheless, a positive contribution to widening participation was noted from a minority with lower entry qualifications.

The programme met its targets of tackling poverty and social exclusion and in engaging / developing CCT champions.

Sustainable development was an area where BioInnovation Wales excelled. The findings indicated this theme was strongly embedded within the programme and was consistently discussed by interviewees. The resource efficiency measure targets for WWV and EW were met. The programme similarly contributed positively to the well-being goals of the Well-being of Future Generations (Wales) Act 2015.

### **The participant experience**

Motivations for joining the programme were varied but an interest in the topics of study was the strongest theme. This interest was personal for around half of participants and work-related for the other half. Just under a half of participants were motivated by the prospect of gaining a qualification at Masters-level. Potential benefits to the business summarised the rationale for supporting employees in their BioInnovation Wales studies for most employers.

A detailed review of the participant experience suggested application processes to the programme could be streamlined. These findings chiefly related to enrolment and finance processes which appeared to be designed for the benefit of different university departments rather than for ease of completion by applicants. This extended to different processes and duplicated effort for participants enrolling on modules at the two different universities.

Quality of teaching and course content were typically regarded as strongly positive features of the programme. Some participants found online learning challenging, but tended to indicate this reflected their past experience or learning style rather than deficiencies in the programme. Strengthening of participant-tutor and participant-participant engagement was suggested by some as areas for development. Use of forums for assessment drew polarised views, as they had throughout the programme.

Support for participants was generally perceived as a strong feature of the programme, regardless of whether academic or administrative staff provided it. Flexibility was a strong theme amongst participants. This stemmed both from the programme design (use of distance learning as mode of delivery) and the approach of programme staff.

Welsh language support was noted by participants and appreciated but not strongly used. Support for disabled students was available but participants felt they had to ask for that support, typically, rather than have it offered proactively.

### **Progress towards outcomes**

Progress towards participant targets was limited, with outputs at 39% and 27% for WWV and EW respectively. The mid-term evaluation recognised the targets were challenging but consistently increasing recruitment patterns at that time were in line with the *snowball effect* predicted for recruitment in the business plans for the operations. This suggested targets were achievable (at least within programme tolerance) but required a greater focus on recruitment.

The findings suggested diminishing levels of recruitment in the second half of the programme could be attributed to the following factors:

- Reduction in engagement with companies and business intermediaries due to reduced business development capacity.
- A change in the business environment post COVID-19, with less business capacity for training.



- 
- Withdrawal of the Welsh Government fee-waiver scheme in March 2022, potentially an example of the loss aversion effect.

A lack of reprofiling, recommended by the mid-term evaluation, coupled with an ineffective collaborative agreement process led to collaborations with enterprises formally achieving 1% of targets for each of WWV and EW.

If the re-profiling recommended at the mid-term evaluation had taken place and appropriate collaborative agreements been put in place between enterprises and the universities, progress would have been 57% and 65% to target for WWV and EW respectively.

The link between participant outputs and results (males and females exiting the two programmes with qualifications at level 7+) led directly to limited progress towards results for both operations. Anticipated results by programme close were 17% and 9% of targets for males having sufficient credit to exit with a qualification in WWV and EW respectively. The corresponding results for females were 24% and 14% of targets for WWV and EW respectively.

The findings suggested a subset of participants would continue to study BioInnovation Wales modules at an unsubsidized rate. An estimate of ultimate results from BioInnovation Wales were 34% and 20% of targets for males having sufficient credit to exit with a qualification in WWV and EW respectively. The corresponding results for females were 44% and 32% of targets for WWV and EW respectively.

The CCT indicator target of operations integrating sustainable development into awareness raising, education and training programmes was achieved.

Study of BioInnovation Wales modules brought about change at all four levels of the Kirkpatrick model, the *de facto* standard for evaluating training impact on employees and their organisations. Alongside such benefits, the findings included evidence of new business starts arising from learning and multiplier effects from college lecturers studying with BioInnovation Wales.

The legacy of BioInnovation Wales was substantial. High quality, online learning materials were produced and will remain on offer to Welsh (and wider) participants beyond the lifetime of BioInnovation Wales. Progress was sufficient to convince Aberystwyth University to retain staff through the transition period from ESF / Welsh Government support into a more sustainable future.

---

Unit costs of study were just under 2.5 times more than forecast for both WWV and EW operations. While this provided significantly lower value for money than anticipated, the substantial legacy anticipated from BioInnovation Wales will lead to a reduction in unit costs per participant as fixed investments in module development will be spread over an increasing number of participants.

### **Recommendations**

Fourteen recommendations were made, based on the lessons learned from the programme.

Four recommendations identified good practice in employer / participant engagement, embedding cross-cutting themes in programme design, participant support and legacy development that partners should translate into future programmes.

Two recommendations related to the potential for more streamlined and participant-focussed approaches to enrolment in future programmes. Three recommendations related to learning about promotional techniques from BioInnovation Wales that would benefit future programmes developed by the partners.

It was acknowledged the CCT approach based on equality for all was largely successful. Nonetheless, a recommendation identified the opportunity for a more positive action approach in support of people from minority groups. Another recommendation identified an opportunity to improve support to disabled people.

The three final recommendations related to enhanced tutor-participant and participant-participant interaction in online learning, use of fit-for-purpose collaboration agreements for student projects and ensuring future programmes are based on robust learning / research to develop challenging but realistic output / results targets.

---

## **Acknowledgements**

This final evaluation was undertaken by Dr Alun Hughes, Sam Woodward and Virginia West of 20 Degrees Consulting Ltd with the support of Helen Capelin of Break Every Chain Productions.

We are grateful for the help and support of the BioInnovation Wales team in providing responses to our requests for information in a timely fashion and with good grace and humour.

Our thanks go also to the past and current participants of the BioInnovation Wales programme and a wider group of stakeholders from employers to business support intermediaries for freely giving up their time to contribute their insights to inform this evaluation.

## **Note on confidentiality**

All participants in this evaluation took part on the understanding that their feedback was confidential. All quotations are anonymised and references to interviewees are made using the gender-neutral terms of *they* and *their* in order to promote anonymisation. Where participants are named, for example in case study films, this was done with their explicit permission.

## 1. Introduction

BiInnovation Wales was a five-year programme scheduled to run between May 2018 and April 2023. It was comprised of two ESF-supported operations summarised in table 1.1.

**Table 1.1 – Overview of BiInnovation Wales structure**

	<b>West Wales &amp; Valleys</b>	<b>East Wales</b>
<b>Priority and objective</b>	Skills for Growth Priority 2 Specific Objective 3	Skills for Growth Priority 2 Specific Objective 4 (at time of application and approval) but Specific Objective 3 by time of 2020 reprofile
<b>Meaning</b>	To increase the number of people with graduate degrees or equivalent undertaking research and innovation activities with enterprise	
<b>Delivery timescale</b>	May 2018 to April 2023	February 2019 to April 2023

The business plan for the WWV operation set out the purpose as<sup>1</sup>:

Our objectives are to align investments in the development of skilled individuals capable of carrying out research and instigating innovation within the businesses of WW&V. The longer term aim is to allow companies to keep abreast of current thinking and affect an increase in the volume and quality of research and innovation activity in the West Wales and the Valleys region.

It seeks to address the ‘complementary problems’ of:

- High level and technical skills shortages in bio-based businesses; and
- Under-utilised graduates in WW&V.

The business plan for EW described the purpose in similar terms, adding that<sup>2</sup>:

It will provide a high-level conduit between current research and decision makers within bio-based businesses in the EW region, and provide the following high-level training objectives for their workforces:

<sup>1</sup> IBERS (2018) Welsh BioInnovation West Wales and the Valleys: C81576, Full Business Plan version 2. [Unpublished]. Aberystwyth University, UK.

<sup>2</sup> IBERS (2019) BioInnovation East Wales: C82169, Business Plan version 0.4. [Unpublished]. Aberystwyth University, UK.

- to recognise the value of innovation as a route to market
- to facilitate access to the latest innovations of relevance to the business
- to manage the translation of innovation into enhanced competitiveness
- to broaden and update the skills base and future career prospects.

Table 1.2 summarises the target outputs and results for each of the operations. These target outputs and results reflect the November 2020 re-profile, with original targets in parenthesis. The re-profiling issue is discussed in detail in section [5.1](#).

**Table 1.2 – Target outputs and results for BioInnovation Wales**

Target output	WWV	EW	Total
<b>Output:</b> Participants with a graduate degree or equivalent – male	178 (194)	87 (96)	265 (290)
<b>Output:</b> Participants with a graduate degree or equivalent – female	180 (195)	86 (97)	266 (292)
<b>Output:</b> Number of enterprises collaborating with learning providers in research and innovation activities from relevant sectors.	293 (315)	139 (158)	432 (473)
<b>Result:</b> Gaining a qualification upon leaving at Masters or Doctoral level – male	88 (95)	45 (51)	133 (146)
<b>Result:</b> Gaining a qualification upon leaving at Masters or Doctoral level - female	88 (95)	44 (50)	132 (145)
<b>CCT:</b> Operations integrating sustainable development into awareness raising, education and training programmes	1 (1)	1 (1)	2 (2)

The above results were based upon an assumption that the minimum exit qualification was a Postgraduate Certificate (60 level 7 credits). The business plan anticipated up to 51% of participants would gain credits for completing one or two modules i.e. 20 or 40 credits respectively<sup>3</sup>.

The business plans put forward a series of demographic targets<sup>4</sup>, linked to cross cutting themes, summarised in table 1.3.

<sup>3</sup> IBERS (2018) Welsh BioInnovation West Wales and the Valleys: C81576, Full Business Plan version 2. [Unpublished]. Aberystwyth University, UK, pp55-56

<sup>4</sup> Ibid, p55

**Table 1.3 – Demographic target outputs for BioInnovation Wales**

Target output	WWV	EW
Age (25+)	80%	80%
Age (50+)	10%	10%
Gender (females)	50%	50%
Participants with work-limiting health conditions or disabilities	5%	5%
Black, Asian and minority ethnic	4%	4%
Welsh speaking	25%	25%

This final evaluation had the following objectives<sup>5</sup>:

*The objective of the evaluation plan is to examine the implementation and impact of BioInnovation Wales against its aims and objectives...The evaluation will endeavour to determine the extent to which the outputs and results for the participants and businesses can be attributed directly to the project and whether the anticipated impacts have been realised.*

*In addition to quantitative information gathered, the project/evaluation will aim to gather qualitative information to confirm the experiences of participants, academic supervisors and relevant staff from enterprises participating from inception through to closure (and post-closure if interaction continues between the project and the enterprise). Where participants are engaged in work-based research, information regarding the impact of their projects will be gathered to confirm that each of the projects is achieving the planned outputs.*

*In addition to research on WEFO's Cross Cutting Themes, possible questions could include:*

- *Has the operation achieved its outputs and results?*
- *Has it come in on budget?*
- *How effective has the management of the project been?*
- *What impact has the project had on individual participants?*
- *What impact has the project had on participating enterprises?*
- *Will the project continue beyond the term of ESF funding?*
- *How has the operation performed against the delivery of CCT aims, objectives and commitments? Specifically*
  - *Operations integrating sustainable development into awareness raising, education and training programmes;*

<sup>5</sup> Reproduced from the evaluation specification provided by Aberystwyth University

- 
- *Positive action measures – women;*
  - *Positive action measures – older workers;*
  - *Female participation in STEM;*
  - *Activity supporting speaker of the Welsh language;*
  - *Resource efficiency measures;*
  - *Organisations paying the living wage;*
  - *Developing / engaging CCT Champions;*
  - *Has the operation provided opportunities for participants to use and develop their Welsh language skills in the workplace?*
  - *How has the operation contributed to the goals of the Well Being and Future Generations Act?*

## 2. Methodology

A logic model, [annex A](#), and an evaluation framework, [annex B](#), were developed for this project, in line with best practice proposed by UK Government in the Magenta Book<sup>6</sup>. The approach aimed to produce a robust evidence base to inform an assessment of the performance and impact of the BioInnovation Wales programme.

A desk-based review of key programme documents was undertaken. This included consideration of the following:

- BioInnovation Wales West Wales and the Valleys: full business plan, version 2, ref: C81576
- BioInnovation East Wales: business plan, version 0.4, ref: C82169
- WEFO ESF grant offer letters for each project
- Programme organisation chart
- Student feedback from modules started in 2019, 2020, 2021 and 2022
- Project Board papers (20<sup>th</sup> February 2019, 16<sup>th</sup> March 2020, 18<sup>th</sup> March 2021 and 16<sup>th</sup> March 2022)
- Student steering group minutes (14<sup>th</sup> May 2020, 28<sup>th</sup> April 2021, 3<sup>rd</sup> February 2022)
- Database of programme participants
- Re-profiled targets (November 2020)

Contact information was provided for 166 participants at the beginning of the final evaluation. All 166 participants were approached up to three times by e-mail for interview, except where responses indicated the contact had moved employer, was on maternity leave or an approach was actively declined. Table 2.1 provides an overview of responses.

**Table 2.1 – Overview of participant**

	WWV	EW	Total
Participants approached for interview	122	44	166
E-mail failed (reason unknown)	5	5	10
Unavailable (e.g. maternity leave or left organisation)	2	1	3
Interview actively declined	16	5	21
Interviews completed	28	12	40
Percentage of interviews (excluding uncontactable)	24%	32%	26%

<sup>6</sup> HM Treasury (2020) *The Magenta Book: Central Government Guidance on Evaluation*. Available at <https://www.gov.uk/government/publications/the-magenta-book>. Accessed 3rd March 2023.



Tables 2.2 and 2.3 summarise the total number of participants interviewed during the lifetime of the programme. Five participants agreed to be interviewed on two occasions, enabling insight into distance travelled and effect on their careers. Consequently, the total number of participant interviews were 43 for WWV and 16 for EW.

**Table 2.2 Summary of participant interviews - WWV**

	Mid-term (2020)	2021	Final (2022/23)	Total
Participants interviewed	10	5	28	39 <sup>a</sup>
Participants interviewed (% contactable population at time of interview)	28%	18%	24%	34% <sup>a</sup>

<sup>a</sup> Four participants were interviewed twice – two at the interim (2020) and final evaluation stages and two at the 2021 and final evaluation stages

**Table 2.3 Summary of participant interviews - EW**

	Mid-term (2020)	2021	Final (2022/23)	Total
Participants interviewed	2	2	12	15 <sup>b</sup>
Participants interviewed (% contactable population at time of interview)	33%	10%	32%	39% <sup>b</sup>

<sup>b</sup> One participant was interviewed twice – once at the interim (2020) stage and then at the final evaluation stage.

A series of wider stakeholder interviews were also undertaken throughout the lifetime of the programme. These tended to be relevant to both WWV and EW and are summarised in table 2.4. The *Programme team* included core BioInnovation Wales staff and relevant academic and management staff from Aberystwyth and Swansea universities. *Intermediaries* were staff of organisations such as Business Wales, Local Authorities or other funded projects that referred potential participants to BioInnovation Wales.

**Table 2.4 Summary of wider stakeholder interviews**

	Number of interviews			
	Mid-term (2020)	2021	Final (2022/23)	Total
Programme team (percentage of those approached for interview)	5 (83%)	2 (100%)	8 (57%)	15 (68%)
Employers (percentage of those approached for interview)	3 (75%)	0	2 (33%)	5 (50%)
Intermediaries (percentage of those approached for interview)	3 (75%)	0	0	3 (75%)

All interviewees were offered the option of being interviewed in Welsh or English. Only two interviewees opted for the Welsh language, one participant and one employer. These were both at the interim evaluation stage in 2020. Interviews were undertaken using a web conferencing platform (Zoom), enabling face-to-face discussions, which were recorded with the participants' consent.

In order to gain an in-depth understanding of the processes and student experience, one of the evaluation team enrolled on a BioInnovation module as part of the interim evaluation and kept a diary of the experience, introducing an autoethnographic method to the evaluation. This also provided an insight into future module promotion to active students. While not intended as the primary research method, it did enable findings from this method to be triangulated with findings from participant interviews and participant survey responses, strengthening the rigour of the evaluation.

---

### 3. Process findings

#### 3.1 Programme rationale

The interim evaluation findings suggested the programme rationale persisted to the end of 2020<sup>7</sup>. High level and technical skills shortages in bio-based businesses continued beyond that review point, not just in Wales but across the UK<sup>8</sup>. Welsh Government policy continued to prioritise the need for skills development in areas addressed by BioInnovation Wales. Agri-Tech, Food and Rural Economy was one of six priority themes underpinning Welsh Government Research, Development and Innovation (RD&I) investment decisions in the most recent Innovation Strategy for Wales, due to its importance to the Welsh economy<sup>9</sup>. Moreover, the importance of the circular economy and regenerative food and nature practices - cross-cutting themes of BioInnovation Wales provision - were identified as crucial elements of Welsh Government innovation strategy<sup>10</sup>.

Employers interviewed as part of the evaluation confirmed the above situation mirrored their practical experience. The specific BioInnovation Wales offer tended to meet the needs of their businesses in upskilling staff.

*“As a manager and as a leader within the organisation, I depend and rely on this training to upskill my staff, not just in their technical ability, but in their ongoing CPD. It just instils confidence in us as an employer that they have the core understanding, the core grounding of collecting data, analysing it and presenting it in a written format or in a presentation format, or they're able to present it in a structured, formal way, which isn't something we would do otherwise.”*

Employer

Participants, employers and evaluator desk research failed to identify any comparable offers to BioInnovation Wales equating to duplication. Table 3.1 summarises the only potential areas of comparability identified. Comparability was very limited amongst these examples, typically amounting to small elements of a module.

---

<sup>7</sup> Hughes, A. and Woodward, S. (2020) Interim Evaluation of the BioInnovation Wales West Wales & the Valleys and East Wales Projects, 20 Degrees Consulting Ltd, p16

<sup>8</sup> Biological scientists and biochemists were on the UK government shortage occupations list for Skilled Worker visas to the UK. HM Government (2022) Skilled Worker visa: shortage occupations available at <https://www.gov.uk/government/publications/skilled-worker-visa-shortage-occupations/skilled-worker-visa-shortage-occupations>. Accessed 6<sup>th</sup> March 2023

<sup>9</sup> Welsh Government (2023) Wales innovates: Creating a stronger, fairer, greener Wales, p23. Available at <https://www.gov.wales/innovation-strategy-wales>. Accessed 6<sup>th</sup> March 2023

<sup>10</sup> Ibid, pp26-27, pp47-50

**Table 3.1 – Comparable online offers to elements of BioInnovation Wales provision**

Provider	Offer	Further information
Bangor University	20 credit module: Sustainable manufacturing management	<a href="https://www.bangor.ac.uk/courses/undergraduate-modules/ICL-3009">https://www.bangor.ac.uk/courses/undergraduate-modules/ICL-3009</a>
Bangor University	MSc Agroforestry and Food Security (by Distance Learning)	<a href="https://www.bangor.ac.uk/courses/postgraduate-taught/agroforestry-and-food-security-by-distance-learning-msc">https://www.bangor.ac.uk/courses/postgraduate-taught/agroforestry-and-food-security-by-distance-learning-msc</a>
Institute of Packaging Professionals	Variety of short, online courses related to different aspects of packaging	<a href="https://www.iopp.org/i4a/pages/index.cfm?pageid=4348">https://www.iopp.org/i4a/pages/index.cfm?pageid=4348</a>
Cambridge University	Various short courses leading to 'certificates of achievement' e.g. biotechnology entrepreneurship	<a href="https://advanceonline.cam.ac.uk/courses/biotechnology-entrepreneurship">https://advanceonline.cam.ac.uk/courses/biotechnology-entrepreneurship</a>

### 3.2 Programme design

The mid-term evaluation considered programme design in detail<sup>11</sup>. The findings suggested:

- Module themes were demonstrably demand-led
- There was a clear rationale for the 14-week structure for students tackling each 20-credit module
- Combinations of filmed lectures, recommended reading, podcasts and film clips accessed via Aberystwyth University's Virtual Learning Environment (VLE) and structured around a downloadable study guide recognised different learning styles
- While assessments largely involved essay writing, attempts were made to vary assessment approaches through inclusion of report writing, conducting a literature review, responding to quizzes or contributing to blogs
- There was comprehensive support for students.

