Whose job is it anyway?

Analysis of approaches to tackling gender imbalances at the subject level in Scotland’s colleges and universities

A report for the Scottish Funding Council prepared by the Higher Education Academy Scotland

Dr Pauline Hanesworth
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Executive summary

Context
In line with the *Developing the Young Workforce: Scotland’s Youth Employment Strategy*, Scottish Funding Council (SFC) ministerial guidance letters and the Scottish Government’s economic strategy (Scottish Government 2014a; 2014b; 2014c; 2015a; 2015c), the SFC is committed to addressing gender imbalances at the subject level within post-16 education. To help achieve this, the SFC is developing a Gender Action Plan to support colleges and universities in tackling extreme imbalance in student intakes. Extreme here means those subjects with a greater than 25:75 gender split, which, according to latest Equality Challenge Unit (ECU) statistical reports (Equality Challenge Unit 2015a; 2015b), include:

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To support their activity, the SFC commissioned the Higher Education Academy (HEA) in Scotland to undertake short-term research to map the approaches currently being utilised to address gender participation imbalances in Scotland’s colleges and universities, and to assess what approaches work best and why.

Methodology
In order to fulfil the research aim, the HEA planned to:

- map current initiatives tackling student gender participation imbalances across Scotland’s colleges and universities;
- assess what approaches work best and why in terms of achieving sustained change in relation to gender imbalances;
- assess what approaches do not work and identify lessons learned from these;
- offer recommendations for tackling gender imbalances to achieve sustained improvements.

A variety of data sources were utilised to ensure appropriate scope and depth of analysis. These comprised:

1. A grey literature review, including institutional reports (outcome agreements, mainstreaming equality reports, equality outcome progress reports, enhancement-led institutional review [ELIR] reports, Education Scotland review reports), institutional documentation (policies, strategies, action plans), institutional websites and published Athena SWAN charter submissions.¹

2. Consultation response analysis, following responses to SFC’s Gender Action Plan consultation, responses from relevant sector agencies and project teams conducting related research and institutional responses to targeted requests for further information.

¹ The Athena SWAN charter is an ECU charter for universities that encourages and recognises institutional and departmental commitment to the advancing of gender equality in employment in higher education and research.
We used a framework analysis (Ritchie and Lewis 2003), which allowed for an examination of similarities and differences in approaches, as well as a situational discourse analysis, which enabled us to contextualise our data according to its circumstances of production (Ruiz Ruiz 2009). We coded the data according to an analytical framework (appendix three), mapping approaches against a related provisional logic frame (appendix four). This mapping can be found in chapter three. We then coded the focus interviews and consultation responses according to emerging themes, placing these within their theoretical context to enable comparison with, support for and refinement of the sectors’ suggestions. This analysis can be found in chapter four. The overarching analysis then resulted in the provisional framework of chapter four and the recommendations of chapter five.

**Key findings**

*The mapping exercise*

Approaches were categorised according to the broad theme and purpose to which they are put; these are infrastructure, influencing the influencers, raising awareness and impacting on aspirations, encouraging applications, and supporting success. A diagrammatic summary of this categorisation can be found below.
Infrastructure referred to institutional systems and processes for the design, delivery and evaluation of effective approaches. The mapping exercise indicated that where institutions had capitalised upon external drivers, such as equality outcomes, the Athena SWAN charter and other equality initiatives, infrastructural support for gender equality work was present. Elsewhere, potential for this support was found in the existing infrastructural mechanisms for broader equality and diversity initiatives, for example with regard to leadership, systems and processes and staff development. However, where there was less evidence for infrastructural support for equality and diversity – e.g. in progression, reward and recognition, in financial and temporal resourcing, and in the formalisation of internal networks – there was consequently less support for the tackling of gender equality. We hypothesised that strengthening, or being more explicit about, the former would enable the strengthening of the latter.

Influencing the influencers referred to supporting those currently – and those who will in the future be – involved in student educational choice processes to better understand their role in the genderisation of education / career choice, as well as their ability / willingness to challenge gender stereotypes and influence aspiration development, and so to enable them to impact on gender imbalances. Our analysis indicated that the influencing of influencers was key to the tackling of gender imbalances in colleges and universities. However, the mapping exercise found that in relation to teachers, careers advisors and parents, examples for it in the institutional documentation were uncommon. Nevertheless, as with infrastructural support, potential did exist in pre-existing non-gender focused activities. The development of current students’ gender competence, in comparison, was more developed; though the link between this activity and the tackling of gender participation imbalances was much less explicitly made by institutions and could be teased out further within their documentation.