<sup>11</sup> Hughes, A. and Woodward, S. (2020) Interim Evaluation of the BioInnovation Wales West Wales & the Valleys and East Wales Projects, 20 Degrees Consulting Ltd, pp16-18

Research findings of the final evaluation suggested the above situation persisted. Incremental changes had occurred to programme design since 2020, but these had been to improve the student experience. Examples of these design changes included:

- Tutors offered a small number of short, optional face-to-face sessions online to promote participant-to-participant engagement<sup>12</sup>. This had been a recommendation of the interim evaluation and was noted as having been implemented in the 2021 evaluation<sup>13</sup>
- Swansea University modules moved from a blended approach in 2020 to learning materials being fully online. Nonetheless, each of the three Swansea University modules had a voluntary, introductory workshop so that students could familiarise themselves with the equipment used in the processes studied. The inclusion of a voluntary workshop was then incorporated into a meat processing module delivered by Aberystwyth University.

*“Students must have the opportunity to see the equipment that is used in the processes they are studying and see how easy it is to use... Hands-on familiarity with the equipment, seeing how easy it is, seeing how it could fit into their business, is what drives change in the real world.”*

Member of Swansea University team

### 3.3 Programme governance

The mid-term evaluation considered programme design in detail<sup>14</sup>. The findings of the final evaluation mirrored those of the mid-term:

- The Project Board – Met annually. It included senior managers from the two universities and was chaired by a Pro Vice Chancellor from Aberystwyth University. Key to the meeting were five representatives of the agri-food industry plus the economic development departments of Ceredigion and Powys local authorities. Attendance was typically good, with 18 people attending in both 2021 and 2022 (a rate of 78%). The meetings enabled external scrutiny on progress by senior members of the universities and external representatives. Minutes of meetings suggested clear input to future potential developments by attendees.

<sup>12</sup> Hughes, A. and Woodward, S. (2020) Interim Evaluation of the BioInnovation Wales West Wales & the Valleys and East Wales Projects, 20 Degrees Consulting Ltd, p50

<sup>13</sup> Hughes, A. and Woodward, S. (2021) Evaluation of the BioInnovation Wales West Wales & the Valleys and East Wales Projects – Annual Evaluation Report December 2021, 20 Degrees Consulting, p13

<sup>14</sup> Hughes, A. and Woodward, S. (2020) Interim Evaluation of the BioInnovation Wales West Wales & the Valleys and East Wales Projects, 20 Degrees Consulting Ltd, pp18-19

- The Steering Group – Met annually. This group included academic and management representatives plus a larger body of current BioInnovation Wales participants. The focus was on securing feedback on the student experience, with a view to learning and improving the experience for future cohorts. Table 3.2 illustrates the changing levels of attendance, with particularly strong student input in 2021.

**Table 3.2 – Steering group attendance levels**

	2020	2021	2022
Attendance	8 (67%)	23 (85%)	10 (48%)
Apologies	4	4	11

- The Project Management Group – This was an operational management group for the programme, involving staff up to Director level. Formal meetings were held monthly, with a less formally structured meeting held weekly.

Employers and the BioInnovation team suggested an annual meeting of the Project Board provided sufficient focus to ensure efficient and effective use of time. Informal meetings between the Programme Manager and employers between meetings helped to sustain effective relationships and timely additional input.

The Steering Group captured the student voice as part of the typical academic approach to quality assurance. Minutes of meetings suggested a structured and comprehensive analysis of the student experience was drawn out of student representatives during these meetings. This supplemented feedback from the wider student body through online feedback questionnaires at the end of each module. The findings suggest the student feedback was applied to improve both module content and wider student processes.

### 3.4 The programme partnership

The findings of the interim evaluation suggested expertise brought by IBERS at Aberystwyth University and the College of Engineering at Swansea University was complementary, with both teams reportedly learning from each other and producing better learning for their students as a result<sup>15</sup>. Findings from the final evaluation continued to reflect this.

<sup>15</sup> Hughes, A. and Woodward, S. (2020) Interim Evaluation of the BioInnovation Wales West Wales & the Valleys and East Wales Projects, 20 Degrees Consulting Ltd, pp19-20

---

*“Aberystwyth is very strong in agriculture, Swansea in engineering. Many Aber staff have an education background, Swansea are in science.”*

Member of academic delivery team

*“I worked with them on the Waste Management module for which they provided materials. I was looking at managing waste packaging and realised there was a connection with some work at Swansea on polystyrene packaging. So, we pooled our resources.”*

Member of academic delivery team

Swansea University academic staff were particularly complementary about development of their online teaching skills by peers at Aberystwyth University. Whereas the IBERS team at Aberystwyth had experience of online provision prior to BioInnovation Wales, that was not the case for the team at the College of Engineering at Swansea University.

*“The experience has been very positive. I’ve learnt a lot about delivery and about the anticipations and outlook of mature learners. It helped me to be massively ahead of the curve when Swansea introduced video lectures during Covid. It’s been very challenging, very enjoyable, an eye-opener.”*

Member of Swansea University delivery team

While academic staff reported a positive and mutually beneficial collaboration, there was a view by some that administrative systems could have been improved for students. The interim evaluation noted that, *“Modules were validated and credits awarded by the university delivering. Credits from Swansea University were transferred in towards any award made by Aberystwyth University<sup>16</sup>.”<sup>17</sup>*

*“The only disadvantage is caused by central university admin. Comms between the two admin systems are terrible. It’s almost entrenched warfare. They will not consider adapting to allow their systems to talk to each other. Why do all students have to enrol in both universities? They go through a poor enrolment experience twice and the second one is not even the same as the first! Students should just be able to enrol on ‘the programme’ and still get credits from both universities.”*

Member of academic team

---

<sup>16</sup> An award could be a postgraduate certificate, postgraduate diploma or masters (MSc or MRes)

<sup>17</sup> Hughes, A. and Woodward, S. (2020) Interim Evaluation of the BioInnovation Wales West Wales & the Valleys and East Wales Projects, 20 Degrees Consulting Ltd, p20

---

### 3.5 Programme resources

The interim evaluation identified gaps in staffing during the critical first year of the programme, largely due to a university-wide restructure at Aberystwyth University<sup>18</sup>. The Business Development Officer was recruited nine months later than intended. It also proved challenging to recruit sufficient design staff during that same period. Academic staff reported a particularly busy initial period, with a need to develop three modules for launch over a three-month period and then having to repeat the process during the following three months. Having achieved this, module development moved into an equilibrium six-monthly development cycle.

The Business Development Officer left their post in April 2022. Although the post was filled by the Programme's Administrative Officer, there were problems recruiting to the latter post. Consequently, the postholder effectively ended up trying to cover both posts. Inevitably this caused gaps in capacity. The Project Manager took on most of the social media work, something which was reportedly time consuming. Nonetheless, gaps in capacity remained. Links with business intermediaries, particularly generic business advisors such as Business Wales and local authority economic development advisors were less apparent at the time of the final evaluation than they had been at the time of the mid-term evaluation, suggesting time to nurture such links was a casualty of capacity constraints. It was suggested direct business development with companies was similarly a casualty.

*"I think what has been missing is the reaching out to companies which we just haven't had the capacity to do."*

Member of the BioInnovation Wales team

Similarly, the Programme had been without a finance officer for over a year at the time of the final evaluation.

The autoethnographic research carried out by a member of the evaluation team identified several areas of student administration that could be strengthened by making the processes easier for students. Members of the Programme team reflected that university registry and finance systems were developed for traditional on-campus provision and were not best-suited to distance learners. Again, this took up time, further reducing team member capacity.

---

<sup>18</sup> Hughes, A. and Woodward, S. (2020) Interim Evaluation of the BioInnovation Wales West Wales & the Valleys and East Wales Projects, 20 Degrees Consulting Ltd, p20



---

*“[An] ongoing problem has been the inadequate systems to deal with off-campus learners. This takes up loads of admin time in creating work-arounds.”*

Member of the BioInnovation Wales team

### 3.6 Promotion and engagement

#### 3.6.1 Events

The Aberystwyth team suggested events were a successful means of recruiting students traditionally. Early participants were recruited through attendance at the Royal Welsh Winter Show and trade events. While successful, this mode of recruitment was suspended when the COVID-19 lockdown started in March 2020.

Online events emerged during the second half of 2020 into 2021, replacing physical events. Examples included include the Business Wales Mid and South West Virtual Regional Roadshow held on 22<sup>nd</sup> October 2020 and the Agri Tech 4.0 virtual conference in January and February 2021. The BioInnovation Wales team also offered webinars scheduled approximately one month before new module start dates. These linked with the team’s social media strategy.

The team started to attend more in-person events during 2022, as COVID-19 restrictions were relaxed. These included waste management fairs, teaching conferences, science events and vets' fairs. The team indicated they used social media in conjunction with the events to *‘beef up their value’*.

Just under a fifth of students in the interview sample recalled hearing about BioInnovation Wales through the following events:

- the Royal Welsh Winter Show
- a Chartered Institute of Waste Management trade exhibition at the NEC
- a BioInnovation Wales presentation at M-Sparc in Anglesey about high-tech farming led by Tech Tyfu<sup>19</sup>
- a Taste Wales event
- a visit to the Aber Innovation campus.

The majority of these examples were physical events held prior to the COVID-19 pandemic.

---

<sup>19</sup> Tech Tyfu was led by Menter Môn in Anglesey and Gwynedd and supported by the European Agricultural Fund for Rural Development. Further information is available at <https://techtifyfu.com/>. Accessed 13<sup>th</sup> March 2023.

### 3.6.2 Website and social media

The programme had a website available at <https://archived.bioinnovationwales.org.uk/20>. This clearly set out the BioInnovation Wales offer and displayed the ESF logo prominently. Information was readily accessible about all aspects of the programme, including:

- who the programme aimed to support
- accreditation
- modes of study
- what modules were on offer
- how students could study
- fees, eligibility and the fee waiver prior to April 2023
- how to apply.

Interested parties could subscribe to the programme's newsletter. The change in numbers subscribed is highlighted in table 3.3, suggesting an increased rate of growth in the second half of the programme relative to the first half.

**Table 3.3 Newsletter subscribers**

	November 2020 (Mid-term evaluation)	March 2023 (Final evaluation)
Number of subscribers	200	534

There were links from the website to the programme's social media channels. Social media offered a route to potential students that was not reliant on face-to-face interaction. Table 3.4 provides an overview of the main channels.

**Table 3.4 – Snapshot of growth in BioInnovation Wales social media followers**

Platform	Followers	
	November 2020 (Mid-term evaluation)	March 2023 (Final evaluation) (Growth)
Twitter	604	688 (14%)
Facebook	171	647 (278%)
LinkedIn	240	475 (98%)

<sup>20</sup> Accessed 12<sup>th</sup> April 2023

---

Just over a quarter of the sample of students interviewed found out about BioInnovation Wales courses online<sup>21</sup>. Half of these either found out via a search engine because they were looking for a course of study or they looked at the Aberystwyth or Aber Innovation Campus website. The other half found out about courses via social media. Four times as many students within the sample cited Facebook rather than LinkedIn as the source of their initial interest. None cited Twitter as the platform that first attracted their attention to BioInnovation Wales.

A random three-month sample of social media posts was reviewed annually over three years. The results are summarised in tables 3.5 and 3.6 for Facebook and Twitter respectively. LinkedIn posts were only available for 12 months after posting, so trend data was not available. While Facebook and Twitter tend to be used differently by users i.e. a retweet on Twitter cannot be compared with a share on Facebook, the action of liking a post on any platform tends to mean people have either noted, are bookmarking or appreciate a post.

The mid-term evaluation indicated that video content about new courses on Facebook attracted more engagement than other forms of content<sup>22</sup>. The use of pay-per-click advertising was reportedly driving much of that engagement. Table 3.5 indicates mean *Likes* and *Shares* continued to be larger for videos than any other form of content across all three years sampled. Numbers of *Replies* were too small to draw any meaningful conclusions.

Twitter engagement tended to be at smaller volumes than Facebook. This was partly due to smaller numbers of followers and smaller numbers of tweets than Facebook posts. The importance of video content on engagement appeared to be less for Twitter users, at least until 2022 when it dominated the type of content attracting engagement.

---

<sup>21</sup> 37 students of the sample of 40 interviewed as part of the final evaluation recalled how they heard about BioInnovation Wales

<sup>22</sup> Hughes, A. and Woodward, S. (2020) Interim Evaluation of the BioInnovation Wales West Wales & the Valleys and East Wales Projects, 20 Degrees Consulting Ltd, p22

**Table 3.5 – Annual overview of Facebook engagement during 18<sup>th</sup> August to 17<sup>th</sup> November**

Year	Type of posts	Quantity	Likes (total)	Likes (mean)	Shares (total)	Shares (mean)	Replies (total)	Replies (mean)
2020	Image	1	2	2.00	0	0.00	0	0.00
	Link	5	7	1.40	3	0.60	0	0.00
	Retweet/repost	1	1	1.00	0	0.00	0	0.00
	Video	10	76	7.60	20	2.00	3	0.30
	<b>Total</b>	<b>17</b>	<b>86</b>	<b>5.06</b>	<b>23</b>	<b>1.35</b>	<b>3</b>	<b>0.18</b>
2021	Image	3	1	0.33	0	0.00	0	0.00
	Link	2	3	1.50	0	0.00	0	0.00
	Retweet/repost	1	4	4.00	1	1.00	2	2.00
	Video	3	35	11.67	8	2.67	0	0.00
	<b>Total</b>	<b>9</b>	<b>43</b>	<b>4.78</b>	<b>9</b>	<b>1.00</b>	<b>2</b>	<b>0.22</b>
2022	Image	1	8	8.00	7	7.00	2	2.00
	Link	1	6	6.00	0	0.00	0	0.00
	Retweet/repost	4	23	5.75	12	3.00	3	0.75
	Video	8	306	38.25	61	7.63	8	1.00
	<b>Total</b>	<b>14</b>	<b>343</b>	<b>24.50</b>	<b>80</b>	<b>5.71</b>	<b>13</b>	<b>0.93</b>

**Table 3.6 – Annual overview of Twitter engagement during 18<sup>th</sup> August to 17<sup>th</sup> November**

Year	Type of posts	Quantity	Likes (total)	Likes (mean)	Shares (total)	Shares (mean)	Replies (total)	Replies (mean)
2020	Image	2	4	2.00	6	3.00	1	0.50
	Link	6	7	1.17	7	1.17	0	0.00
	Retweet/repost	3	4	1.33	4	1.33	0	0.00
	Video	5	4	0.80	5	1.00	0	0.00
	<b>Total</b>	<b>16</b>	<b>19</b>	<b>1.19</b>	<b>22</b>	<b>1.38</b>	<b>1</b>	<b>0.06</b>
2021	Image	0	0	0.00	0	0.00	0	0.00
	Link	2	122	61.00	34	17.00	3	1.50
	Retweet/repost	3	10	3.33	8	2.67	1	0.33
	Video	1	0	0.00	0	0.00	0	0.00
	<b>Total</b>	<b>6</b>	<b>132</b>	<b>22.00</b>	<b>42</b>	<b>7.00</b>	<b>4</b>	<b>0.67</b>
2022	Image	0	0	0.00	0	0.00	0	0.00
	Link	0	0	0.00	0	0.00	0	0.00
	Retweet/repost	0	0	0.00	0	0.00	0	0.00
	Video	4	9	2.25	6	1.50	0	0.00
	<b>Total</b>	<b>4</b>	<b>9</b>	<b>2.25</b>	<b>6</b>	<b>1.50</b>	<b>0</b>	<b>0.00</b>

One post stood out in the 2021 sampling period for having attracted significantly more engagement than any other. This is reproduced in figure 3.1. It related to Public Goods, which were very topical in 2021 due the on-going discussion about the role of public goods in a sustainable farming scheme in Wales to replace EU agricultural subsidies<sup>23</sup>. The delivery team confirmed the post was promoted in the same way as other posts during that period, reinforcing the view that the post was simply topical.

<sup>23</sup> Welsh Government (2020) Sustainable Farming Scheme. Accessed at <https://www.gov.wales/sustainable-farming-scheme-guide> on 4th April 2023

**Figure 3.1 – Social media post attracting most interest in quarterly trend sample**



### 3.6.3 Personal recommendation

A third of the participant interview sample were introduced to BioInnovation Wales by people in their workplace or network. This mirrored the comparable finding at the mid-term stage of the evaluation<sup>24</sup>.

The importance of a line manager's introduction to BioInnovation Wales was a theme for most of these students. Even where the line manager did not make an initial introduction, subsequent encouragement by a line manager to engage was important.

<sup>24</sup> Hughes, A. and Woodward, S. (2020) Interim Evaluation of the BioInnovation Wales West Wales & the Valleys and East Wales Projects, 20 Degrees Consulting Ltd, p23

---

### 3.6.4 Passive and active referrals

The mid-term evaluation findings included the project team having identified several organisations and initiatives that referred potential students to BioInnovation Wales. These included:

- Business Wales
- Menter a Busnes which delivers Farming Connect on behalf of Welsh Government
- Food Skills Wales and Tyfu Cymru (Horticulture Wales), two Welsh Government and European Agricultural Fund for Rural Development-supported projects delivered by LANTRA
- Welsh Government Cluster Groups, particularly the Controlled Environment Agriculture Cluster
- Economic Development Departments of Ceredigion and Powys County Councils.

Reference has already been made to the EU-supported Tech Tyfu project in North-West Wales. At least one student interviewed during the mid-term evaluation was actively referred to BioInnovation Wales by this project. One student within the final evaluation interview sample had also found out about BioInnovation Wales via Careers Wales.

A sample of representatives from the organisations above were interviewed as part of this evaluation. It revealed a consistently high regard for the BioInnovation Wales offer. The modules on offer were perceived to be demand-led, on topics unavailable elsewhere and of high quality. Interviewees suggested they promoted BioInnovation Wales via social media, articles in their newsletters and by direct referral or recommendation to individuals and businesses, when appropriate.

### 3.6.5 Other approaches

The BioInnovation team identified student ambassador recommendation as a potentially effective means of promotion. Examples of testimonials were available on the BioInnovation Wales website<sup>25</sup>.

Both radio and TV (S4C) commercials were produced to promote BioInnovation Wales<sup>26</sup>. Both media were identified as ways members of the sample of participant

---

<sup>25</sup> Example case studies can be found at <https://archived.bioinnovationwales.org.uk/about/news-media/>. Accessed 5<sup>th</sup> April 2023

<sup>26</sup> The TV advertisement was accessible at <https://vimeo.com/728745949/0c30ed20a5> on 5th April 2023

---

interviewees heard about BioInnovation Wales, with 11% of interviewees recalling the TV advertisement and 5% the radio advertisement.



## 4. The participant and employer experience

### 4.1 Motivations for joining the programme

A snapshot of key motivations for joining the Programme provided by the sample of 40 students interviewed as part of the final evaluation is summarised in table 4.1. This is a snapshot from qualitative responses and should not be interpreted as a quantitative study. Individuals tended to offer one, two or three key motivations for their engagement, none of which were prompted (grounded theory research method). Motivations were grouped into themes to create table 4.1.

The top three motivations related to the topics studied within modules either being relevant to work or personal interests i.e. the subject matter of the modules was the overwhelming reason for studying with BioInnovation Wales. This aligned with the mid-term findings<sup>27</sup>.

**Table 4.1 – Snapshot of key motivations for joining the BioInnovation Wales programme (n=40)**

Motivation	Number of respondents	Percentage of respondents
Subject matter of modules	18	45%
Relevance to work	13	33%
Link to personal interests	11	28%
Securing a qualification	10	25%
Subsidy reduced barrier to engagement	8	20%
Advance / change career	7	18%
Flexible / part-time learning approach	5	13%
Enjoy learning generally	3	8%

Notably, just over half of the sample cited motivations related to work i.e. either the relevance of learning or because they felt study would enable them to advance their career or enter a career related to the learning.

*“I wanted to further my studies and potentially get a doctorate and to add another string to my bow and diversify my qualifications.”*

EW participant

<sup>27</sup> Hughes, A. and Woodward, S. (2020) Interim Evaluation of the BioInnovation Wales West Wales & the Valleys and East Wales Projects, 20 Degrees Consulting Ltd, p34

---

*“Modules I was interested in were quite specific and applied to areas of work I’m in and was looking to upskill knowledge in that sector both for personal knowledge and professional. .... The range of modules are on trend - they’re key categories for Wales.*

*For me it was about continuous learning and getting information about the science behind things, not just the applied product information.”*

WWV Participant

Employers also talked about supporting employees because it would help the company by upskilling employees in relevant areas.

*“Continuous personal development and the needs of the business. Two areas/modules I thought would fit with their personal development and enhance the knowledge of the business.”*

Employer – asked the reason why they supported employees to study with BioInnovation Wales

In line with the mid-term evaluation, the majority of participants talked about the learning being the most important element of the experience for them<sup>28</sup>.

*“Neither, just about learning. Interested in doing that module and possibly doing some further modules for the knowledge. It interested me because it was distance learning and part-time. I already have a Masters, so getting another wasn’t of interest to me.”*

WWV participant asked whether professional or academic qualifications were the most important motivators

Nonetheless, just under a half of the interview sample were motivated to study by the prospect of a masters-level qualification. A theme emerged of participants studying their first module out of an interest in the subject. This developed a wider interest in learning and hooked them into the prospect of gaining a postgraduate qualification.

---

<sup>28</sup> Ibid

---

*"[It] started off being professional accreditation and learning. Originally, I only planned to do one module on meat processing. I was enjoying the module, so I looked at more modules and decided to turn it into academic qualification and am going for the full MSc."*

EW participant asked whether professional or academic qualifications were most important motivators

While a fifth of the interview sample mentioned the importance of the ESF-Welsh Government fee subsidy to enable their learning as a key motivator (table 4.1), this increased notably when questions focussed explicitly on the issue of payment. Almost a half of participants mentioned the fee-waiver (during COVID-19 pandemic period) or fee subsidy, suggesting it was a significant motivation to study. This appeared to have been particularly important for participants in the interview sample who were personally liable for any fees.

*"I'm self-employed. The fact it's subsidised and during Covid it was free, that was a big factor in doing as many [modules] as I did."*

WWV participant

Although the learning was online, the offer being from Aberystwyth / Swansea University was a factor for some in deciding to study with BioInnovation Wales. This appeared to be based upon prior knowledge of the institution(s) either from previous contact or from the general proximity of the institution creating an affinity.

*"It's also a Welsh University, which makes a difference to me."*

WWV participant

*"I live about half an hour away and with the connection with BioAccelerate with Aber Innovation and Aberystwyth University it seemed to fit together well."*

WWV participant

#### **4.2 The pre-course experience**

The autoethnographic approach gave detailed insights into the application process which tended to be forgotten by participants. This was explored fully in the mid-term evaluation, with no additional insights provided by participants during the final evaluation<sup>29</sup>.

In summary:

---

<sup>29</sup> Ibid, pp35-36

- Basic information needed to be duplicated on multiple forms, giving the impression different departments of the university did not talk, so each needed their own form completed
- Forms felt designed for mass entry of students to campus-based study, rather than tailored to the needs of distance learners
- Form clarifications were addressed to the BioInnovation Wales administrative team. Responses were both timely and professional
- Responses to forms submitted felt timely.

While not explored explicitly in the final evaluation, some interviewees nevertheless commented on the pre-course experience.

*“The registration process is a little overwhelming...If you're not used to the academic world, there are a lot of processes involved that seem potentially unnecessary. I'd be interested in what their dropout rate was between signing up and not even getting to day one, because I teetered on the edge of just giving up sometimes because the sign-up process was so arduous.*

Employer who undertook modules as a participant

### 4.3 The learning experience

Learning took place online, regardless of which university taught a module. Swansea University modules provided a voluntary, in-person session at the beginning of each module, so that participants could see the equipment being discussed online and understand how it could be used in their industrial processes.

*“Hands-on familiarity with the equipment, seeing how easy it is, seeing how it could fit into your business, is what drives change in the real world.”*

Member of Swansea BioInnovation Wales team

Several of the academic staff had prior experience of developing online learning materials but felt that BioInnovation Wales provided the resources to do a professional job, typically using phrases like ‘*a well-oiled machine*’ about the production process. However, even where academic staff had previous experience, the BioInnovation Wales approach appeared to be different:

*“BioInnovation Wales has been more tailored to student needs, so harder work for us. It's very different to face-to-face learning - a lot more time-consuming. Student feedback is very important because we have to gauge how they are getting on with the materials and our input. We have to balance their voices*

---

*carefully too: One voice might be very loud but not actually representative of the majority. We have made many incremental changes based on student feedback, but we've also learnt not to rush into change."*

Member of BioInnovation Wales team

Most participants rated the quality of course content and support from tutors highly. This reflected module-level feedback within the project monitoring system – [annex C](#). For example, table C1 and C2 suggested no participants disagreed with the statement that modules were well taught and 98% felt that tutors were approachable. Indeed, there was 5% or less disagreement with a wide range of positive statements about the modules and tutors within tables C1 and C2. Comparable views were expressed about assessments (table C3).

While some found the nature of online learning new to them or challenging, the majority appreciated the flexibility of the approach.

*"Support when I've needed it has been good. The online format has been good for me because its flexible. Content has been excellent and up to date, which reflects the fact it's a new qualification. There are two core modules but beyond that you have a lot of scope to do what you're interested in."*

EW participant

*"I've done one module in entirety. I thought it was very good. The main lecturer was very knowledgeable and enthusiastic. The number of lecturers was about right. I come from more practical academic background with fieldwork, but I thought this was a very good introduction to more classroom based academic work. There was lots of help available if we were struggling with any aspect. I can't think of anything that could be done better."*

WWV participant

The mid-term evaluation highlighted that, 'balancing the number of hours required for study and submission of assessments with work and home commitments was the main issue highlighted by participants. Some commented on the volume and depth of work required per module. In the main participants acknowledged the volume was necessary.'<sup>30</sup> This finding remained true amongst the final evaluation interview sample. Some were not motivated by accreditation but found the online approach suited their situation well.

---

<sup>30</sup> Ibid, p36

*“I have two small children so online and being able to go at own pace was very important. I did it as a non-qualifying post-grad - I don't need additional stress or qualifications...I just accessed the reading and recordings of lectures and worked through. It took me a whole year to get through it all because I was only doing small amounts at a time, maybe half an hour each evening.”*

WWV participant

While individual students were able to suggest areas for improvement, ranging from navigation of Blackboard VLE to quality of lecturer videos, there were only two themes emerging from the final evaluation interview sample. Both aligned with mid-term evaluation findings as areas where participants felt improvements could be made<sup>31</sup>:

- Improved interaction between students and lecturers and between students and other students as part of the learning experience. While some recognised this as a feature of distance learning relative to on-campus learning, others felt greater use of Zoom meetings would have been beneficial.
- Forums – These were conceived as one way of tackling the first theme, while enabling bite-sized assessments. Participants posted short blog posts of up to 200 words each, with perhaps three to five posts per participant per block (there were typically three blocks in a module). In total, they typically amounted to 15% of a module's available marks. They were intended to respond to points made by other participants in their posts but used an academic style of writing, including references. These attracted a very polarized response from participants.

These two issues were recurring themes of the evaluation and mirrored project monitoring, for example table C4 ([annex C](#)) and minutes of steering group discussions<sup>32</sup>.

*“More push towards the social side of things would have been helpful. You get to interact with others by sending messages, but it felt quite alone. When I was at uni I got to know people and we could bounce ideas off each other. Maybe some social aspect of the course would be helpful to get that interaction.”*

EW participant

*“The assessed forums. When you work full time it's difficult to use. You might post something when you have time, but if other's aren't posting at the same time*

<sup>31</sup> Ibid, pp37-38

<sup>32</sup> For example, BioInnovation Wales Student Steering Group Minutes, 28<sup>th</sup> April 2021 – Item 4 Forums and item 6 Staff / tutorials / seminars

---

*you can't really have a 'discussion'. It just doesn't work. No one has time to wait for people to respond and then add to a conversation again. It is very artificial. No one has casual conversations about these topics. You're carefully wording and referencing whatever you put on there."*

WWV participant

The evaluator undertaking an autoethnographic research method by studying one module initially empathised with the WWV participant above. Nonetheless, the evaluator persisted and found the forums to be a good way of securing small numbers of marks for an hour of research and writing effort. This significantly lowered the number of marks required to pass the module from more substantial assignments. The findings suggested this aligned with the experiences of those taking a positive view of the forums amongst the final evaluation interview sample.

The mid-term evaluation identified assessment as a significant area of feedback, with participants typically preferring multiple means of assessment throughout a module to a single, large summative assessment<sup>33</sup>. While forums drew advocates and detractors in equal measure, this was clearly an attempt to provide such a bite-sized means of assessment throughout modules.

There was little comment about assessment amongst the sample of final evaluation interviewees. Where comments arose, they tended to relate to dissatisfaction with discussion forums or inadequate explanation of assignment expectations at an early enough stage.

*"It wasn't until the last assignment that I was told I was being too practical and that should have been said after my first assignment, not at the end."*

EW participant

Student feedback on assessment within the project monitoring system ([annex C](#), table C3) aligned with the above, i.e. typically high levels of satisfaction with assessments. Explanations about assessments were scored highly but marginally lower than other factors. This aligned with approval scores of 84% and 81% respectively for the helpfulness and timeliness of tutor feedback ([annex C](#), table C2).

The learning experience was not confined to participants. Academic members of staff typically reflected on having learned significantly from the BioInnovation Wales experience.

---

<sup>33</sup> Hughes, A. and Woodward, S. (2020) Interim Evaluation of the BioInnovation Wales West Wales & the Valleys and East Wales Projects, 20 Degrees Consulting Ltd, p37

---

*“The whole distance-learning approach was a learning curve. My background was in lab-based teaching. It was very interesting pedagogically too after my teacher training. I’m on the workflow to create templates for the initial micro-credentials now and couldn’t have done these without the learning so far on BioInnovation Wales.”*

Member of the BioInnovation Wales team

#### **4.4 Student support**

Participants were typically positive about the support offered by the BioInnovation Wales team, both tutors and support staff. This agreed with module-level feedback ([annex C](#), tables C2 and C5).

Staff appeared to understand the position of students and flexibility was a recurring word used to describe how they endeavoured to deal with participant issues.

*“Most students are mature working people, not 18-year-olds with free time. If there’s illness or family problems, we fully understand and try to help. We are flexible with deadlines and with the structure of assignments. We arrange Zoom meetings at times to suit them. We adapt, change, provide flexible options. We offer them the tools to make learning accessible.”*

Member of BioInnovation Wales team

There was a recognition that there was a trade-off between in the *moment* support through an on-campus learning experience and distance learning.

*“Because its distance learning and there are times when you’re going through something and want to ask a question or just clarify something and while you can ask, it’s not as natural as would happen in face-to-face learning. But then it’s pros and cons - that format allows me to sit early morning or late at night and learn.”*

EW participant

Some participants would have appreciated more proactive support from tutors, suggesting occasional touch-base phone calls or Zoom meetings. Others, recognised the onus was on them to ask for support, given the level of study:



---

*“Only thing is maybe a couple of phone-calls with someone to make sure they're on track and everything is okay would be useful. But I suppose at that level you should be reaching out if you're struggling or have any questions.”*

WWV participant

Where participants asked for help, they indicated the support was provided. The most common form of support identified by participants was the need for assessment deadline extensions to accommodate business and life issues ranging from busy periods at work through to illnesses or, in one case, giving birth early. Participants tended to describe the team in terms such as *flexible* and *supportive* in this respect.

Interviewees recognised Welsh language support was available, albeit most did not choose to study in Welsh even if they were Welsh speakers. Lack of familiarity with technical words in Welsh was a common reason for choosing to study in English if participants' main education had been in English. One interviewee had the opposite experience:

*“Someone on the course provided a lot of support in Welsh. They were very good at providing me with a bit more support going through concepts I hadn't dealt with since high school, which I did in Welsh.”*

EW participant

Another interviewee noted support with English, given their first language was from another European nation. Other support identified by participants included research skills and mathematics.

In line with the mid-term evaluation, few participants required reasonable adjustments because they were disabled people. One individual in the final evaluation interview sample identified as a disabled person. The individual did not identify their needs and so no support was provided.

*“I have mental health issues and am dyslexic. I didn't get a great deal of support pushed forward. I'm sure it would have been there if I went looking, but I wasn't made aware of it. For example, no course resources were offered in alternative colour formats (white background with black writing can be very difficult to read). Maybe I should just have asked for it.”*

WWV participant

---

This illustrates a wider point that the BioInnovation Wales team were supportive when participants asked for support, but a more proactive approach may have been more beneficial for some.

## 5. Progress towards outcomes

### 5.1 Outputs

#### 5.1.1 Participant outputs

The headline indicator was the number of participants enrolled on the BioInnovation Wales programme. All other qualification (result) and CCT outputs derived from this headline. A breakdown of enrolled participants is presented in table 5.1.

**Table 5.1 – Enrolled participants (March 2023)**

Indicator	WWV		EW	
	Re-profiled target output	Actual output (Percentage of target)	Re-profiled target output	Actual output (Percentage of target)
Participants with a degree or equivalent – male	178	61 (34%)	87	18 (21%)
Participants with a degree or equivalent – female	180	78 (43%)	86	28 (33%)
<b>Total</b>	<b>358</b>	<b>139 (39%)</b>	<b>173</b>	<b>46 (27%)</b>

The business plan and subsequent re-profile predicted a *snowball effect* in terms of recruitment i.e. an increasing number of students recruited as more participants shared their experiences with colleagues in the sector and attracted more interest. The mid-term evaluation findings suggested this was happening in practice. There was an annual cycle of maximum recruitment at the start of the academic year (October), then a reduced recruitment for the February intake and a further reduction in the June intake numbers. There was a notable increase for each intake relative to the same intake the previous year. This led to a conclusion that output targets were challenging but achievable.

Figures 5.1 and 5.2 illustrate course enrolment trends for WWV and EW, based on intake data reproduced from the project management system in [annex F](#). The pattern described above held until June 2021. After this point there was a clear reversal of the trend.

One possible explanation for the changed recruitment patterns could be latent demand having been satisfied by mid-2021 and therefore a lesser annual demand only being available to the programme for recruitment. While this may have been the case, there

---

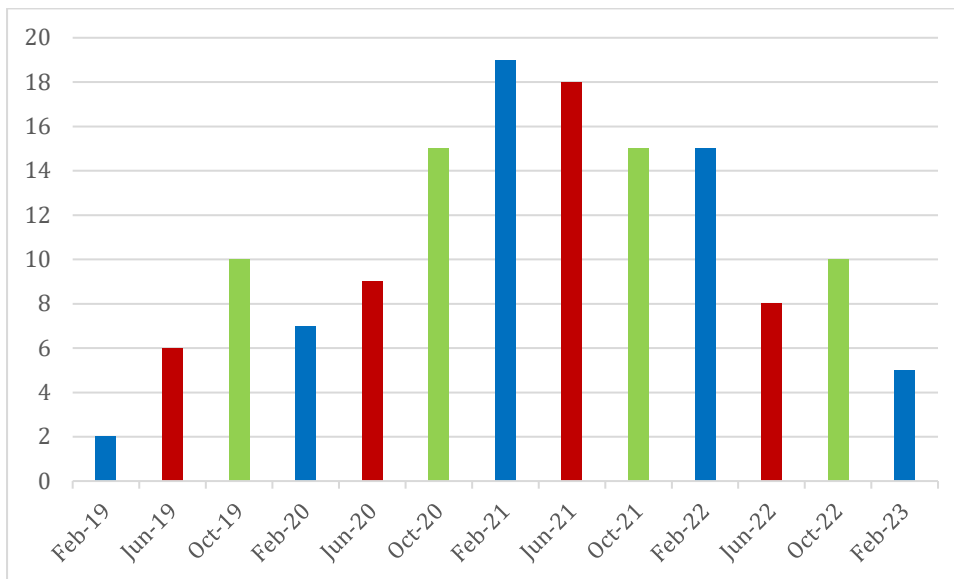
were specific changes coinciding with the drop in recruitment that offer rather more direct explanations:

- The COVID-19 furlough scheme wound down through 2021, ending in September 2021. Interviews with the final evaluation sample of participants revealed a trend of people reportedly becoming significantly busier at work through 2021. While this led to participants deferring the start of modules or seeking assignment extensions, it would be reasonable to assume it deterred potential participants joining the programme i.e. reducing recruitment.
- The Welsh Government pandemic-support fee waiver scheme ended in March 2022. Although a module remained heavily subsidised (£165 instead of £750), the well-known effect of *loss aversion* would have meant the loss of £165 fee waiver would have created a far more significant barrier to take up in potential participants' minds than the reduction in barrier from the original introduction of the fee waiver<sup>34</sup>. Although the June 2021 enrolments in figures 5.1 and 5.2 appeared to remain relatively high, many participants had actually enrolled earlier to secure the fee waiver but had subsequently deferred to the next module due to work commitments i.e. dates shown in figures 5.1 and 5.2 are dates new participants started a module, not enrolment dates.
- A Business Development Officer left post in April 2022, as discussed in [3.5](#). While filled by another member of staff, the overall result was a reduction in direct reach to companies or business intermediaries.

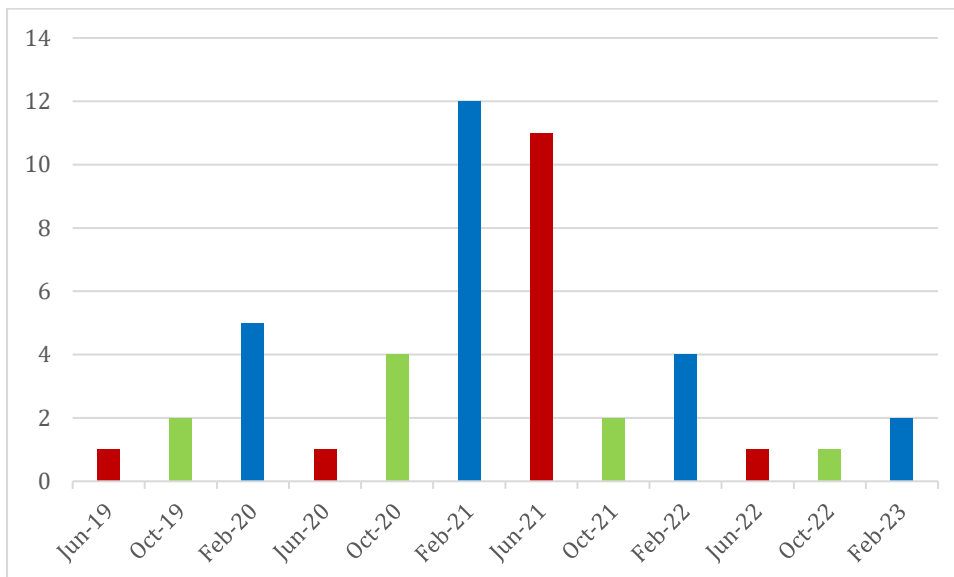
---

<sup>34</sup> Kahneman, D., Knetsch, J.L. and Thaler, R.H. (1991) Anomalies – The endowment effect, loss aversion and status quo bias. *Journal of Economic Perspectives*, 5(1), pp193-206

**Figure 5.1 – Number of participants and their start dates 2019-23 WWV**



**Figure 5.2 – Number of participants and their start dates 2019-23 EW**



### 5.1.2 Enterprises collaborating outputs

The mid-term evaluation identified a misunderstanding based on loose wording within the BioInnovation Wales business plans, leading to targets of 315 and 158 enterprises collaborating with BioInnovation Wales being agreed originally with WEFO<sup>35</sup>. This arose from Aberystwyth University’s misunderstanding of the target definition.