Raising awareness and aspirations referred to outreach activities. It was clear that colleges and universities conduct a lot of activity in this regard. However, the research sometimes found it difficult to discern an overarching, joined-up and strategic oversight to this. Further, whilst initiatives tended to have intended outcomes, the evidence base used to evaluate the extent to which these outcomes were achieved was rarely discussed and when impact was recorded it tended to be anecdotal. Nevertheless, the outcomes on which these initiatives tended to concentrate – the raising of awareness regarding career opportunities and the impacting on aspirations – did cohere with the research literature which illustrated how young people’s knowledge regarding the variety of roles and aspects relating to most careers could be limited, as could their understanding of routes to entry, and their view of professions tended to be coloured by societal stereotypes.

Encouraging applications referred to the methods by which institutions market and package both themselves and their courses to support the transition from awareness / aspiration to application. The mapping exercise indicated that the encouraging of applications focused especially on the use of counter-stereotypical imagery, role models and case studies and the promoting of a gender-inclusive environment. Our analysis suggested that we must be careful with the former: although stereotypical marketing can have negative connotations in its reinforcement of gender norms, counter-stereotypical marketing can also be received negatively if made too obvious and can have an unintended consequence of counter-intuitively reinforcing gender stereotypes. Use of role models must also be treated with caution. Current research disagrees as to the efficacy of role models: they appear to have little effect as standalone interventions on gender participation balances but rather, it is argued, should be used as part of broader solutions that focus on impacting the educational choice process.

Supporting success referred to the enhancing of learning experiences of gender minorities to support their progression through and beyond their programmes of study. The mapping exercise indicated that both colleges and universities have strong support mechanisms for student success in place. With regard to gender, particularly noted were mentoring schemes and networking groups, which research suggests can be effective in impacting on student outcomes in general with some evidence for its effect on gender outcomes. The analysis also highlighted the complex nature of minority gender experiences to which institutions must respond. There can be gendered responses to gendered subjects and being a
gender minority can force a negotiation of gendered and subject identity (e.g. “I am a girly scientist”; “I’m just one of the boys”). There can also be an internalisation of social discourses regarding gender and subject (e.g. that women prefer the everyday applications of STEM). Institutions can react to this through being sensitive to and supporting students’ identity negotiations and through designing curriculum initiatives that are understanding of genderisation without assuming essentialist standpoints, whilst encouraging the challenging of those same gendered discourses that are being internalised.

**Key themes**

Whilst the five categories exhibited differing patterns and activities, seven key themes emerged as common areas of potential development:

1. **Strategic approaches**: Scotland’s colleges and universities are delivering, and have delivered, many activities, embedded in a variety of approaches, for the tackling of gender participation imbalances. There is potential, however, for stronger strategic oversight that could maximise staff capacity and impact potential. The oversight required for the public sector equality duties reporting and Athena SWAN charter submissions can support this to an extent, as long as they are utilised for their planning potential rather than as records of post-hoc cohesion. SFC’s Gender Action Plan would ideally be a platform from which this potential can be fulfilled, with the framework of chapter four hopefully acting as support.

2. **Mechanisms for success**: related to this are those mechanisms that already exist within institutions that can be capitalised upon for the design, delivery and evaluation of approaches. Scotland’s colleges and universities already have some of the infrastructural support, networks and models of activities needed – as well as the expertise and experience in utilising them – through their extensive equality and diversity, learning and teaching, outreach and access, and student support work. Rather than creating new mechanisms, these could (and in some cases already are) be utilised for gender.

3. **Evidencing impact**: whilst some initiatives were shown to have impact, often with regard to applications or attitudes, there is scope for a more cohesive understanding of approach outcomes which incorporates broader impacts on societal, institutional and cultural change, many of which can be long term and implicit. This does not devalue the activities already occurring, but rather suggests that our understanding of what the results of tackling gender imbalances look like needs developing and that approaches should be designed with these broader outcomes, as well as their evaluation, in mind.

4. **External enablers**: it is clear that whilst institutions deliver a lot independently, the utility of external enablers for supporting this work is vast. Hence, the use of equality outcomes, the connecting with national campaigns, the use of charter marks, the involvement in sector projects and initiatives and the connecting with local authority, subject-focused organisation and industry activities. Through these, institutions are able to capitalise on wider infrastructures, knowledge, support and networks for the furthering of their approaches. Support for the extending of enabler activity as well as for the extending of institutional ability and capacity to connect to that activity could strengthen this further.

5. **Student involvement**: one of the key themes was that of student involvement, be that through participation in infrastructural support, through co-creation of approaches or through student-led initiatives. Of especial note were the actions of students’ associations, student association women’s officers and Interconnect champions. Such involvement can be, owing to the temporary nature of such positions and the dependence on individual interest, transient.

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2 Interconnect champions are ambassadors within institutions for the Equate Scotland Interconnect network, which is a network for women studying science, engineering, technology and the built environment across Scotland.
Support for the continuity and capacity of such positions and activities across student activity would go some way towards mitigating this.