However, applying the correct definition of *“An enterprise collaborating with a recognised learning provider to deliver a research or innovation project at Masters*

<sup>35</sup> Hughes, A. and Woodward, S. (2020) Interim Evaluation of the BioInnovation Wales West Wales & the Valleys and East Wales Projects, 20 Degrees Consulting Ltd, pp40-41

(CQFW 7) or Doctoral (CQFW 8) level” to a careful reading of the business plans should have led to targets of 58 for WWV and 23 for EW, subsequently reducing through reprofile in November 2020 to 54 for WWV and 20 for EW. Although the mid-term evaluation suggested this was discussed with WEFO, no further re-profile was undertaken to rectify the mistake. Consequently, table 5.2 shows progress towards the formal target recognised by WEFO and the actual target identified by the evaluation team.

**Table 5.2 – Number of enterprises collaborating with learning providers in research and innovation activities from relevant sectors (March 2023)**

Indicator	WWV		EW	
	Target output	Actual output (Percentage of target)	Target output	Actual output (Percentage of target)
Agreed WEFO target	293	2 (1%)	139	1 (1%)
Appropriate target aligned to business plan	54	2 (4%)	20	1 (5%)

Source: Project monitoring system

The limited progress towards targets in table 5.2 reflects only two employers in WWV and one in EW signing research collaboration agreements and paying student fees during the dissertation phase. The programme team suggested employers did not wish to sign collaboration agreements because *‘they were too Aberystwyth University-orientated and too IP-focussed’*.

A review of the monitoring system revealed a larger number of employers sponsoring students at the Masters level. Given Masters-level projects tended to be focussed on employer-based problems, table 5.3 reflects the potential progress against this indicator if collaboration agreements had been put in place. N.B. the outputs reflect the number of enterprises involved in Masters-level projects, rather than the number of Masters-level projects. Some enterprises sponsored multiple students, so numbers of Masters-level projects would be higher.

**Table 5.3 – Number of enterprises collaborating with learning providers in research and innovation activities from relevant sectors if collaboration agreements had been put in place (March 2023)**

Indicator	WWV		EW	
	Target output	Actual output (Percentage of target)	Target output	Actual output (Percentage of target)
Agreed WEFO target	293	31 (11%)	139	13 (9%)
Appropriate target aligned to business plan	54	31 (57%)	20	13 (65%)

Source: Project monitoring system

### 5.1.3 CCT outputs

Table 5.4 summarises the CCT output position. The rationale for these outputs was explored in detail in section [3.7](#).

**Table 5.4 – Operations integrating sustainable development into awareness raising, education and training programmes**

Indicator	WWV		EW	
	Target output	Actual output	Target output	Actual output
Operations integrating sustainable development into awareness raising, education and training programmes	1	1	1	1

Source: Project monitoring system

This will be explored more fully in section 6.

## 5.2 Results

Table 5.5 shows progress towards results by March 2023. Progress appeared limited. Review of the monitoring system suggested attainment was better than table 5.5 suggests.

Table 5.6 shows the number of participants having completed three or more assessed modules successfully i.e. they could have exited with a postgraduate certificate qualification (60 credits) but chose to continue studying towards a postgraduate diploma (120 credits) or a full Masters qualification (180 credits). Table 5.7 additionally includes participants that had completed two modules successfully and had

commenced studies for a third module during January 2023 i.e. were likely to have achieved sufficient credits to exit with a level 7 qualification during the lifetime of the operations.

**Table 5.5 – Gaining a qualification upon leaving at Masters or Doctoral level (March 2023)**

Indicator	WWV		EW	
	Target output	Actual output (Percentage of target)	Target output	Actual output (Percentage of target)
Gaining a qualification upon leaving at Masters or Doctoral level – male	88	2 (2%)	45	1 (2%)
Gaining a qualification upon leaving at Masters or Doctoral level – female	88	2 (2%)	44	2 (5%)

Source: Project monitoring system

**Table 5.6 – Eligible to exit with a qualification (March 2023)**

Indicator	WWV		EW	
	Target output	Actual output (Percentage of target)	Target output	Actual output (Percentage of target)
Sufficient credits to exit with a level 7 qualification – male	88	12 (14%)	45	3 (7%)
Sufficient credits to exit with a level 7 qualification – female	88	14 (16%)	44	6 (14%)

Source: Project monitoring system



**Table 5.7 – Participants having gained 40 or 60 credits and having commenced studies for a further 20 credits during January 2023 (March 2023)**

Indicator	WWV		EW	
	Target output	Actual output (Percentage of target)	Target output	Actual output (Percentage of target)
Anticipated sufficient credits to exit with a level 7 qualification – male	88	15 (17%)	45	4 (9%)
Anticipated sufficient credits to exit with a level 7 qualification – female	88	21 (24%)	44	6 (14%)

Source: Project monitoring system

### 5.3 Outcomes

Insights were primarily drawn from qualitative interviews with participants. Where quantitative insights are provided, these were drawn from student feedback within the monitoring information.

#### 5.3.1 Outcomes at the individual level

Participants tended to suggest they enjoyed learning through BioInnovation Wales. 98% indicated their understanding of the subject matter had increased due to their participation<sup>36</sup>.

*"I just greatly enjoyed it and found it to be a really fulfilling experience in that [my supervisor] has gone the extra mile to accommodate me...It's probably introduced me to a whole new branch of science that I probably wouldn't have experienced otherwise."*

EW participant

Participants tended to suggest their subject-specific knowledge had broadened or been updated. Key themes were around confidence and motivation. Participants tended to speak about improved confidence within the work environment due to increased knowledge and understanding of the subjects studied. They tended to suggest improved motivation too, either to engage in further academic study or to get more involved in their industry.

<sup>36</sup> Annex C, table C1

Participants tended to express a sense of achievement or satisfaction gained through study. This was despite the challenge of finding time to study while managing work and other commitments.

*"It's given me more confidence and knowledge in sustainable supply systems as a subject area. I have more confidence in distance learning generally as well. I was worried that I wouldn't be able to keep on top of things with full-time work, but it was okay."*

WWV participant

The ability to select modules of interest to the individual and only study the number of modules wanted was valued by most participants.

*"It's great because you can go as far as you want to go and end up with a Masters if you want. That flexibility is good."*

EW participant

Although expressed in different ways, participants tended to highlight development of their critical reflection and research skills. As an example, some talked about no longer taking claims at face value, such as packaging being recyclable or compostable. Others talked about the studies changing both their writing style and content for reports. Greater incorporation of background research was an example of how this was manifest. Several interviewees appreciated access to academic papers not only for their academic study but as reference material to support their work.

Some interviewees talked about personal behaviour change as a result of their studies, for example in reduced levels of meat-eating or personal spending priorities in light of sustainable-living considerations.

*"I'm better at managing what food I buy and when I buy it. I'm a lot more cautious what I do about my food, using public transport more etc. I cycle to work now."*

EW participant

Only business owner-managers were able to identify tangible benefits for their careers at the mid-term evaluation<sup>37</sup>. This tended to be through improved business prospects. Employees tended to anticipate benefits in terms of personal satisfaction from improved understanding or qualifications gained. By the final evaluation, various participants had been able to study several modules or even exit the programme with

<sup>37</sup> Hughes, A. and Woodward, S. (2020) Interim Evaluation of the BioInnovation Wales West Wales & the Valleys and East Wales Projects, 20 Degrees Consulting Ltd, p44

an award. As a result, there were instances of employees identifying tangible benefits too, such as new jobs or career paths that they attributed to their BioInnovation Wales studies.

*"This job that I'm moving to...I wouldn't have been qualified for that had I not done the Masters. I probably wouldn't have even known I was interested in that, if I hadn't done the Masters."*

WWV participant

*"It's definitely helped me to get this current job. Being able to put on my application form 'currently studying towards', I think that scored points."*

EW participant

*"It's been completely profound. I went from working in [leisure sector] and looking for a new path which had more meaning...Discovering...those modules I did really helped guide me down a direction where I can make a positive influence."*

WWV participant

The evaluation team produced a series of case studies during the evaluation. These are reproduced here, so that the participant voice can be heard and seen unfiltered. Where participants are named, this was with their explicit consent. Anonymised case studies use gender neutral pronouns.

### **Case Study 1**

Adam – Business Owner - <https://youtu.be/XquL84Oy6Fs> - 3 minutes 34 seconds

The agro-forestry business was moving into mushroom production and used BioInnovation modules to upskill Adam.

### **Case Study 2**

Jodie – Rural Surveyor - <https://youtu.be/gJS78IN5mWs> - 3 minutes 10 seconds

Initially studying out of interest, Jodie realised the learning was relevant to her work.

### **Case Study 3**

Jane – Business Owner - <https://youtu.be/gQZZf5bS0J0> - 3 minutes 7 seconds

Studying helped Jodie to develop a wider appreciation of aquaculture and sustainability, enabling her to grow within her industry.

#### Case study 4

Mark Adams is involved in two companies based in Aberdare, South Wales. He is Director of a company, BPI Consultancy, that delivers training for other businesses, and is part of another company called Food Adventure Social Enterprise. This has a partnership agreement with the Cameroonian Government's Ministry of Small and Medium-sized Enterprises, Handicrafts and Social Economy to provide consultancy in sustainable food systems. Both businesses are small businesses with a handful of employees plus freelance consultants who do ad hoc work.

Mark heard about the course from his wife who he thinks probably came across it scrolling through social media. He thought the subject matter was very useful. He was looking at sustainability and food systems in his work so that he could improve the training services they offer.

*"It started off being professional accreditation and learning. Originally, I only planned to do one module on meat processing. I was enjoying that module, so I looked at more modules and decided to turn it into an academic qualification and am going for a full MSc".*

*"The course content was good. I enjoyed the content of the modules and the delivery style of recorded lectures worked well for me. I tried to do e-learning previously with a different university and it was a terrible experience, so I was hesitant at first. Because I felt more comfortable, I moved onto further modules".*

In terms of his work and life, Mark thought the course had had a definite impact:

*"It's given me more confidence than I had when I started. It's challenged preconceptions I had and made me think about stuff more in-depth. It's been good to have some regular structure to learn with.*

*Some of the modules were very intriguing. I was very interested in the module about behaviour change. I've been able to incorporate some of those things into my own life to overcome some of my failings.*

*I've also built some of the knowledge and skills I learned in the behaviour change module into some of the training courses I develop to help people understand why they do things that if they sat down and rationally thought about it they wouldn't do.*

*It's made us more aware of sustainability as well. It's made me look at the kind of*

*courses we offer to clients. We now offer different courses more aligned with some of the things I've done with Biolnno”.*

Mark’s overall impression was very positive:

*“I've got a lot out of doing it. It's been run very well by the University. My previous experience of online learning was a disaster but this has been so much better. All the staff have been very helpful with any queries”.*

### **Case Study 5**

Julia Pirson works for a non-profit social enterprise working to create opportunities for exceptional care in Wales. They offer services to parts of the health and social care system, such as facilitation and project management. Julia has delivered projects around prescribing guidelines in Wales and some pathway design. She now works mostly in project management.

Julia chose to take the course because she is generally interested in climate change and why people choose to do the things they do. It was also useful for her work:

*“...healthcare workers are under huge pressure and have no headspace to make changes .....[The course helped] understand behaviour change from an academic perspective and how to help people change and how people think, so we can understand how to help them better”.*

Julia found the approach fitted in with her family commitments:

*They [the modules] were very good - all online. I have two small children, so online and being able to go at own pace was very important....I don't need additional stress or qualifications. I didn't do any forum posts or projects / assignments / assessments. I just accessed the reading and recordings of lectures and worked through”.*

*In relation to the future of the course she said:*

*“The fact that this kind of course is available and that there's funding for it and it's online and it's remote and it's do-it-at-your-own-pace, and you can do it without having to do the big scary exam bits... all of that put together makes it really, really valuable to people who might not have access to that kind of thing.”*

*“I wouldn't have been able to do it if there hadn't been funding for it. The fact it's online [means it] is accessible. The fact it's recorded means people who would benefit from*

*a little more training when they have little time and little money could have access to it”.*

### **Case Study 6**

Jozsef moved to Wales from Hungary six years ago. When he started the course he was working as a taxi driver. He obtained his undergraduate degree in Hungary and wanted to update his degree and advance his career in the near future. He saw frequent Facebook advertisements for the course and enrolled, hoping to get back into work related to his degree. He used to be an environmental protection agency officer in Hungary.

Both professional and academic accreditation were important to Jozsef in taking the course:

*“I needed something to update my diploma. I'd been following the controlled environment agriculture industry. I chose that for my first module. I also have my own hydroponics system. I would like to be more professional and increase my knowledge in those subjects”.*

He found the approach challenging but enjoyed it:

*“I finished university more than 20 years ago and online learning was new and difficult to me at first. English isn't my first language, but I got a lot of help. I had to learn most of the agricultural expressions I'd known and those have come up since my graduation.*

*I really enjoyed it overall though. When I needed it, I got support. The course was well organised and the second module was then much easier since I was familiar with the assignment system. A lot of written information and videos are available. The course content is very relevant and up to date with the trends in the industry”.*

In relation to what stood out for him on the course:

*“The first course on CEA was eye opening but I wanted to know more about the sustainability of agriculture. So, I chose the Life-cycle Assessment module after that. I got a lot of answers to the questions I had had before doing that module. I learned to find answers through a scientific approach as I got access to a big pool of knowledge through the online portals of studies and research papers.”*

In terms of the impact on his future:

*“At the moment I'm in a learning curve. In a year or a few years' time I could say more about the effects. Hopefully I will make use of the course. One direct benefit of the programme is that now I'm more confident in using LinkedIn and doing related training like IEMA to apply for jobs that needs more qualified professionals. Also, the community organisations and social enterprise I volunteer for can make good use of my knowledge.*

*I'm hoping to get involved in a start-up project related to hydroponics or sustainability. Now I understand how fragile the food chain system is. So, if you can grow your own you can get some sustainability and some independence from that system and bring fresh food to the table”.*

Overall:

*“I'm very thankful I've found this programme and I wish I had found it earlier so I could take more courses on the subsidised price. I really appreciate the help and support I've received. It's been very useful for me. I hope I can get a green job in Wales”.*

### **Case study 7**

The student did not work in a company that specialised in a biotechnology but some of their processes had a biotechnology connection.

The student came across the course when they were helping a friend who ran a shop and was having issues disposing of cardboard boxes in an environmentally friendly way. The course seemed interesting so they enrolled on a module.

*“I enjoyed learning. It got me thinking about being more environmentally conscious. I started noticing things more and bringing more things up at work”.*

The student initially found the course content challenging having been out of education for a while, and that it was difficult to achieve a good work / study balance. They found the support of tutors useful in this respect:

*“I found the people running the modules were helpful. They got back to me quickly. I got good feedback which helped. I've been out of academia for a long time and so coming back I was very nervous. They were very helpful. [A Tutor] on the course provided a lot of support in Welsh. They were very good at providing me with a bit more support going through concepts I hadn't dealt with since high school, which I did in Welsh.”*

In relation to how involvement in the course might impact their career, the student thought that working in a non-biotech industry meant there would inevitably be limits;

*“but they're looking more into [specific industry] technology and BioInno has helped me understand that”.*

With regards to the longer-term the student thought that the course provided a foundation for them to move into a job in green industry:

*“With the changes the government is making to battle climate change there's going to be more need for people with these kind of qualifications in the future”.*

### 5.3.2 Outcomes at the wider level

The mid-term evaluation identified participants working in advisory roles were translating their learning in topics such as packaging, waste management and sustainability to support clients, particularly small businesses<sup>38</sup>. Such participants felt they had a greater understanding of the wider issues of sustainability and could advise clients with greater insight and authority. Some suggested this increased confidence widened the pool of tender opportunities for which they could bid. This theme persisted amongst the final evaluation sample of interviewees.

*“We advise and help businesses...we've noticed every single business wants to eliminate plastic packaging, but now I'm really confident when it comes to discussing packaging options. I'm now the go-to technologist for those topics.”*

WWV participant

The mid-term evaluation highlighted other participants' learning translating into knowledge underpinning start-up businesses<sup>39</sup>. Again, this persisted into the final evaluation.

*“It's really informing how I'm going to develop my business from here moving forward. It's also really good to keep abreast of what regulations are coming out, what other people are doing.”*

WWV participant

Other examples of participants having translated learning into their own work included:

---

<sup>38</sup> Ibid

<sup>39</sup> Ibid



- 
- Setting up quality processes
  - Introducing elements of their learning into training materials
  - Having confidence to amend membrane processes
  - Undertaking a carbon audit.

Feedback from some participants suggested a multiplier effect can be expected from their participation. They work as lecturers in Further Education or Higher Education Institutions and indicated they would use their learning to benefit their own students.

The Kirkpatrick model tends to be the *de facto* standard for evaluating the effect of human resource development programmes. The four levels of the model are:

1. Reaction
2. Learning
3. Behaviour and
4. Results<sup>40</sup>.

Reflecting on the findings presented suggests study of BioInnovation Wales modules brought about positive change at all four levels of the Kirkpatrick model. Participants were pleased with the programme, typically i.e. they tended to enjoy the learning (reaction). Similarly, participants reported improved levels of knowledge and confidence linked to their personal or work interests through their studies (learning). The findings suggested learning led to behaviour change ranging from amended consumer behaviour, improved motivation and improved critical thinking through to improved work practices (behaviour). Finally, changed behaviours had a positive effect on participant organisations (results).

#### **5.4 Legacy**

The BioInnovation Wales team engaged in legacy planning for two years in advance of the end of the operations. It was recognised that significant investment had been made into developing online modules and a sustainable model to keep these modules available was required.

The BioInnovation Wales team, together with a wider team from IBERS, considered a range of potential operating models. An underlying assumption was the need to extend the size of the market if sufficient income was to be generated to enable Welsh participants to continue to benefit from the investment in BioInnovation Wales.

---

<sup>40</sup> See, for example, Phillips, J.J. (2004) Handbook of Training Evaluation and Measurement Methods. Jaico, Delhi, pp38-39

---

The 20 Degrees team researched a sub-set of these options as part of a 2022 evaluation exercise<sup>41</sup>.

The evaluation exercise concluded, “No *silver bullet* nor single way of promoting the BioInnovation Wales offer was identified but a combination of approaches should enable a viable business to be built.” The following approaches were recommended as options:

- Application of BioInnovation Wales learning about how to target and recruit people to individual modules using online search engines and social media channels. Although this could be scaled globally, it was suggested IBERS focussed on the UK and a manageable basket of international markets, in the first instance
- MOOCs<sup>42</sup> offer access to significant volumes of potential students, with FutureLearn aligning best with Aberystwyth University’s brand and aspirations
- Marketing portals, such as Adventus, Distance Learning Portal and Postgraduate Research could promote the BioInnovation offer
- Making use of Aberystwyth University’s recruitment agents and alumni globally
- Leveraging alumni attachment to IBERS to open conversations about in-company courses based around the online modules.
- Seeking to work with local authorities in Wales around the waste reduction and circular economy agendas.

On the basis of their work and the contribution above, the BioInnovation Wales team were able to put forward a successful business case to Aberystwyth University. The staff have been retained for a year initially and will form part of a core distance learning team for Aberystwyth University. The BioInnovation Wales modules remained on offer in a recognisable format to participants of BioInnovation Wales. The brand was transitioning to IBERS Distance Learning and marketing had begun by the IBERS team so that a new intake of students could take place after the closedown of BioInnovation Wales.

*“It seems that BioInnovation Wales is now being seen as the benchmark to which Aberystwyth University wants other departments to aspire.”*

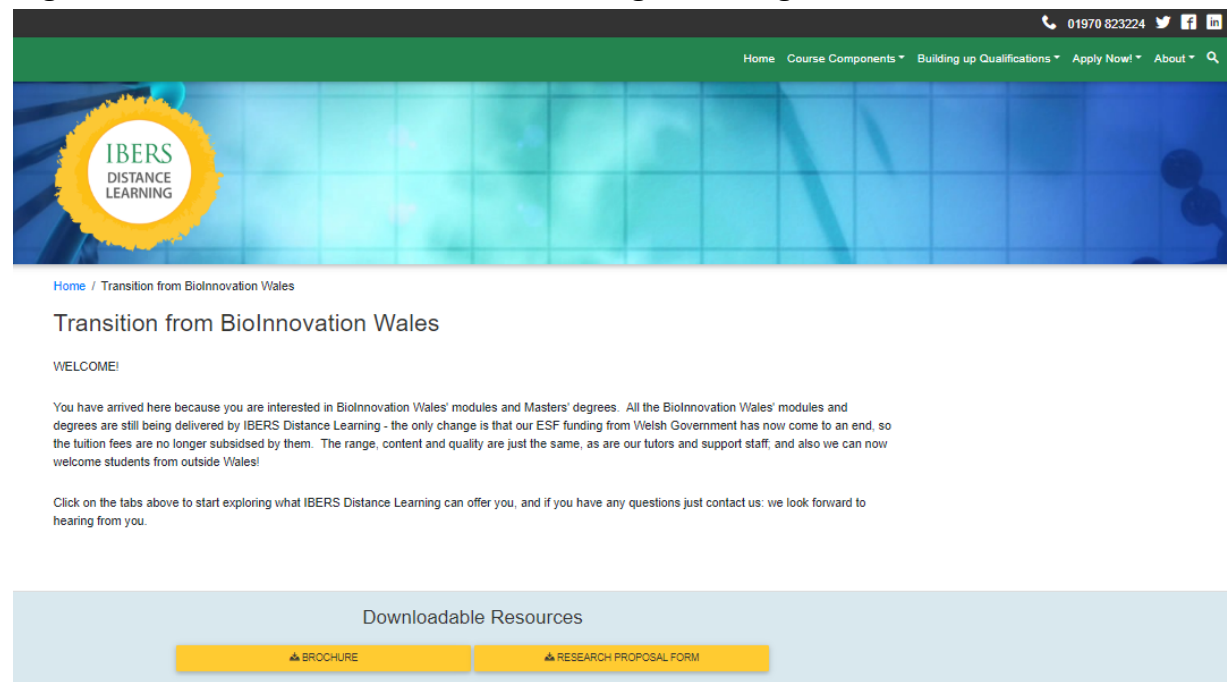
Member of BioInnovation Wales team

---

<sup>41</sup> Hughes A., West, V., Evans, C. and Woodward, S. (2022) BioInnovation Wales - West Wales & the Valleys and East Wales - Evaluation report – Legacy - April 2022

<sup>42</sup> Massive Online Open Course

**Figure 5.3 – The IBERS Distance Learning branding**



Source: A Google search for 'BioInnovation Wales' on 7<sup>th</sup> April 2023 enabled access to <https://ibersdl.org.uk/transition-from-bioinnovation-wales>

Several additional developments took place to further enable sustainability of the offer:

- The BioInnovation Wales team were experimenting with micro-credentials by offering the Controlled Agriculture module as four, five-credit modules. This fitted with the HEFCW supported development of micro-credentials elsewhere in the university<sup>43</sup>. Micro-credentials can be transferred into a larger module and ultimately contribute towards a Masters qualification.
- The university approved use of the FutureLearn MOOC from September 2022 as a vehicle to offer BioInnovation modules
- Aberystwyth University secured Commonwealth Scholarships to enable students from less developed countries of the Commonwealth to benefit from a postgraduate education.

All of these positive developments build upon the foundation of BioInnovation Wales. Analysis of tables 5.5 to 5.7 suggest 28 to 39 participants already studying with BioInnovation Wales were likely to continue with their studies, paying full fees for each module. If the assumption is made that the lower number of these students will

<sup>43</sup> Aberystwyth University (2022) Micro-credentials training programme. Accessed at <https://www.aber.ac.uk/en/abs/micro-credentialstrainingprogramme/> on 9<sup>th</sup> April 2023

---

continue their studies and each studies an average of two modules, this would yield £47,600 of income as a starting point for sustainability. Moreover, BioInnovation Wales developed positive working relationships with several companies placing multiple staff on the programme. Retaining these relationships would contribute a further element to a sustainable future.

Employers having experienced BioInnovation Wales modules at a subsidized rate tended to be open to investing in unsubsidized modules for their staff, subject to overall budget constraints.

*“The research methods module that my team member will be doing isn't funded, so we've paid for it because we believe it's important. We as senior management approve training provisions. But these courses, in particular, it's a foregone conclusion that they will benefit the organisation.”*

Employer

**Figure 5.4 – Commonwealth Scholarship offer**Source: Twitter @BioInnoWales 17<sup>th</sup> February 2023**5.4 Value for money**

The forecast eligible project costs for WWV and EW were £4,061,889 and £1,826,982 respectively. These were 7% and 12% lower than originally budgeted within the business plans and reflected a re-profile in 2020<sup>44</sup>. At the time of the evaluation, Aberystwyth University and WEFO anticipated an underspend of approximately 15% for both operations.

<sup>44</sup> BioInnovation Wales West Wales and the Valleys: full business plan, version 2, ref: C81576, p88 and BioInnovation East Wales: business plan, version 0.4, ref: C82169, pp89-90

The business plans for the two operations forecast the cost per unit of 20 credits studied as a basis for considering value for money. Table 5.8 uses business plan forecast budget and units of 20 credits to compare forecast and actual unit costs of study for WWV and EW to October 2022<sup>45</sup>.

The cost per unit of study was significantly higher than originally forecast in each operation. This largely reflected the lower than anticipated numbers of participants, given on-line module development costs were largely fixed.

**Table 5.8 – Comparison of forecast and actual unit study costs**

Operation	Business plan forecast			Actual eligible at October 2022		
	Cost (£)	Units	Unit cost (£)	Cost (£)	Units	Unit cost (£)
WWV	4,369,067	1,117	3,911	3,049,138	317	9,619
EW	2,070,705	487	4,252	1,324,556	126	10,512

Source: Programme monitoring information

The strong legacy of the operations (discussed in sub-section [5.5](#)) mean that the actual unit costs of table 5.8 will reduce over time as the sunk costs of development will be spread over a growing number of participants into the future.

<sup>45</sup> When the final evaluation report was issued in April 2023, the October 2022 financial statement was the most recent available

## 6. Progress towards cross cutting themes and case level indicator targets

### 6.1 Operations integrating sustainable development into awareness raising, education and training programmes

The findings suggested BioInnovation Wales had embedded sustainable development into its operations.

The majority of awareness raising about the operations took place through digital promotion rather than travel to face-to-face events. The use of webinars, website, e-newsletters, social media, links to Wales Online and TV commercials all played their part in this respect. As will be considered shortly, sustainable development lay at the heart of BioInnovation Wales courses. This came through within promotion. Examples of this can be seen at figure 6.1.

#### Figure 6.1 Examples of Sustainable Development awareness raising embedded in promotion

Source: Twitter @BioInnoWales 10<sup>th</sup> February 2021 and Facebook/bioinnowales 10<sup>th</sup> March 2023



**BioInnovation Wales**  
10 March at 13:15 · 🌐

13-week, online, postgraduate level course from Aberystwyth University - find out more  
<https://ibersdl.org.uk/.../distance.../ruminant-nutrition/>  
#agriculture #farming #lowcarbon #elearning #mastersdegree

**Livestock Nutrition**

**Livestock farming is a major contributor to greenhouse gas emissions,**

Another example of the way BioInnovation Wales uses sustainable development as a core theme within promotion was in sharing content about sustainability from third parties. Figure 6.2 illustrates this approach.

**Figure 6.2 Examples of Sustainable Development as a core theme of third party content shared**

Source: Twitter @BioInnoWales 8<sup>th</sup> March 2021 and Facebook/bioinnowales 27<sup>th</sup> March 2023

↳ BioInnovation Wales Retweeted

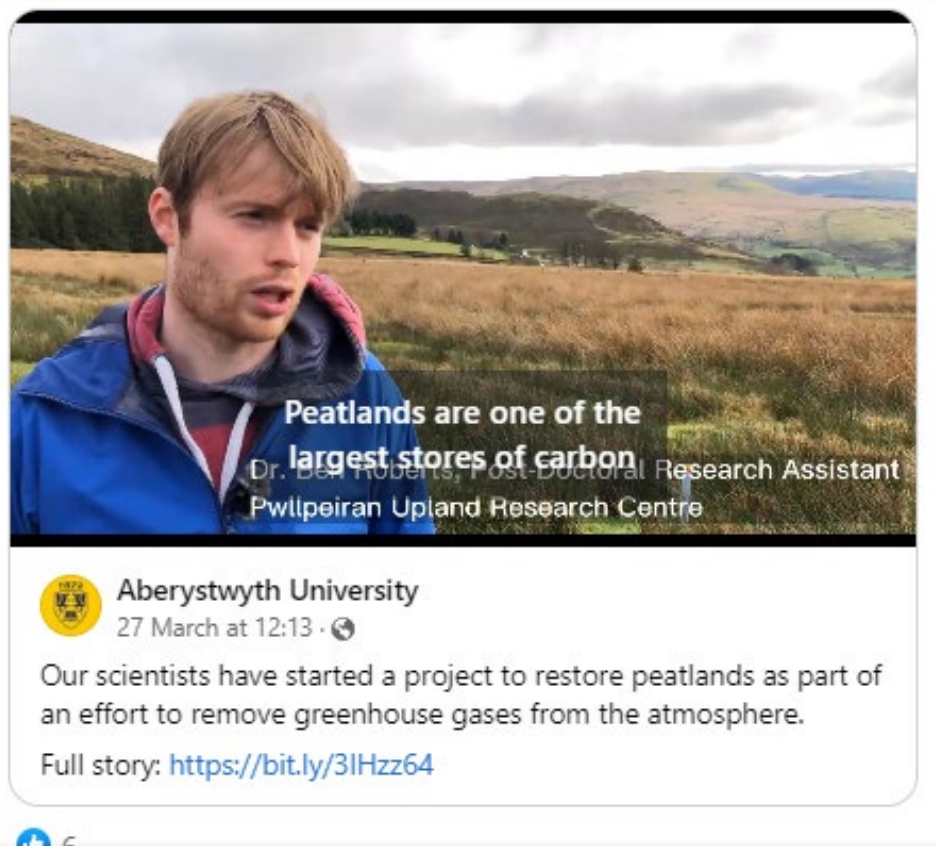
**Meat Industry App** @meatindustryapp · Mar 8

📍 Wales 'can be a global leader' in sustainable livestock farming | @FarmingUK

@HybuCigCymru 's Gwyn Howells "we're determined to minimise our emissions and maximise the carbon that we capture in our soils,"

1 4 8





Sustainable development was at the centre of the BioInnovation Wales mode of delivery. Most courses were fully online. The only courses requiring an element of on-campus attendance (and associated travel) were laboratory-based practical sessions within Swansea University courses.

Review of BioInnovation Wales courses suggested sustainable development was embedded in all modules. This manifest itself in various ways:

- Reduction of processes that generate waste or re-purposing of waste for productive use
- Shortening of supply chains to reduce energy consumption
- Reduction of agricultural and industrial processes that negatively affect biodiversity and/or public goods, such as clean air or water
- Understanding human behaviour to prompt positive change in sustainable development

Participants interviewed at the mid-term, the 2021 annual and this final evaluation confirmed that sustainable development was embedded as a core theme of all modules.

---

*“I’ve definitely learned principles of the circular economy that I only vaguely knew about before. These modules tend to encourage you to focus on the circular economy part of business.”*

WWV participant

Many participants suggested the modules had affected the way they thought about sustainable development, to the extent that many were able to give personal or business examples of positive changes.

*“The modules have made me think much more about how by-products could be used more efficiently. Where can I find gluts that might go to waste and where can they be used elsewhere in the food chain? Personally, it has made me question whether I am over shopping and throwing out too much food.”*

WWV participant

Where participants did not change their minds about sustainable development, all suggested this was because it was already part of their thinking. Some suggested it was this interest in sustainable development that had led them to study BioInnovation Wales modules initially.

*“I don’t know if it has [changed views about sustainable development]. I’ve been doing this for so long. It’s certainly given me more of an insight into the circular economy than I did have before, and how waste can be utilized or monitored even more effectively.”*

WWV participant

## **6.2 Resource efficiency measures**

This case level indicator was largely a subset of the CCT Sustainable Development indicator considered in 6.1. Specifically:

- Travel was being minimised due to promotion being primarily digital
- Travel was being further minimised due to delivery being mainly online
- The predominantly online nature of delivery meant that heating and lighting of physical lecture spaces was unnecessary, although energy was required to host content servers and for staff and participants to engage with content.
- Waste reduction and sustainable development measures were key messages to the public through promotion.
- Waste reduction and sustainable development were key messages to participants through course content. The findings showed that resource

---

efficiency measures were being implemented by some participants as result of participation in BioInnovation Wales.

Minimisation of travel was supported by Aberystwyth University having an organisational travel plan which encouraged sustainable transport initiatives.

### **6.3 Equal opportunities and gender mainstreaming**

#### **6.3.1 Positive action measure – women**

The BioInnovation Wales team recognised the importance of role models to encourage female participation in the operations. While many of the images on the BioInnovation Wales website were gender neutral, typically using images of objects rather than people, where people were shown, women tended to be significantly more prominent. For example, the key image illustrating the ‘Work based Research Projects’ theme was a woman. The major area in which positive action was apparent was in case studies on the website. Four of the five case studies were of women.

Table 6.1 illustrates the breakdown of male versus female messaging for each module from the BioInnovation Wales website. 53% of modules had a testimonial from female participants, whereas only 33% of modules had male participant testimonials. Moreover, there were twice as many testimonials from female relative to male participants.

Case studies used on the website were similarly used in social media channels (Twitter and Facebook) and reflected the proportions used within the website<sup>46</sup>.

The messaging of the BioInnovation Wales programme brochure<sup>47</sup> was analysed similarly. Table 6.2 reproduces the results. The 2021 annual evaluation found images and case studies in the brochure tended to be gender neutral but where gender was identifiable images and case studies tended to support positive action to encourage female participation<sup>48</sup>. Table 6.2 suggests a balanced approach to gender messaging, rather than positive action in support of women or female participation in STEM. Interviews with members of the BioInnovation Wales team suggested this approach was intentional.

---

<sup>46</sup> An example of a female role model: Twitter @BioInnoWales ‘Carol’ posted 4<sup>th</sup> September 2020

<sup>47</sup> BioInnovation Wales (2021) BioInnovation Wales – Postgraduate E-Learning 2021-2022 Guide. Available at [file:///C:/Users/alunh/Downloads/BI Brochure April 2021 English DIGITAL SP.pdf](file:///C:/Users/alunh/Downloads/BI%20Brochure%20April%202021%20English%20DIGITAL%20SP.pdf). Accessed 16<sup>th</sup> November 2021

<sup>48</sup> Hughes, A. and Woodward, S. (2021) BioInnovation Wales - West Wales & the Valleys and East Wales Annual evaluation report - December 2021, p26

*“A lot of effort has gone into making sure the marketing and the module design are accessible and gender neutral.”*

Member of the BioInnovation Wales team

**Table 6.1 – Overview of gender messaging implicit in module-level promotion (BioInnovation Wales website)**

Module	Tutors		Testimonials	
	Male	Female	Male	Female
Behaviour Change	-	1	1	1
Controlled Environment Agriculture	2	-	-	2
Fermentation for Food Applications	3	-	-	-
Future of Packaging	1	-	1	1
Horticultural Science	1	1	-	-
Life Cycle Assessment and Beyond	1	-	1	-
Livestock Health and Welfare	1	-	-	-
Meat Processing	1	-	-	2
Membrane Filtration Technologies	2	-	1	-
Microalgal Technologies – Progress Towards a Circular Economy	2	-	-	-
Precision Livestock	1	-	-	1
Public Goods	1	1	-	-
Research Methods	1	-	-	1
Sustainable Supply Systems	2	-	1	1
Waste Resource Management	1	-	-	1

**Table 6.2 - Overview of gender messaging implicit in BioInnovation Wales brochure**

	Male	Female
Number of images	9	7
Number of images overtly linked to STEM careers	1	1
Number of case studies	8	9

Staff involved in BioInnovation Wales were keen to point out that staff at Aberystwyth University are appointed on merit. Consideration of 6.1 suggests modest female involvement in module delivery, with only three of 15 modules involving female tutors i.e. 20%. The 2021 annual evaluation highlighted involvement of eight female

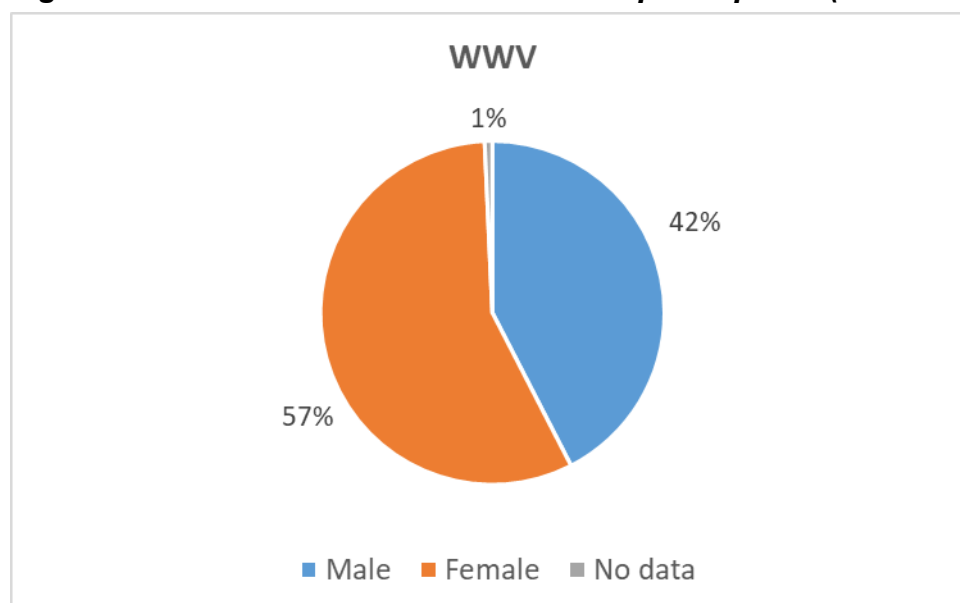
members of staff involved in delivery<sup>49</sup>. One was the Programme Manager, one the Operations Coordinator and one the Deputy Teaching Group Leader i.e. senior members of the team. It was suggested naming one of these senior members of the team alongside the tutors in module-level promotion on the website, perhaps the Programme Manager, would significantly alter the balance of messaging about female involvement in the course. This recommendation did not appear to be accepted. The most recent version of the brochure (November 2022) made no reference to the staff involved in delivery, seemingly reinforcing a gender-neutral stance more apparent in the final year of the programme.