6. **Cross-sector support**: whilst there were little discernible patterns of activity with regard to region, sector and subject differences were patent. Sector differences could sometimes be attributed to ethos (e.g. the research focus of universities), ability to access external support (e.g. colleges’ lack of access to a gender charter mark), or available resource and budget (e.g. university provision of bursaries). Other differences may merit further investigation (e.g. the willingness of colleges to explore single-sex courses compared to universities). However, the presence of these differences is an opportunity: through cross-sector sharing, colleges and universities could learn from each other’s specific experiences and expertise to develop further their approaches for the tackling of gender imbalances.

7. **Subject focus**: with regard to subject, it was clear that women in STEM, especially Engineering, Construction and Computing, dominated. Work around women in Automotive Studies was much rarer and this deserves exploration. With regard to men, approaches tackling male underrepresentation in Care / Childcare, Hair, Nursing and Veterinary Science did exist, only to a much lesser extent. Work addressing male underrepresentation in Education was even more rarely discussed. There is scope to turn further attention onto these imbalances, though work is needed to understand whether the same activities would be as effective or whether different approaches are needed.

**Provisional framework**

Scotland’s colleges and universities have been conducting years, even decades, of activities that could be utilised for the tackling of gender participation imbalances. Nevertheless, many are just beginning to understand their strategic approach to the issue. Hence, there is a general perception that we do not have evidence for what approaches actually work. Yet, through the interview and consultation processes, which capitalised on these years of experience, key underlying criteria for and design features of successful and sustainable approaches emerged. These are summarised pictorially in the provisional framework below. We should note that the provisional framework is precisely that: provisional. It is a hypothesis of ways forward that needs to be tested.

In summary, it hypothesises that at the heart of all approaches for the tackling of gender participation imbalances would be:

- a drive to support the development of young people’s and students’ identities with regard to subject choice and future employment;
- a drive to challenge gender stereotypes and increase the awareness, willingness and ability of others to do the same, facilitating the realisation that it is everyone’s responsibility.

This heart would be braced by the foundations of strong institutional infrastructures and sector support. The former of which comprises robust systems for strategic oversight and institutional commitment, staff development and resource support for motivation and capacity, and mechanisms for the development and support of effective relationships. The latter comprises support mechanisms for collaborative and partnership working, appropriate reporting mechanisms, the brokerage of activities and systems, capacity and finance release and the development of further research and resources.

These foundations would sustain and power an approach that incorporates all four of the foci of influencing the influencers, raising awareness and impacting on aspiration, encouraging applications and supporting success. These foci both overlap and feed in to one another (e.g. supporting success can result in the influencing of influencers in the increasing of our current students’ gender competence) and encompass the entirety of the educational choice process.
The approach would be enabled by:

**The adoption of a theory of change model**, meaning that approaches are:

- evidence-based: utilising current research and theory that is critically assessed and contextualised within student, subject, institutional and sector trends, characteristics and priorities;
- developed from a place of anticipated outcomes and impact;
- monitored and evaluated not for the accounting of success or failure but rather in order to feed in to a long-term, iterative process of sustainable change.

**The adoption of a dual model of strong leadership and dispersed operation**, contextualised by institution, subject and student cohort, in which strategic oversight, direction and coordination enable an understanding of and coherence with institutional, sector and national strategies.

**The targeting of initiatives to audience**, whilst ensuring that they do not assume essentialist approaches to gender nor reinforce gender stereotypes.

**The use of longitudinal intervention-based studies** for the enhancement of our understanding of, and resources for, what works as well as for the continuous enhancement of student participation and progression in a process of iterative development and change.
Recommendations

Thus, this research project revealed an abundance of activities – mainly focused on outreach, marketing and supporting success – and areas of future potential for which the groundwork, and strong models, often already exists. It yielded a variety of exempla of practice from which we hope the sectors can learn and develop. It is clear, however, that currently these initiatives are the remit of a select, admittedly extremely motivated and committed, few; more is needed to engender sector-wide commitment and capacity, supporting the realisation that this work is everyone’s job.

Nevertheless, Scotland’s colleges and universities have real potential to drive activity that – as part of a broader, collective, national strategy – can impact on educational choice processes, aspiration developments and career trajectories to support societal change with regard to gender equality. Chapter five offers a variety of recommendations, explored in more detail, to support this work. Here, we offer a truncated version of our top ten.

These are that institutions either begin to, or continue their work to:

1. Develop institutional commitment to the tackling of student gender participation imbalances.

2. Develop the capacity and motivation of all staff to tackle student gender participation imbalances.

3. Adopt a theory of change methodology for the development of approaches.

4. Develop holistic and longitudinal approaches that support young people throughout their educational choice process.

5. Adopt a multi-pronged approach that combines the four foci of influencing of influencers, raising awareness and impacting on aspirations, encouraging applications and supporting success.