BioInnovation Wales business plans set out targets for involving females in the operations. Both operations were exceeding female participation targets, as indicated in table 6.3 and illustrated in figures 6.3 and 6.4.

**Table 6.3 – Progress towards female participant targets**

	Target	Output
Percentage of female students – WWV	50%	57%
Percentage of female students – EW	50%	61%

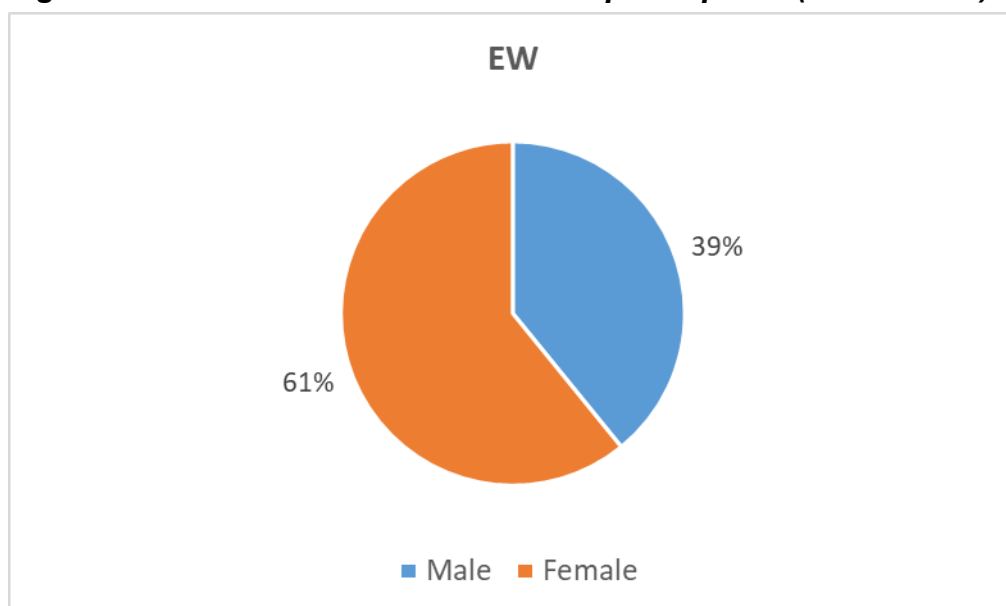
**Figure 6.3 – Gender breakdown for WWV participants (March 2023)**



(n=139 – 79 female: 59 male: 1 undefined)

<sup>49</sup> Hughes, A. and Woodward, S. (2021) BioInnovation Wales - West Wales & the Valleys and East Wales Annual evaluation report - December 2021, p27

**Figure 6.4 – Gender breakdown for EW participants (March 2023)**



(n=46 – 28 female :18 male)

The BioInnovation team suggested the main factor affecting gender of participants appeared to be the subject of particular modules offered, potentially reflecting relative numbers of males and females in particular sub-sections of the bio-business workforce. For example, female participation in Behaviour Change modules was 77% (n=30), whereas the Horticulture module had a more balanced representation (46% male: 54% female where n=13).

### **6.3.2 Activity supporting female participation in STEM**

As noted in the previous section, promotion via the BioInnovation Wales website incorporated a significantly higher proportion of female testimonials than male, and marginally more female case studies. These case studies and testimonials served as female role models promoting participation in STEM.

More generally, the choice of website images used to promote the programme, when not neutral, tended to promote female participation in STEM by promoting normative images of females working in STEM environments. For example, the key image illustrating the 'Work Based Research Projects' theme was a woman working in a laboratory environment.

The website had a case study explicitly celebrating the programme's achievements in encouraging female participation in STEM<sup>50</sup>. It used the example of a female new to higher education study. Unlike stereotypical images of women in laboratories, this case study looked at how the individual was studying to help her endeavours in community development. A promotional collaboration between BioInnovation Wales and Wales Online took this case study and created an engaging story about the subject of the case study<sup>51</sup>.

The case study above stated BioInnovation Wales was designed to be flexible enough to support people balancing work with caring responsibilities. It further suggested women were more often in that priority balancing situation than men. The implicit message was that the course supported women in STEM to develop their careers.

The use of case studies on the website to promote female engagement in STEM was used similarly in social media content (Twitter and Facebook) and newsletters. An example could be seen in the March 2022 BioInnovation Wales newsletter, where a student, Amanda Wood, identified the benefits of vertical farming<sup>52</sup>.

### **6.3.3 Activity supporting speakers of the Welsh language**

The BioInnovation Wales website had a Welsh language version which was identical to the English language version<sup>53</sup>. The Welsh language site provided links to a Welsh language course brochure and a Welsh language Twitter account. Links to Facebook and LinkedIn were to English language versions of these platforms.

BioInnovation Wales processes captured each participant's language preferences on first contact. This enabled all subsequent contact to be in Welsh where that reflected the participant's preference. Table 6.4 reflects participant capability and recorded preferences regarding the Welsh language.

---

<sup>50</sup> BioInnovation Wales (2021). Case Study – Women into STEM. Available at <https://archived.bioinnovationwales.org.uk/about/news-media/case-study-women-into-stem>. Accessed 5<sup>th</sup> April 2023

<sup>51</sup> Ramsey, W. (2021). Meet the working mum following her passion through a low cost Masters degree. Wales Online. Available at <https://www.walesonline.co.uk/special-features/meet-working-mum-following-passion-22053427> Accessed 5<sup>th</sup> April 2023

<sup>52</sup> BioInnovation Wales (2022) What have our students been up to? Available at <https://youtu.be/mZCMsf2kOME>. Accessed 4<sup>th</sup> April 2023

<sup>53</sup> Accessed at <https://archived.bioinnovationwales.org.uk/cy> on 6<sup>th</sup> April 2023

**Table 6.4 Welsh language capabilities and preferences**

	<b>WWV (n=139)</b>	<b>EW (n=46)</b>
	<b>No. (%) participants</b>	<b>No. (%) participants</b>
Understand Welsh	76 (55%)	18 (39%)
Read Welsh	60 (43%)	14 (30%)
Welsh speaker	58 (42%)	13 (28%)
Write Welsh	51 (37%)	11 (24%)
Preference for Welsh communications	9 (6%)	2 (4%)
Wish to study in Welsh	4 <sup>+</sup> (3%)	0 (0%)

Source: BioInnovation Wales monitoring system

<sup>+</sup> One further participant expressed a preference to study partially in Welsh, which would increased those wishing to study in Welsh to 4% for WWV.

The BioInnovation Wales team ensured at least one module offered to each intake had a Welsh language version. Additional modules using the Welsh language were developed around module choices of participants already studying through the medium of Welsh.

While few students sought to study in Welsh exclusively, more were open to elements of communication being in Welsh. The findings suggested this was proactively encouraged by the BioInnovation Wales team. BioInnovation Wales appointed a Welsh Language Associate Lecturer to act as a personal tutor to support the approach. This enabled all participants to communicate, submit assignments and post on forums in their preferred language. A new appointee in late 2021, a Food Science Lecturer, was also fully bilingual and able to support learning through the medium of Welsh.

Participant interviews from all three waves of the evaluation indicated all were aware of the Welsh language offers available. None of the Welsh speakers interviewed had chosen to study exclusively in Welsh but they were grateful for the offer. Some exchanged e-mails with tutors or made forum posts (part of assessment) in Welsh. A minority had watched introductory videos in Welsh and noted that tutors made bilingual posts to students. Some participants noted the availability of film transcripts in Welsh.

*“Welsh language folks have been in touch offering support in Welsh if I want it.”*

WWV participant



**Table 6.5 Percentage of Welsh speakers participating**

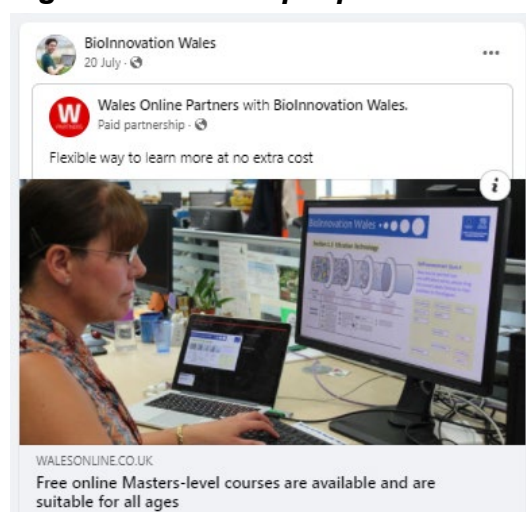
	Target	Output
WWV (n=139)	25%	42%
EW (n=46)	25%	28%

Table 6.5 illustrates levels of Welsh speaker participation in BioInnovation Wales exceeded targets set within the business plans for WWV and EW, significantly so for WWV.

### 6.3.4 Positive action measure – older workers

There were limited examples of older people's images on the BioInnovation Wales website or within the course brochure. However, a case study about a 61-year old participant was available on the website and shared on social media (Twitter and Facebook)<sup>54</sup>. This was further turned into an engaging article through a promotional partnership with Wales Online to promote BioInnovation Wales to potential older participants<sup>55</sup>. This was promoted via Facebook and Twitter by Wales Online and shared by BioInnovation Wales.

**Figure 6.3 – Example positive action for older people – Facebook 20<sup>th</sup> July 2021**



While the positive measures taken to encourage older people to participate in BioInnovation Wales were modest, table 6.6 illustrates levels of participation were significantly higher than targeted in the business plans.

<sup>54</sup> BioInnovation Wales (2021) Case Study Older People. Available at <https://archived.bioinnovationwales.org.uk/about/news-media/case-study-older-people>. Accessed 6th April 2023

<sup>55</sup> Peregrine, C. (2021). Free On-line Masters-level courses are available and they are suitable for all ages. Wales Online. Available at [https://www.walesonline.co.uk/special-features/free-online-masters-level-courses-21070621?fbclid=IwAR3RVt-1n25Jq\\_xmJVmSk3vQzj6CdaXlvshI530gkL33tZTUq6F9CQqpunA](https://www.walesonline.co.uk/special-features/free-online-masters-level-courses-21070621?fbclid=IwAR3RVt-1n25Jq_xmJVmSk3vQzj6CdaXlvshI530gkL33tZTUq6F9CQqpunA). Accessed 6th April 2023

**Table 6.6 Progress towards older workers' participation targets (Aged 50+)**

	Target	Output
<b>WWV</b> (n=139)	10%	20%
<b>EW</b> (n=46)	10%	24%

#### **6.4 Tackling poverty and social exclusion - Organisations paying the living wage**

Both Aberystwyth and Swansea Universities were Real Living Wage Employers. Both promote this via their websites<sup>56</sup>.

#### **6.5 Developing / engaging CCT Champions**

The operations had two CCT Champions: the Programme Manager and the Operations Coordinator. These post holders were chosen due to their roles having contact with all members of BioInnovation staff and participants. Both had a prior interest in sustainable development evidenced through their previous careers and personal interests. The Programme Manager had an MSc in Environmental Impact Assessment and the Operations Coordinator a BSc in Countryside Management, suggesting interests in sustainable development were long-standing. They both had training to develop their appreciation of CCT issues while working at Aberystwyth University, for example in Diversity.

A variety of examples of their work as CCT Champions were available in the findings. Development of case studies reflecting on the operations' actions to promote female participation in STEM and older workers' participation have been highlighted already ([6.3.2](#) and [6.3.4](#) respectively). Another example was directing the Business Development Officer to attend a series of Circular Economy development sessions at Swansea University during October 2021. In practice, the interests of BioInnovation Wales academic staff led them to engage with CCT activities without significant prompting from CCT Champions. For example, the Sustainability Lecturer led discussions around food sustainability at a Holden Farm Dairy event in August 2021<sup>57</sup> after members of the team shared insights at the Royal Welsh Show in July of that year.

<sup>56</sup> Aberystwyth University (2018) Real living wage accreditation for university. Available at <https://www.aber.ac.uk/en/news/archive/2018/11/title-218321-en.html>.

Swansea University (2023) Jobs and working at Swansea. Available at <https://www.swansea.ac.uk/jobs-at-swansea/>. All accessed 6<sup>th</sup> April 2023

<sup>57</sup> Holden Farm Dairy is the maker of Hafod Organic Cheese. Further information available at <https://www.holdenfarmdairy.co.uk/hafod-cheese>. Accessed 24<sup>th</sup> November 2021

**Figure 6.4 – Example of the BioInnovation Wales team sharing insights about the circular economy and sustainable farming at the Royal Welsh Show, July 2021**



## 6.6 Contribution to the goals of the Well-being of Future Generations (Wales) Act 2015

The seven well-being goals of the Well-being of Future Generations (Wales) Act 2015 will be considered in turn. In each case, the definition of the Well-being Goal is taken from the website of the Office of the Future Generations Commissioner for Wales<sup>58</sup>.

### **A prosperous Wales**

*“An innovative, productive and low carbon society which recognises the limits of the global environment and therefore uses resources efficiently and proportionately (including acting on climate change); and which develops a skilled and well-educated population in an economy which generates wealth and provides employment opportunities, allowing people to take advantage of the wealth generated through securing decent work.”*

<sup>58</sup> Office of the Future Generations Commissioner for Wales (2020) Seven Well-being Goals. Available at <https://www.futuregenerations.wales/about-us/future-generations-act/>. Accessed on 24<sup>th</sup> November 2021.

As discussed within [6.1](#) and [6.2](#), BioInnovation Wales made positive contributions to sustainable development and resource efficiency. These related directly to the low carbon society agenda. It did this while raising knowledge and skills levels of workers to CQFW level 7. Embedded within the learning for those reaching the Masters stage was a focus on research and innovation. Key aims of the programme were to enable participants to move into or develop rewarding careers in the food production/processing or bioscience sectors. Findings from the three waves of this evaluation suggested learning from participation in BioInnovation Wales translated into cost-reducing or income generating (through re-purposing waste) activities by businesses.

*“It got me thinking about being more environmentally conscious. I started noticing things more and bring more things up at work.”*

EW participant

In light of the above, it was concluded that BioInnovation Wales was making comprehensive contributions to this well-being goal.

### **A resilient Wales**

*“A nation which maintains and enhances a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change.”*

A review of module units suggested this approach was embedded within the modules delivered by BioInnovation Wales<sup>59</sup>. There were references within unit descriptors to such issues as circular economy solutions, understanding greenhouse gas (GHG) emissions and biodiversity. Just taking one module as an example, Public Goods, issues of ecosystem services such as nutrient cycling, the importance of biodiversity to health and culture and the problems of agricultural run-off into water systems illustrate the depth to which sustainable thinking was embedded in the learning materials.

---

<sup>59</sup> Module themes and units can be found at <https://archived.bioinnovationwales.org.uk/>. Accessed 4<sup>th</sup> April 2023

**Figure 6.5 – Examples of module descriptions from course brochure illustrating sustainable thinking embedded in modules**



## Future of Packaging

Learn the facts about plastic and develop a sustainable packaging strategy for your business

With around one third of our food wasted, and in the context of the ongoing scandal of plastic pollution, the packaging used for our food and drinks is the source of critical problems and potential solutions for achieving Food Security and a more sustainable society. The aim of this module is to assess the challenges and opportunities around packaging, and to provide businesses with the tools to develop their own packaging strategies as we transition to zero-carbon.

## Horticultural Science

Explore the underlying scientific principles that unlock sustainable horticulture.

This module provides a robust understanding of the scientific principles that will prepare students with a common language and fundamental knowledge base to respond to critical global challenges, including: climate change mitigation and adaptation, food security, halting biodiversity loss, and the transition to a zero-carbon economy within this diverse sector. It will cover above- and below-ground biology, the interactions that enable plant health, and the micro and macro environmental strategies that can be utilised to maximise plant performance and/or ecosystem services.

Source: BioInnovation Wales course brochure (November 2022) available at <https://archived.bioinnovationwales.org.uk/study-options/distance-learning>. Accessed 4<sup>th</sup> April 2023

### **A more equal Wales**

*“A society that enables people to fulfil their potential no matter what their background or circumstances (including their socio-economic circumstances).”*

BioInnovation Wales primarily targeted people in employment Table 6.7 illustrates the number of participants employed or unemployed.

**Table 6.7 Percentage of participants employed or self-employed**

	<b>Output</b>
<b>WWV</b> (n=139)	92%
<b>EW</b> (n=46)	91%

Table 6.7 suggests a minority of participants were primary carers of children.

**Table 6.7 Percentage of participants who were the primary carer of children**

	<b>Output</b>
<b>WWV</b> (n=139)	32%
<b>EW</b> (n=46)	33%

Balancing work, other commitments and learning can be too challenging if learning requires regular attendance at a university, particularly for participants living significant distances from the university. The distance learning mode offered by BioInnovation Wales and the structured yet flexible approach to learning was reportedly compatible with balancing the circumstances of individual participants.

*“The fact it was distance learning as well was attractive so I could fit it in around my business and busy life.”*

WWV participant

A minority of participants were unemployed and BioInnovation Wales offered a way of gaining qualifications to retrain or upskill.

The majority of participants did not hold level 7+ qualifications prior to joining BioInnovation Wales, as can be seen from table 6.8. This suggests the programme enabled the majority of participants to extend their learning ambitions, possibly realising their academic potential.

**Table 6.8 – Previous highest level of qualification**

CQFW level	WWV (n=139)	EW (n=46)
1	0 (0%)	0 (0%)
2	0 (0%)	1 (2%)
3	3 (2%)	2 (4%)
4	5 (4%)	1 (2%)
5	3 (2%)	2 (4%)
6	91 (65%)	27 (59%)
7	28 (20%)	11 (24%)
8	5 (4%)	0 (0%)
Unknown	4 (3%)	2 (4%)

N.B. Rounding error where total does not sum to 100%

Interview findings with participants suggested the level of fees for individual modules were viewed favourably and were felt to be widely accessible. The fee waiver introduced by Welsh Government for the period July 2020 to August 2021 made affordability even less of an issue.

*“I’ve wanted to do a Masters for a long time and the biggest barrier was always cost.”*

WWV participant

### **A healthier Wales**

*“A society in which people’s physical and mental well-being is maximised and in which choices and behaviours that benefit future health are understood.”*

This goal was addressed indirectly rather than explicitly. The agri-food sector was a key focus for BioInnovation Wales. A review of modules suggested production and processing of nutritious food and drink was embedded. Similarly, issues such as effective waste management, carbon sequestration and reduction of Green House Gas emissions were embedded within modules. The importance of managing a landscape for biodiversity (to help support natural body immunity) and enable exercise in the outdoors were also embedded, for example in the Public Goods module. All these issues have a bearing on future health of the population. Learning about choices and modifying behaviours around such topics would have a direct bearing on the future health of society.

*“As a result of those modules, it really inspired me to think about how I can influence consumer behaviour and eating behaviours of the general population”*

*and improve nutrition. I wanted to approach it through schools and looking at school gardening programmes.”*

WWV participant

### **A Wales of cohesive communities**

*“Attractive, safe, viable and well-connected.”*

Although this was a weaker theme within BioInnovation Wales, it was discernible. The viability of largely rural communities, where agri-food businesses tend to be based, rests on those businesses remaining competitive. It has already been noted in consideration of the first well-being goal that BioInnovation Wales sought to do this as an over-arching aim. Moreover, the attractiveness of the communities would, in part, be influenced by issues of sustainable development which have been noted as embedded. For example, minimisation of waste and reduced degradation of the countryside result in them maintaining their attractiveness.

### **A Wales of vibrant culture and Welsh language**

*“A society that promotes and protects culture, heritage and the Welsh language, and which encourages people to participate in the arts, and sports and recreation.”*

Promotion of the Welsh language and opportunities for participants to use and develop their Welsh language skills was considered in [6.3.3](#). They were areas that participants recognised BioInnovation Wales had addressed explicitly and effectively.

Arts, sports and recreation were not explicit concerns of BioInnovation Wales. Nonetheless, aspects of learning touched on cultural heritage. Taking the Public Goods module as an example, the concept of agricultural environments being both productive yet attractive to visitors and part of rural culture was embedded in the learning materials.

### **A globally responsible Wales**

*“A nation which, when doing anything to improve the economic, social, environmental and cultural well-being of Wales, takes account of whether doing such a thing may make a positive contribution to global well-being”*

As considered within the *resilient Wales* Well-being Goal, modules embedded the interconnectedness of Wales with the wider world. Remaining with the example of the Public Goods module, it taught participants about the worst impacts of Green House Gas emissions being experienced by people in countries other than the polluter. Similarly, waste was often exported from richer nations to less developed nations.



Raising understanding about such issues played directly into the Well-being Goal, if followed through with action.

### 6.7 Progress towards other cross cutting theme targets

Table 6.9 summarises other CCT characteristics captured within monitoring information. These were self-identified characteristics.

**Table 6.9 – Additional CCT indicators (March 2023)**

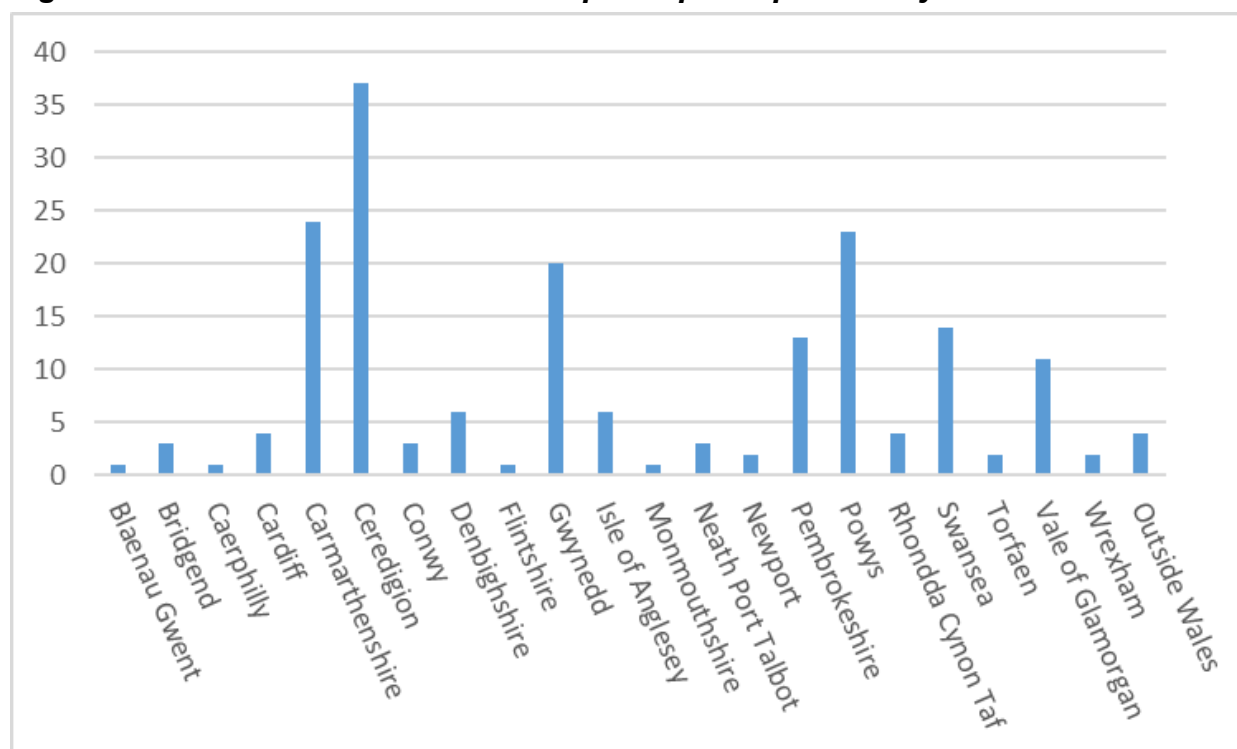
Indicator	WWV		EW	
	Target	Actual	Target	Actual
Age (25+)	80%	83%	80%	89%
Age (50+)	10%	21%	10%	26%
Participants with work-limiting health conditions or disabilities	5%	7% <sup>a</sup>	5%	7% <sup>a</sup>
Black, Asian and minority ethnic	4%	1%	4%	0%
Welsh speaking	25%	42%	25%	28%

(*n*=139 for WWV, *n*=46 for EW)

<sup>a</sup> This represents a lower limit, one participant declined to indicate whether they had a work limiting health condition in WWV and two declined to respond in EW.

Age related targets were exceeded, particularly for the over 50 age category. Such encouragement of lifelong learning may be viewed positively. Whether it is positive in terms of this programme’s aims depends on the extent that learners were based in bio-businesses and were not simply retired hobbyists. The sample of interviewees did not suggest any cause for concern. Interviewees were mainly based within the sector. Where people were retired or working in another sector, they tended to be sharing their learning with others within the sector or were helping to start new ventures within the sector.

Table 6.9 suggests there was only one person self-identifying as from a Black, Asian or minority ethnic background. Part of the reason for low Black, Asian and minority ethnic participation may be understood from the places where participants lived. Food production and processing businesses tend to be based in more rural parts of Wales. This tends to be reflected in locations where participants live and work. Figure 6.6. indicates where participants lived. StatsWales suggested people from Black, Asian and minority ethnic backgrounds were least well represented in rural counties such as Carmarthenshire, Ceredigion, Pembrokeshire and Powys (reproduced in [annex D](#)) i.e. counties with relatively large numbers of participants.

**Figure 6.6 – Breakdown of number of participants per county of domicile**

While the BioInnovation team indicated that they used a diverse range of images to resonate with different ethnic groups, there was little evidence to suggest more proactive measures were being taken to recruit people from Black, Asian and minority ethnic communities, such as developing relationships with regional equality networks or equalities and diversity officers in large employers targeted by the programme. This had been recommended in the mid-term evaluation<sup>60</sup>.

Progress in recruiting people who identified as disabled people or people with working limiting health conditions was above targets. Nonetheless the findings did not suggest this was attributable to proactive engagement with disabled people's organisations, equalities organisations nor equality and diversity officers in large employers, again recommended in the mid-term evaluation.

The relatively large number of Welsh speakers, particularly amongst WWV participants was likely to reflect the counties from which participants were largely drawn. If figure 6.6 is compared with the breakdown of speakers by Welsh county ([annex E](#)), the aligned peaks within Carmarthenshire, Ceredigion and Gwynedd are apparent.

<sup>60</sup> Hughes, A. and Woodward, S. (2020) Interim Evaluation of the BioInnovation Wales West Wales & the Valleys and East Wales Projects, 20 Degrees Consulting Ltd, p50

---

## 7. Conclusions and recommendations

### 7.1 Conclusions

#### 7.1.1 Rational, design and processes

The rationale for the BioInnovation Wales programme held throughout the lifetime of the programme. There was good alignment with Welsh Government policy and addressing sector skills shortages across the UK. There was no evidence that the programme duplicated other provision nor displaced commercially available provision.

The findings suggested on-going efforts to ensure the design, content and mode of delivery were demand-led (employers and employees) and built on demonstrable expertise, including learning from previous programmes. Multiple channels existed to capture potential and current student feedback. The findings indicated the programme team acted on learning from that feedback to modify and improve content and processes for future cohorts.

Governance of the programme was fit for purpose, with clear linkage to senior managers at Aberystwyth and Swansea universities. Representatives of participants, bio-businesses and support organisations were embedded within the governance structure.

A positive working relationship was apparent between the two universities, particularly at the academic level. Mutual benefit from the partnership was demonstrable. However, a recurring theme of the findings was the potential to streamline registration (enrolment) and finance practices for participants, particularly those participants that studied modules from both universities.

Gaps in the staff complement were apparent at various points in the programme's lifetime. These slowed module development and recruitment in the early stage of both operations and again slowed recruitment from April 2022 onwards.

The findings suggested multiple means of promotion were effective:

- Direct engagement with potential participants / employers at physical events
- Provision of a website
- Use of social media, particularly using filmed content on Facebook where potential participants were targeted through profiling and pay-per-click advertising
- Personal recommendation, with the role of line managers featuring highly in the importance of recommendations translating into enrolments

- 
- Radio and TV advertisements.

### **7.1.2 Characterising participants and CCT progress**

BioInnovation Wales had notable success in attracting female participants, with 57% and 61% female participants in WWV and EW respectively. This was viewed positively in terms of encouraging females into STEM subjects.

Similarly, the programme exceeded its target of attracting participants identifying as disabled people or having work limiting health conditions (7% relative to a target of 5% for each of WWV and EW).

The findings suggested few people from Black, Asian and minority ethnic backgrounds participated in BioInnovation Wales, with very limited progress towards the 4% target for each of WWV and EW. This may reflect Black, Asian and minority ethnic communities being centred more in urban areas and the majority of participants being more rurally based. However, there was also an element of some participants not identifying as Black, Asian or minority ethnic when their ethnicity might have suggested such a characterisation.

The programme was designed to support people of working age, ideally not those newly graduated with an undergraduate degree. The majority of participants fitted this profile, with 83% and 89% being 25 years of age or older from WWV and EW respectively. Moreover, 92% and 91% of participants in WWV and EW respectively were in work. The programme exceeded targets of participants aged 50 years or older, with 21% and 26% in WWV and EW respectively against a target of 10% in each operation.

While the programme delivered well against the above targets, this could not be attributed to proactive measures to recruit participants with these characteristics. Promotion tended to adopt an intentionally neutral stance on matters of gender, for example. The findings suggested good programme design was a more significant factor in recruiting participants with minority backgrounds than proactive promotional measures. For example, flexibility around time spent learning and place of learning may have been more attractive to some disabled people than scheduled learning times at a campus.

Recruitment of Welsh speaking participants was the exception to the above conclusion. While good programme design was certainly a factor in strong recruitment, as were the localities in which participants lived, there was clear evidence of proactive Welsh language promotion within the findings. The result was 42% and 28% of

---

participants being Welsh speakers in WWV and EW respectively, against a target of 25% in each area.

Participants lived in every county of Wales except Merthyr Tydfil, but the majority lived in more rural areas, most notably in Ceredigion, Powys, Carmarthenshire and Gwynedd. In part this reflected areas where agri-food businesses tended to be based. The findings suggested that, despite this being a distance learning programme, some participants had an affinity for study with Aberystwyth University based on general proximity / prior knowledge of the institution.

The programme was designed to support people for whom attendance at a university might be problematic due to other commitments. Almost a third of participants in WWV and EW were primary carers of children. Coupled with employment findings, it is reasonable to conclude participants largely fitted this target profile.

Participants tended to have an undergraduate or postgraduate degree prior to studying with BioInnovation Wales. Given the higher-level nature of the learning, that may not be surprising. Nonetheless, 8% and 12% of participants from WWV and EW respectively commenced with previous qualifications at level 5 or lower. 2% and 6% of participants in WWV and EW respectively held highest qualifications at levels 2 or 3 prior to studying with BioInnovation Wales, suggesting a positive contribution to widening participation.

The programme met its targets of tackling poverty and social exclusion and in engaging / developing CCT champions.

Sustainable development was an area where BioInnovation Wales excelled. The findings indicated this theme was strongly embedded within the programme and was consistently discussed by interviewees. The resource efficiency measure targets for WWV and EW were met. The programme similarly contributed to the well-being goals of the Well-being of Future Generations (Wales) Act 2015. Table 7.1 summarises contributions.

**Table 7.1 – Contributions to the Well-being of Future Generations (Wales) Act 2015**

Well-being goal	Clear, direct contribution	Partial or indirect contribution
A prosperous Wales	✓	
A resilient Wales	✓	
A more equal Wales	✓	
A healthier Wales		✓
A Wales of cohesive communities		✓
A Wales of vibrant culture and Welsh language	✓	
A globally responsible Wales		✓

### 7.1.3 The experience

Motivations for joining the programme were varied but an interest in the topics of study was the strongest theme. This interest was personal for around half of participants and work-related for the other half. The learning itself was a motivator for most, but just under a half of participants were motivated by the prospect of gaining a qualification at Masters-level. Potential benefits to the business summarised the rationale for supporting employees in their BioInnovation Wales studies for most employers.

A detailed review of the participant experience suggested application processes to the programme could be streamlined. These findings chiefly related to enrolment and finance processes which appeared to be designed for the benefit of different university departments rather than for ease of completion by applicants. This extended to different processes and duplicated effort for participants enrolling on modules at the two different universities.

Quality of teaching and course content were typically regarded as strongly positive features of the programme. Some participants found online learning challenging, but tended to indicate this reflected their past experience or learning style rather than deficiencies in the programme. Strengthening of participant-tutor and participant-participant engagement was suggested by some as areas for development. Use of forums for assessment drew polarised views, as they had throughout the programme.

Support for participants was generally perceived as a strong feature of the programme, regardless of whether academic or administrative staff provided it. The flexibility of the programme (design) and programme staff also came through as a strong theme from participants.

---

Welsh language support was noted by participants and appreciated but not strongly used. Support for disabled students was available but participants felt they had to ask for that support, typically, rather than have it offered proactively. An example would be alternative font sizes or colour contrasts for learning materials.

#### 7.1.4 Progress towards outcomes

Progress towards participant targets was limited, with outputs at 39% and 27% for WWV and EW respectively. The mid-term evaluation recognised the targets were challenging but consistently increasing recruitment patterns were in line with the *snowball effect* predicted for recruitment in the business plans for the operations. These suggested targets were achievable (at least within programme tolerance) but required a greater focus on recruitment.

The findings suggested diminishing levels of recruitment in the second half of the programme may be attributed to the following factors:

- Reduction in engagement with companies and business intermediaries due to reduced business development capacity following the Business Development Officer leaving the programme.
- A change in the business environment post COVID-19, with less capacity for training as employers needed to re-focus staff on direct income-generating activities. A feature of this period was the loss of the furlough scheme in 2021, reducing availability for study for some.
- Withdrawal of the Welsh Government fee-waiver scheme in March 2022. While participants tended to acknowledge the subsidised £165 price per module remained good value for money, the *loss aversion* phenomenon meant the withdrawal of the fee waiver appeared to create a significant barrier to engagement for some.

The target number of enterprises with which the learning provider collaborated in research and innovation was inappropriately defined in the business plan, relative to the WEFO guideline definition. This translated into an inappropriately high target output. This was identified in the mid-term evaluation but was not re-profiled. If that re-profiling had taken place plus collaborative agreements had been put in place between enterprises and the university, progress would have been 57% and 65% to target for WWV and EW respectively.

Regardless of any re-profile, only three collaborative agreements were put in place. It was suggested the Aberystwyth University agreements were too biased towards the university holding intellectual property rights, so companies did not wish to sign.

A consequence of the lack of reprofiling and an ineffective collaborative agreement process was progress towards target being limited to 1% of targets for each of WWV and EW.

The link between participant outputs and results (males and females exiting the two programmes with qualifications at level 7+) led directly to limited progress towards results for both operations. The slow start to recruitment for both operations was a contributory factor also. Consequently, the anticipated results by programme close were 17% and 9% of targets for males having sufficient credit to exit with a qualification in WWV and EW respectively. The corresponding results for females were 24% and 14% of targets for WWV and EW respectively. Qualitative findings suggested a subset of participants would continue to study BioInnovation Wales modules at an unsubsidized rate. At the time of the evaluation, it was not possible to determine the extent that expressed willingness to pay would translate into actual willingness to pay. If instead an estimate is made that 50% of participants would continue to study modules within five years of first enrolment, such that they successfully complete assignments for a minimum of three modules, the results could reflect table 7.2.

**Table 7.2 – Estimate of ultimate results from BioInnovation Wales**

Indicator	WWV		EW	
	Target output	Potential output (Percentage of target)	Target output	Potential output (Percentage of target)
Gaining a qualification upon leaving at Masters or Doctoral level – male	88	30 (34%)	45	9 (20%)
Gaining a qualification upon leaving at Masters or Doctoral level – female	88	39 (44%)	44	14 (32%)

The CCT indicator target of operations integrating sustainable development into awareness raising, education and training programmes was achieved. The conclusions on which this was based were considered in [7.1.2](#).

While quantitative progress towards outcomes was limited, the findings suggested quality and legacy outcomes were significant.



---

Study of BioInnovation Wales modules brought about change at all four levels of the Kirkpatrick model<sup>61</sup>. Participants were pleased with the programme, typically i.e. they tended to enjoy the learning (reaction). Similarly, participants reported improved levels of knowledge and confidence linked to their personal or work interests through their studies (learning). The findings suggested learning led to behaviour change ranging from amended consumer behaviour, improved motivation and improved critical thinking through to improved work practices (behaviour). Finally, changed behaviours had a positive effect on participant organisations (results). Findings included employers identifying higher levels of knowledge and skills translating into improved results for clients and additional opportunities for income generation. Alongside such benefits, the findings included evidence of new business starts arising from learning and multiplier effects from college lecturers studying with BioInnovation Wales.

The legacy of BioInnovation Wales was substantial. High quality, online learning materials were produced and will remain on offer to Welsh (and wider) participants beyond the lifetime of BioInnovation Wales. Progress was sufficient to convince Aberystwyth University to retain staff through the transition period from ESF / Welsh Government support into a more sustainable future. Indeed, learning from BioInnovation Wales reportedly shaped a wider Aberystwyth University distance learning offer. Continued innovation was apparent during the final evaluation that would further aid sustainability of the BioInnovation Wales legacy. Micro-credentials were being trialled and scholarships had been attracted.

Unit costs of study were just under 2.5 times more than forecast for both WWV and EW operations. While this provided significantly lower value for money than anticipated, the substantial legacy anticipated from BioInnovation Wales should lead to a reduction in unit costs per participant as fixed investments in module development will be spread over an increasing number of participants. Typically, academic courses are subject to quinquennial reviews. Consequently, it is reasonable to anticipate value for money will continue improving for up to five more years, assuming modifications to current modules will be relatively minor during the period before the quinquennial review.

## 7.2 Lessons learned and recommendations

BioInnovation Wales aimed to be relevant to employers and to enable participants to either develop their careers in the biotech / agri-food sectors or enable transition into

---

<sup>61</sup> The Kirkpatrick model tends to be the *de facto* standard for evaluating the effect of human resource development programmes. The four levels of the model are 1. Reaction, 2. Learning, 3. Behaviour and 4. Results. See, for example, Phillips, J.J. (2004) Handbook of Training Evaluation and Measurement Methods. Jaico, Delhi, pp38-39

those sectors. The findings suggested this aim was achieved. The programme used multiple methods of engaging participants and employers to influence module content and design to achieve this aim. The approach could be applied beneficially to future developments.

**Recommendation 1:** BioInnovation Wales partners should continue their good practice of implementing insights from regular (at least annual) panels of employers and students to define content required for modules, modes of delivery, styles of assessment and securing feedback on the learning experience.

Enrolment onto university modules was a recurring theme of the evaluation. The findings suggested enrolment processes may have been designed for the benefit of individual university departments, rather than the students. Examples included repetition of information requested on multiple forms and enrolment needed for each of the two BioInnovation Wales universities, rather than a single enrolment onto the BioInnovation Wales programme.