6. Support student involvement in approaches through the development of student-led, student-staff co-created, and student-delivered initiatives.

7. Work institutionally, in collaboration with other institutions and in partnership with other sectors.

Whilst sector agencies and wider authorities begin to, or continue their work to:

8. Develop a national campaign and strategy for the tackling of gender equality into which post-16 education approaches fit.

9. Create a virtual and physical hub of and for practitioners tackling student gender participation imbalances.

10. Broaden the remits of sector agencies and organisations for the support of institutions’ gender equality work.
1. Introduction

1.1 Overview

“Gender stereotyping in education exists as does gender segregation in a significant number of the occupations and careers young people pursue.”

(Scottish Government 2014b: 58)

So the final report from the Scottish Government’s commission for developing Scotland’s young workforce recommends, amongst other things, the redressing of gender imbalances within education.\(^3\)

This is in line with the government’s economic strategy (Scottish Government 2015c) which emphasises the need for wider gender equality in the support of a “strong, vibrant and diverse economy”. Hence, the recent ministerial guidance letters to the SFC have outlined the strategic objective of encouraging action by colleges and universities to address gender balance a) on governing bodies, b) at senior levels and c) among student intakes for certain subjects (Scottish Government 2014c, 2015a). It is within the latter that this report is situated.

To support the development of its Gender Action Plan, which aims to support colleges and universities in tackling extreme imbalance in student intakes,\(^4\) the SFC commissioned HEA Scotland to undertake short-term research to map the approaches currently being utilised and to assess what approaches work best and why.

The HEA aimed to fulfil this remit through:

- mapping current initiatives across Scotland;
- assessing what approaches work best and why in terms of achieving sustained change in relation to gender imbalances;
- assessing what approaches do not work and identify lessons learned from these;
- offering recommendations for tackling gender imbalances to achieve sustained improvements.

1.2 Context

That there are participation disparities at the subject level with regard to gender in Scotland’s colleges and universities is in no doubt. The latest Equality Challenge Unit (ECU) statistical report for Scotland’s colleges indicates that whilst the 2013/14 academic year saw a 51.7% / 48.3% female / male split with regard to all student participation,\(^5\) disparities can be seen in particular at SCQF level (with, for example, SCQF 11-12 seeing a 77.8% / 22.2% female / male split) and at subject level (Equality Challenge Unit 2015a: 101-109; cf. Scottish Funding Council 2015a). The most extreme subject disparities can be found in:\(^6\)

\(^3\) This is taken up further by the Scottish Government’s response to the report in their implementation plan: Scottish Government 2014a.

\(^4\) Responding to recommendation 29 of the commission’s final report which encourages the SFC to work with colleges to develop an action plan to address gender disparities within college education (Scottish Government 2014b: 61), whilst extending the remit of the plan also to the university sector.

\(^5\) This reflects a significant narrowing of the overall participation gap from 14.4 percentage points in 2006/07 (57.2% / 42.8% female / male split) to only 3.4 percentage points in 2013/14. Though we would like to bring to the readers’ attention the differences in gender balance according to region as outlined in ECU 2015a: 116, particularly to the significant imbalance (22.0% / 78.0%) in the land-based region.

\(^6\) ‘Extreme’ follows the government measure of a greater than 25:75 split (Scottish Government 2014b: 73; Scottish Funding Council 2015b: 5). However, disparities exist across subjects with only a very few seeing a less than 10 percentage point difference (i.e. Mass Communications and Documentation, and Education at HE level and Computing and ICT, Media, and Special Programmes at FE level). Attention should particularly be given to Care at FE level in colleges, and Language and Physics at HE level in colleges which fall within a 70:30 split.
• at college higher education (HE) level:
  o Engineering and Technology (10.1% / 89.9%);\(^7\)
  o Subjects allied to Medicine (86.4% / 13.6%);
  o Architecture, Building and Planning (14.0% / 86.0%);
  o Mathematical and Computing Science (14.2% / 85.8%);
  o Social Studies (78.6% / 21.4%);
• at college further education (FE) level:
  o Hairdressing, Beauty and Complementary Therapies (94.9% / 5.1%);
  o Nautical Studies (5.9% / 94.1%);
  o Construction (8.5% / 91.5%);
  o Engineering (13.5% / 86.5%).