**Recommendation 2:** BioInnovation Wales partners could usefully reconsider their enrolment processes from the perspective of students. Information should be collected once and shared between departments, rather than expecting students to complete similar information on multiple forms.

**Recommendation 3:** Universities designing future learning collaborations should enable students to enrol onto a programme, rather than expect students to enrol multiple times with different universities. Given all universities in the UK operate under the same standards and practices overseen by the Quality Assurance Agency, recognising a lead institution for enrolment should be possible without compromising quality.

A wide range of promotional routes were used to recruit participants. All promotional channels yielded results. Direct engagement with employers was important, given the role of line managers in encouraging employees to study with BioInnovation Wales. This linked with the importance of personal recommendation also. Targeting filmed content at profiled Facebook users stood out as an effective approach too.

**Recommendation 4:** Direct engagement with employers should be prioritised in future distance learning promotion. Examples (case studies) of how studies have benefited businesses should be used for effective messaging.

**Recommendation 5:** Filmed content should remain a key element of future social media promotion of distance learning offers.

The largely gender-neutral stance adopted by BioInnovation Wales was successful in attracting a majority of female participants to this STEM programme. This may have been a feature of the inherent programme design rather than the promotional stance.

Neutrality, rather than positive action similarly characterised promotion on the basis of age, ethnicity or whether people identified as disabled or having work-limiting health conditions. Despite this neutral approach, the programme typically performed well against cross-cutting theme targets relating to participant characteristics. Again, this may reflect the inherent programme design, based on distance learning coupled with a flexible and supportive approach adopted by the delivery team.

The opportunity for positive action in future programmes remains. Where the programme adopted a positive action approach in support of Welsh speakers, success was evident, most significantly in WWV.

**Recommendation 6:** BioInnovation Wales partners may wish to adopt a more positive action approach to recruiting people from minority backgrounds in future programmes. Closer working with regional equality organisations and equality and diversity officers of large employers would help in this respect.

The conclusions identified sustainable development as an area where the programme excelled. The findings made clear this cross-cutting theme was firmly embedded. It highlighted the benefit of designing cross-cutting themes into programmes so that they become a natural part of delivery.

**Recommendation 7:** BioInnovation Wales partners should continue their good practice of designing cross-cutting themes into their programmes, rather than regarding cross-cutting themes as an additional *burden* at delivery stage.

The target audience was working-age people with multiple commitments. The support of academic and administrative staff was recognised and appreciated by participants. *Flexibility* was a key characteristic appreciated by participants.

**Recommendation 8:** BioInnovation Wales partners should continue their good practice of providing understanding and flexibility for participants juggling multiple demands on their time.

---

Support was typically seen as a strength of the programme by participants. Support for disabled students was available but perceived by some as needing to be requested, rather than offered proactively.

**Recommendation 9:** BioInnovation Wales partners should increase the visibility of support available to disabled students in introductory materials, keeping in mind that disabled students may not self-identify as such i.e. examples of support should be highlighted to all students together with an offer to discuss other specific needs, rather than highlighted as support for disabled students.

One of the drawbacks of online learning versus on-campus provision, was perceived to be limited opportunities for informal tutor-student and student-student interaction. Attempts were made to address this during the programme through optional tutor-student sessions online and informal blogging areas. The former were not offered by all tutors and participants did not engage greatly with the latter.

**Recommendation 10:** BioInnovation Wales partners should re-consider the possibilities of informal tutor-student and student-student interaction by reviewing good practice used by other online providers and discussing at future panels where participant feedback can be gained directly.

The pandemic-influenced operating environment of 2020 to 2021 was challenging and in many respects unique. At one level, the after-effects contributed to issues of recruitment and the subsequent limitations in levels of attainment of participant outputs and results. Conversely, the online offer of BioInnovation Wales was well-suited to the pandemic environment and recruitment was at its peak during the most challenging period of COVID-19 during 2020 and the first half of 2021. Therefore, while the pandemic affected output and results attainment, it may not have been the biggest influence. Challenging targets were set for outputs and results. Hindsight suggests these targets might have been too challenging.

**Recommendation 11:** In developing future project targets, BioInnovation Wales partners should set challenging but realistic output targets, based on past experience or evidence-based research.

Progress towards number of collaborations with enterprises was particularly limited. Companies did not wish to sign the university's collaboration agreement, mainly due to issues of intellectual property rights. Given the university did not press companies to sign the agreements, the issue of intellectual property rights was clearly not a major concern for the university in practice. Moreover, it is generally recognised that students

---

retain the intellectual property rights in their own projects, or their employers retain the rights if the projects form part of their paid duties<sup>62</sup>. Given this background, the BioInnovation Wales team could have developed a short, light touch collaborative agreement that would have been acceptable to most companies.

**Recommendation 12:** In developing future projects, BioInnovation Wales partners should put in place succinct, fit-for-purpose collaboration agreements with collaborating enterprises, drawing on principles of fairness and pragmatism.

While progress towards quantitative targets was limited, progress towards outcomes from the learning for individual participants and employers was substantial. The findings suggested the BioInnovation Wales team were using case studies of such success to engage future distance learning students.

**Recommendation 13:** The BioInnovation Wales partners should continue to use case studies of successful participation in the programme to promote their distance learning offer to potential participants and employers.

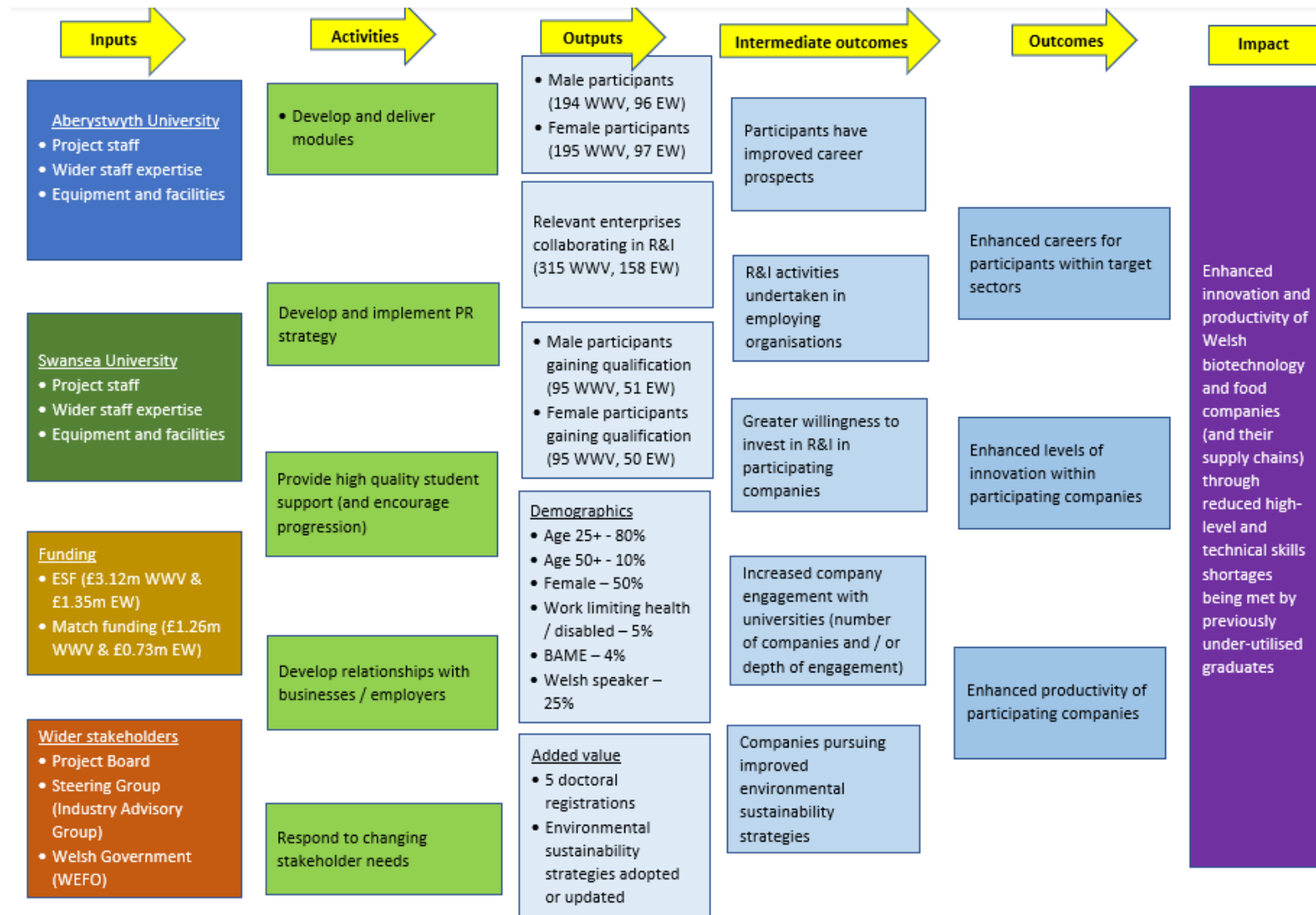
BioInnovation Wales created a sustainable legacy. Planning for a transition from ESF-Welsh Government support to a more commercial model began two years before the end of the operations. This enabled sufficient time to develop an acceptable business case to retain staff and begin recruitment of the first post-BioInnovation Wales cohort. This approach ensured the substantial investment in developing BioInnovation Wales modules was not lost at the end of the programme.

**Recommendation 14:** In developing future programmes, the BioInnovation Wales partners should note the good practice of the BioInnovation Wales team in starting development of a sustainable legacy offer two years before the end of the operations.

---

<sup>62</sup> This assumption is based on undergraduate or taught postgraduate programme projects and not projects undertaken for an external funder nor where the project is primarily defined and led by the academic supervisor

## Annex A – BioInnovation Wales logic model and key assumptions (2018/19)



---

## Assumptions

- Demand-driven modules developed using input from Project Board and Steering Group (Industry Advisory Group).
- Improvements in content and delivery practice from participant and employer feedback.
- Modules can be online or blended if there is a workshop element.
- Modules are 20 university credits and may be accredited by a relevant industry body.
- Provision is being developed with a view to integrating into degree apprenticeships i.e. potentially sustainable provision beyond period of ESF support<sup>63</sup>.
- The theme of environmental sustainability is embedded within each module.
- The Operations Coordinator is the CCT Champion.
- 50% will gain a qualification (PgCert, PgDip, MSc or MRes) and 50% will take one or two modules for CPD.
- The total of 582 participants will be drawn from a minimum of 473 enterprises (the number that collaborate in R&I)
- Qualifications (including CPD certified by industry bodies) improve the career prospects of participants.
- The outcomes of improved staff capabilities together with demonstration of R&I during masters research makes employers more inclined to invest in R&I and collaborate with HEIs.
- Productivity improves within participating companies due to new products / services / processes adopted as a result of learning gained through BioInnovation Wales.
- Participant learning leads to employers more willing or more able to pursue environmentally sustainable practices.
- Sustainability primarily relates to environmental sustainability. More explicitly, this includes efficient use and re-use of resources, life cycle assessments (LCA)/carbon footprint, biodiversity and public goods provision.

---

<sup>63</sup> At the time of the baseline work (July 2020) BioInnovation Wales modules fitted the remit of English Degree Apprenticeships but the scope within Wales was restricted to IT, engineering and advanced manufacturing i.e. outside the scope of BioInnovation Wales. The team felt the provision was well placed should the scope broaden to apprenticeships around the bioeconomy, life sciences or the agrifood supply chain.

## Annex B - Research framework

	Data source				
	Secondary Research	Primary Research			
Source	Management information  Monitoring information	BiInnovation Wales team	Students (participants)	Employers (enterprises)	Wider stakeholders
Research methods	Desk research	Interviews	Interviews Case studies Auto ethnographic	Interviews Case studies	Interviews
<b>Rationale and logic</b> Was there: <ul style="list-style-type: none"> <li>Evidenced need for the BiInnovation Wales project amongst the community of stakeholders?</li> <li>An evidence based project design</li> </ul>	X  X	  X	  X	  X	  X
<b>Inputs</b> Does the project have: <ul style="list-style-type: none"> <li>Support from stakeholders?</li> <li>Appropriate levels of staffing</li> <li>Appropriate financial resources?</li> <li>The most effective design to meet the project aims and objectives?</li> </ul>		X  X  X	X  X	X  X	X  X
<b>Processes / activities</b> Does the project have: <ul style="list-style-type: none"> <li>Appropriate and effective governance?</li> <li>Effective means of stakeholder engagement?</li> </ul>	X  X	X  X	X  X	X  X	X  X



<ul style="list-style-type: none"> <li>• Effective promotion?</li> <li>• Effective recruitment processes?</li> <li>• Effective means of delivery?</li> <li>• Appropriate support for students?</li> <li>• Clear means of tackling CCT targets?</li> <li>• Effective monitoring mechanisms</li> </ul>	X	X	X	X	
<p><b>Outputs</b></p> <ul style="list-style-type: none"> <li>• Is the project meeting targets (main and CCT)?</li> <li>• What are the reasons for attaining/not attaining each target?</li> <li>• Are the output targets appropriate i.e. aligned to intended outcomes and of the correct scale?</li> </ul>	X				
<p><b>Outcomes</b> <i>For Welsh bio &amp; food companies</i></p> <ul style="list-style-type: none"> <li>• Availability of more high level and technically skilled graduates</li> <li>• Improved recognition of value of innovation</li> <li>• Improved access to innovation</li> <li>• Higher levels of translation of innovation</li> </ul>	X				

<ul style="list-style-type: none"> <li>Improved competitiveness</li> </ul> <p><b>For Welsh biotech &amp; food employees / graduates</b></p> <ul style="list-style-type: none"> <li>Improved higher level and technical skills</li> <li>A greater understanding of the role innovation can play in the competitiveness of a business</li> <li>Improved career prospects</li> </ul>			X	X	
<p><b>Counterfactual / Attribution / Deadweight and Displacement</b></p> <ul style="list-style-type: none"> <li>To what extent would outcomes have arisen without BioInnovation Wales?</li> <li>What comparable interventions exist?</li> </ul>	X	X	X	X	X

## Annex C – Module-level student feedback

Source: project monitoring system - participants completing module feedback during 2019 to 2022.

n=58, unless stated otherwise

**Table C1**

<b>I found the module:</b>	<b>Agree</b>	<b>Neither agree nor disagree</b>	<b>Disagree</b>
Well organised	50 (86%)	8 (14%)	0 (0%)
Appropriately challenging	50 (86%)	6 (10%)	2 (3%)
Increased my understanding of the subject matter	57 (98%)	0 (0%)	1 (2%)
Well taught	50 (86%)	8 (14%)	0 (0%)
Well paced	43 (74%)	12 (21%)	3 (5%)
Contained good quality media	47 (81%)	8 (14%)	3 (5%)
Kept me motivated to learn	46 (79%)	10 (17%)	2 (3%)

N.B. Rounding errors where responses do not sum to 100%

**Table C2**

<b>The tutors for this module:</b>	<b>Agree</b>	<b>Neither agree nor disagree</b>	<b>Disagree</b>
Were approachable	54 (93%)	4 (7%)	0 (0%)
Gave helpful feedback	49 (84%)	8 (14%)	1 (2%)
Gave timely feedback	47 (81%)	8 (14%)	3 (5%)

**Table C3**

<b>The assessments:</b>	<b>Agree</b>	<b>Neither agree nor disagree</b>	<b>Disagree</b>
Were clearly explained	48 (83%)	7 (12%)	3 (5%)
Had clear marking criteria	53 (91%)	2 (3%)	3 (5%)
Were appropriate to the level of the module	55 (95%)	2 (3%)	1 (2%)
Enhanced my understanding of the subject	53 (91%)	3 (5%)	2 (3%)

N.B. Rounding errors where responses do not sum to 100%

**Table C4**

<b>I found the forums:</b>	<b>Agree</b>	<b>Neither agree nor disagree</b>	<b>Disagree</b>
A positive part of the experience (n=57)	32 (56%)	14 (25%)	11 (19%)
Helped me feel connected to other students	26 (45%)	19 (33%)	13 (22%)
Well structured	37 (64%)	16 (28%)	5 (9%)
Taught me a lot about the subject covered	29 (50%)	17 (29%)	12 (21%)

N.B. Rounding errors where responses do not sum to 100%

**Table C5**

	<b>Agree</b>	<b>Neither agree nor disagree</b>	<b>Disagree</b>
The administrative team were helpful	53 (91%)	4 (7%)	1 (2%)
I found the flexibility of the course helped me fit it around my work and home life (n=35)	26 (74%)	5 (14%)	4 (11%)

N.B. Rounding errors where responses do not sum to 100%

## Annex D – Breakdown of people from Black, Asian and minority ethnic backgrounds by Welsh county

Source: StatsWales (2023) Ethnicity by area and ethnic group – Year ending 30 June 2022. [Online] Available at <https://statswales.gov.wales/Catalogue/Equality-and-Diversity/Ethnicity/ethnicity-by-area-ethnicgroup>. Accessed 4<sup>th</sup> April 2023.

Area	Percentage of people who are Black, Asian and minority ethnic
Wales	5.1
Isle of Anglesey	1.8
Gwynedd	2.5
Conwy	2.1
Denbighshire	4.4
Flintshire	0.6
Wrexham	2.1
Powys	1.5
Ceredigion	1.5
Pembrokeshire	1.2
Carmarthenshire	3.1
Swansea	9.9
Neath Port Talbot	3.2
Bridgend	2.2
Vale of Glamorgan	3.8
Cardiff	16.6
Rhondda Cynon Taf	3.6
Merthyr Tydfil	0.7
Caerphilly	1.5
Blaenau Gwent	1.3
Torfaen	1.2
Monmouthshire	2.6
Newport	12.0

## Annex E – Breakdown of Welsh speakers by Welsh county

Source: StatsWales (2023) Annual population survey – Ability to speak Welsh – Year ending 30 June 2022. [Online] Available at <https://statswales.gov.wales/Catalogue/Welsh-Language/Annual-Population-Survey-Welsh-Language/annualpopulationsurveyestimatesofpersonsaged3andoverwhosaytheycanspeakwelsh-by-localauthority-measure>. Accessed 4<sup>th</sup> April 2023.

Area	Percentage of people who say they can speak Welsh
Wales	29.7
Isle of Anglesey	62.1
Gwynedd	76.3
Conwy	42.3
Denbighshire	38.1
Flintshire	23.9
Wrexham	25.8
Powys	29.0
Ceredigion	57.4
Pembrokeshire	27.7
Carmarthenshire	52.1
Swansea	17.6
Neath Port Talbot	21.7
Bridgend	18.3
Vale of Glamorgan	20.7
Cardiff	28.5
Rhondda Cynon Taf	20.5
Merthyr Tydfil	22.4
Caerphilly	26.3
Blaenau Gwent	16.6
Torfaen	17.3
Monmouthshire	18.4
Newport	22.4

---

**Annex F – Participant enrolment mapped onto triannual intakes**

<b>Module start</b>	<b>WWV</b>	<b>EW</b>	<b>Combined</b>
<b>Feb-19</b>	2	-	2
<b>Jun-19</b>	6	1	7
<b>Oct-19</b>	10	2	14
<b>Feb-20</b>	7	5	12
<b>Jun-20</b>	9	1	10
<b>Oct-20</b>	15	4	19
<b>Feb-21</b>	19	12	31
<b>Jun-21</b>	18	11	29
<b>Oct-21</b>	15	2	17
<b>Feb-22</b>	15	4	19
<b>Jun-22</b>	8	1	9
<b>Oct-22</b>	10	1	11
<b>Feb-23</b>	5	2	7
<b>Total</b>	139	46	185