Likewise, the latest ECU statistical report for universities indicates that the same academic year saw a 57.6% / 42.4% female / male split with regard to all student participation in Scotland (Equality Challenge Unit 2015b: 309-348).\(^8\) Across the four nations, the most extreme subject disparities can be found in:\(^9\)

  - Engineering and Technology (16.1% / 83.9%);
  - Computer Science (17.1% / 82.9%);
  - Subjects allied to Medicine (79.5% / 20.5%);
  - Veterinary Science (76.1% / 23.9%);
  - Education (76.0% / 24.0%).\(^{10}\)

Naturally, these participation imbalances impact on the diversity of the workforce: fewer female Engineering graduates or male Education graduates, for example, result in fewer female engineers / male teachers. In some professions, these imbalances are exacerbated at the employment level: the latest Engineering UK report highlighted how 71.0% of male, currently employed, Engineering graduates were in an engineering occupation compared to just 58.7% of female graduates (Kumar et al 2015: V). Similarly, the 2012 Tapping all our Talents report found that 73% of female graduates were, at the time of publication, “lost from STEM”, compared to just 48% of male graduates (Royal Society of Edinburgh

\(^7\) All figures are provided according to a female / male split.
\(^8\) Compared to an average 56.1% / 43.9% female / male split for all four nations. Across the four nations, the narrowing of the gender gap has been much smaller than that of Scotland’s colleges with a reduction from a 14.6 percentage point gap in 2003/04 to that of 12.2 percentage points for 2013/14. However, this may be partly – though by no means wholly – accounted for by the disproportionate reduction in female students within Scotland’s colleges (Equality Challenge Unit 2015a: 101).
\(^9\) ECU does not disaggregate subject participation by nation. Figures for Scottish domiciled entrants to universities in Scotland can be accessed via the SFC’s Learning for All: Measures of Success online table 8 (http://www.sfc.ac.uk/communications/Statisticalpublications/2015/SFCST062015.aspx, last accessed 29.01.2016). This indicates trends similar to that of the average of the four nations outlined above with the disparities measuring:
  - 14.7% / 85.3% for Engineering;
  - 84.1% / 15.9% for Subjects allied to Medicine;
  - 21.9% / 78.1% for Mathematical and Computer Sciences;
  - 23.8% / 76.2% for Technologies;
  - 75.6% / 24.4% for Education.
To this list, we should add Veterinary Science. Although Learning for All indicates a 64.1% / 35.9% female / male split for Veterinary Science, this includes Agriculture and related subjects. ECU, in contrast, separates Veterinary Science from Agriculture and related subjects and indicates a 76.1% / 23.9% female / male split for the former with a smaller 60.0% / 40.0% split for the latter. The difference in percentage point gaps would suggest that the combining of the two areas has resulted in the smaller gap in the Scotland figures.
\(^{10}\) Again, disparities still exist across the other subject areas with Social Studies, in the Learning for All report if not in ECU’s statistics, in particular still falling within a 70:30 split.
Further, even in those occupation areas where gender balance reflects, or rather is close to, that of student participation, there exist disparities within roles undertaken. For example, whilst 11% of the construction workforce are women, only 1% are on-site workers, and whilst 23% of teachers in Scotland are male, they comprise only 9% of the primary sector.\(^{12}\) If we accept that the development of a diverse workforce – including one diverse with regard to gender – the tackling of inequality and the promoting of wellbeing are key aspects of a sustainable, competitive and prosperous economy (Scottish Government 2015b, 2015c), then we need to address both these factors: student participation and transition into post-education careers. Whilst this report focuses on the former, it does not disregard the importance of the latter. Further, in line with the latest statistics, it explores these factors with regard to Science, Technology, Engineering and Maths (STEM) with a specific emphasis on those subjects with a greater than 25:75 imbalance. Where the data collected provided evidence to address imbalances beyond STEM, particularly where there was low male representation (e.g. in Care and Education), these were also analysed and subsequent findings incorporated into the report.\(^{13}\)

Of course, the gender participation gap is not simply a college and university phenomenon. Gender imbalances are the product of wider societal perceptions, stereotypes and realities (e.g. Blickenstaff 2005; Forde et al 2006; Smyth and Darmody 2009; Archer et al 2013; Education Scotland 2015c).\(^{14}\) Further, imbalances in student participation at the post-16 level reflect the same imbalances in pre-16 education: colleges and universities inherit their gender participation imbalance from the schools from which they recruit.\(^{15}\) That does not mean, however, that colleges and universities do not have a role to play. First, they have a great potential for the generation of societal and cultural transformation: they play a part in either the reproduction or transformation of societal norms through their research activities, their learning and teaching practices and their cultural regimes (Brennan et al 2004; Gunn et al 2015). We can harness this potential for societal change in order to influence those societal stereotypes that shape gender imbalances. Second, as their widening participation activities and policies show, colleges and universities are key players in the supporting of fairer access to post-16 education. Whilst current widening participation initiatives tend to concentrate on socioeconomic disadvantage, they can also be harnessed for wider societal, including gender, equality.\(^{16}\) Finally, colleges and universities are able to look inwards, not only to consider how they are able to attract and retain a wider diversity of students but also how they are able to support them and facilitate their transition into their post-education careers, harnessing existing activities for the supporting of student success. It was with these contexts in mind that our research into the approaches to, and criteria for, successful addressing of gender participation imbalances was conducted.

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11 This is not unique to Scotland or the UK: WISE 2012 outlines similar patterns of participation for other western European countries.


13 Our focus is colleges and the undergraduate level of universities; further work is needed to explore approaches tackling gender imbalances at a postgraduate level.

14 Cf. also the Scandinavian Paradox in which the societies that score most highly for gender equality via the gender equality index still see imbalances in participation in educational and occupational choice along the men = STEM / women = teaching and care division. As Henriksen (2015: 7) argues, “improving women’s STEM participation is not a simple matter of removing inequitable practices”.

15 As outlined in an internal briefing by Universities Scotland on gender balance in student intake in October of 2014.

16 See Equality Challenge Unit 2013a: 12-16 for persuasive arguments for and examples of the aligning of widening participation and equality and diversity activities for the tackling of gender participation and retention imbalances.
1.3 Report structure

This report summarises that research and comprises five main chapters. Each chapter can be read independently of the other; however, for full understanding of the research, we recommend taking the report as a whole. In summary:

1. Following this introduction, which briefly explores the context of the report and outlines some of the assumptions and limitations under which the research operated, chapter two details the methodology of the project.

2. Chapter three maps the approaches currently utilised by colleges and universities in Scotland in their tackling of gender participation imbalances. This section comprises five parts – infrastructure, influencing the influencers, raising awareness and aspirations, encouraging applications, and supporting success – and explores the patterns and trends across the sector with regard to approach type and utilisation.

3. Chapter four details the findings of the qualitative interviews and consultations regarding the underlying criteria for and design features of successful and sustainable approaches. It compares these to the approaches taking place and puts them within their theoretical context, resulting in the development of a provisional framework for the tackling of gender imbalances.

4. Chapter five then offers, by way of a conclusion, recommendations at the institutional and sector level for the redressing of the issue.

1.4 Assumptions and limitations

As with any project, our research was influenced by a number of assumptions and limitations that all readers should keep in mind. In summary, these are:

1. The researchers recognised, as noted above, that gender equality in post- and pre-16 education is part of a larger societal issue. Whilst colleges and universities have an important role to play in tackling gender participation imbalances, this must be seen as but one part of the jigsaw in which all members of Scotland’s society, including government, public sector bodies, private industry, professional and regulatory or statutory bodies (PRSBs), pre-16 educational providers etc., work towards the same goal. The report and its recommendations must be situated within this wider societal context.

2. In lieu of richer terminology, the report uses ‘female / male’ as a useful, if assumptive and misleading, shorthand for both gender and sex whilst acknowledging that the two identity measures are not interchangeable. Further, the researchers do not adhere to an essentialist notion of gender but rather see it as both non-binary and a social construct “complexly produced through identificatory and performative practices” (Butler 2004: 212), and see sex as materialised by regulatory norms (Butler 1993: 4-12).

3. Whilst the report focuses on gender, the researchers recognised:
   a. That a focus on gender should not mean a relaxing of focus on other protected characteristics and other measures of inequality (e.g. race, sexuality, socioeconomic background etc.).

4. Although, where possible, the report refers to those subjects outlined above, many of the activities uncovered were not discipline-focused but rather incorporated into broader initiatives tackling, for example, STEM in general, or were incorporated within wider access and
participation interventions and so difficult to isolate. Further, in line with the discussion in section 1.2, whilst focusing on student participation, the research also explores, where relevant, initiatives for student success, recognising the importance of retention, attainment and progression to the tackling of gender imbalances.

5. Finally, this report is the product of a three-month research project. We recognise that it will not have captured every initiative adopted by Scotland’s colleges and universities. Rather, we aim to provide a representative sample of activities classified under broader approaches that enable a general understanding of sector positions. We recognise that further research would help refine the framework and recommendations outlined in chapters four and five.

Overall, this report aims not only to support the SFC in its development of the Gender Action Plan but also colleges and universities in the development of their own activities and approaches.
2. Methodology

2.1 Data sources

In order to achieve the aims of the research, a variety of data sources were utilised so as to ensure appropriate scope and depth of analysis. These sources are illustrated diagrammatically in figure one.

![Diagram of data sources](image)

**Figure 1: Data Sources**

In more detail, the research comprised:

*Grey literature review*

A review of institutional grey literature was conducted to explore how individual colleges and universities reported on tackling student gender imbalances. Data sources comprised institutional reports (outcome agreements, mainstreaming equality reports, equality outcome progress reports, enhancement-led institutional review [ELIR] reports, Education Scotland review reports), institutional documentation (policies, strategies, action plans) and published Athena SWAN charter submissions. Analysis of this literature acknowledged that much of it derives from regulatory processes and thus may not reflect the full range of approaches and activities occurring on the ground.

This review also included a three-pronged analysis of institutional websites. First, websites were utilised as a depository of institutional reports and documentation not found elsewhere. Second, they were utilised as a document in their own right: we applied a range of search strings and phrases (e.g. “women, STEM, access”, “men in care”, “female engineers” etc.) to uncover further approaches not detailed elsewhere. Finally, we analysed each website to uncover the explicit and implicit messages they were broadcasting with regard to gender, access, participation and success. This final approach operated from the understanding that websites and other media are not neutral purveyors of information but rather are cultural artefacts that can inscribe – or challenge – dominant discourses, in this situation with regard to gender (Mesch 2009; Leathwood 2013; Mendick and Moreau 2013).

*Consultation response analysis*

An analysis of a variety of consultation responses was undertaken to supplement the approaches uncovered by the grey literature review and to begin to understand the underlying criteria for success.
Data included the SFC Gender Action Plan consultation responses,\textsuperscript{17} responses from relevant sector agencies and project teams undergoing related research to consultation enquiries\textsuperscript{18} and responses to targeted requests for further information.\textsuperscript{19} The latter followed a gap analysis during the grey literature review which aimed to fill any gaps in subject, institutional, region and/or sector approaches. In total, these consultations yielded responses from 13 of Scotland’s universities,\textsuperscript{20} ten of Scotland’s colleges and ten sector agencies / interested bodies.\textsuperscript{21}

In addition to this were the responses to and discussions about presentations by both an SFC representative and the HEA lead researcher at ECU’s Scottish Higher Education Liaison Group and College Liaison Group. These groups comprise equality and diversity managers from Scotland’s colleges and universities as well as ECU representatives, the responses of whom are reflected anonymously in chapters three and four of the report.

\textit{Focus interview analysis}

The research lead conducted a representative ten interviews with select Scottish colleges and universities to gather institutional practical knowledge and experience, based on their delivery of approaches. The interviews aimed to further bridge the gap between institutional reporting / consultation responses and practical understandings of that which was occurring, uncovering in particular underlying criteria for and barriers to success as well as lessons learned. College and university selection was a) based on the grey literature review and consultation response analysis and b) ensured a range of representation across the sectors and geographical regions. Five colleges and five universities were interviewed with representation from the west, central, east and north of Scotland comprising institutions of varying ages, sizes and subject specialisms. Some interviews were with single individuals and others with small groups all of whom had knowledge, experience and responsibility for various elements of equality and diversity, widening access, learning and teaching or a combination thereof. Interviewees ranged from academics, to professional staff to senior management. The interview sample size, composition and focus were approved externally by ECU and the interview invitation letter, including overarching questions, can be found in appendix two. Interview responses were written up and sent to interviewees for approval (or correction) with extra space given for further thoughts.

Unfortunately, owing to the limited timespan of the project, students were not a formal part of this interview process and we would strongly recommend that future research include student knowledge, understanding and opinion. Indeed, a complementary research piece to this would concentrate solely on students as research subjects.\textsuperscript{22} However, individual students, student cohorts and student bodies were

\textsuperscript{17} Permission was gratefully received from those who took part in the consultation process for anonymised use of responses. We thank SFC for seeking permission and allowing access. The consultation process lasted from 15.06.2015 – 31.08.2015. Its questions can be found in appendix one.

\textsuperscript{18} This comprised both written responses from emailed requests for further information as well as phone, Skype and face-to-face meetings focusing on approaches, barriers and the underlying criteria for success.

\textsuperscript{19} Requests for further information with regard to approaches were sent via email to targeted individuals and institutions. This aspect of the consultation exercise focused on approaches rather than underlying criteria.

\textsuperscript{20} For the purpose of classification here only, the University of the Highlands and Islands and Scotland’s Rural College have been placed within the university sector. However, when outlining approaches in chapter three, these are placed within the appropriate college or university category depending on where each approach and/or initiative fits.

\textsuperscript{21} Some consultation exercises yielded multiple responses from single institutions. This has not been reflected in the numerical summary here. For the purposes of the research, these will remain anonymous.

\textsuperscript{22} This would complement similar research outwith Scotland (e.g. Bieri Buschor et al 2014; Henriksen et al 2015) and at the school level (e.g. Kintrea et al 2011; Archer et al 2013; Fuller et al 2013; Childwise 2015). We would recommend, however, that the design of any student-focused research takes into account the methodological suggestions of Ryder et al (2015: 361-364) who illustrate how retrospective narratives of educational choice might differ from the narratives articulated during, and at key points of, the choice process. They recommend rather longitudinal research that examines student experiences up to, through and beyond the choice process which includes both snapshot narratives and retrospective accounts.
involved in the consultation aspect of the project and, whilst small in number, their responses are included among the analysis of chapter four.

Research review

The project team also utilised recent research on tackling gender imbalances to enable interpretation of the data in the context of established success measures for participation and progression approaches. We should note that this did not comprise a formal literature review, which was precluded by paucity of time, but rather concentrated on relevant and recent findings: a full-scale review would be useful as part of future research.

Although gender imbalances are a specific topic with unique concerns, where practice across protected characteristics (e.g. on the access and attainment of black and minority ethnic students) was of use, this was taken into account. Further, although the focus of the project was on Scottish colleges and universities, a broader geographical range was utilised, recognising the extent of research conducted on tackling gender imbalances and the value of cross-nation influence.

2.2 Utilisation of data

This data was put to use in both the mapping and analysis outlined below. A diagrammatic summary of this can be found in figure two.

![Figure 2: Utilisation of Data]

In more detail, it comprised:

Approaches mapping

The grey literature, consultation responses and a small part of the focus interviews yielded the data for the approaches mapping of chapter three. For the purposes of this research, we distinguished between approaches and activities whereby approaches comprise the broad manner in which gender imbalances are tackled (e.g. outreach approach, marketing approach) whilst activities comprise the specific applications of these approaches (e.g. summer schools, diverse representation in prospectuses etc.). It is on the former of the two that we concentrated. A mapping and analysis of approaches rather than
activities enabled us to better understand the assumptions underpinning activities and to gather more effective comparison material from which both mapping and analysis could take place. Institutions were coded for mapping purposes and the data return for each institution was tracked to facilitate gap analysis.

To most effectively interpret the data, we utilised a framework analysis (Ritchie and Lewis 2003), which allowed for an examination of commonalities and differences in approaches as well as an exploration of relationships and patterns across themes. This was supplemented by a situational discourse analysis that enabled us to contextualise our data according to its circumstances of production (Ruiz Ruiz 2009). An analytical framework comprising 31 codes clustered into six categories was formed following a review of the HEA frameworks for student access, retention, attainment and progression (Higher Education Academy 2015) and embedding equality and diversity in the curriculum (May and Thomas 2010; Hanesworth 2015), as well as internal project impact and project sustainability frameworks. The Higher Education Funding Council for England (HEFCE) student opportunity outcomes framework (CFE Research 2015), recommendations from ECU and the College Development Network (CDN), as well as relevant research (Marshall 2012; Thomas 2012; Stevenson et al 2014; Butcher 2015; Hulme and De Wilde 2015) were also considered and utilised. Finally, codes and categories were scrutinised by ECU, with recommended changes made prior to implementation of analysis. These were then utilised to inform a provisional logic frame against which the data was mapped so as to further analyse patterns and gaps in provision against a suggested way forward. The analytical framework and provisional logic frame can be found in appendices three and four respectively.

**Understanding what works**

The consultation responses, focus interviews and research review yielded the data for the analysis of approaches and the development of understanding regarding the underlying criteria for, barriers to and lessons to be learned about the successful tackling of gender imbalances. By gathering data from those at the coalface, the focus interviews and consultation responses enabled us to capitalise on the expertise of those delivering initiatives in the Scottish sector for the development of our recommendations. Once complete, the focus interviews and consultation responses were coded in two ways:

1. According to emerging themes and data type (e.g. interview, consultation response) so as to explore the sector’s informed understanding of what is needed for sustained change. Emerging themes are fleshed out in chapter four and are categorised under:
   a. Approach focus.
   b. Approach design.
   c. Approach support.
2. According to the analytical framework and logic frame of the mapping exercise so as to compare current provision with sector understanding of success criteria.

These findings were then placed within their theoretical context to enable comparison with, support for and refinement of the sector’s suggestions. This overarching analysis resulted in the framework of chapter four and the recommendations of chapter five.
3. Mapping the approaches

This chapter provides a detailed overview of the approaches adopted by Scotland’s colleges and universities in their tackling of gender participation imbalances at the student level. It explores patterns and trends and situates them within the provisional logic frame of appendix four.

Whilst the research aimed to focus specifically on those subjects with a greater than 25:75 split, it quickly became clear that mapping primarily to subject would not work. This was owing to the fact that, as noted in section 1.4, many approaches were either incorporated into larger access activities and so difficult to isolate or targeted broader subject clusters such as STEM in general rather than, say, Construction in particular. This was also because there was overlap between initiatives and approaches used across the disciplines. Mapping primarily according to region or sector was also dismissed since, again, there was overlap and repetition. Instead, approaches are categorised according to the broad theme and purpose to which they are put; these are infrastructure, influencing the influencers, raising awareness and aspirations, encouraging applications, and supporting success. A diagrammatic summary of this categorisation can be found in figure three. Whilst this does not eradicate all overlap (for example an approach that utilises the Athena SWAN charter for the development of a gender-inclusive environment could also be utilised as a marketing tool to encourage applications), it does allow for greater clarity and conciseness. Where specific initiatives, patterns and trends were uncovered with regard to subject, region and sector, these are outlined and explored.

![Figure 3: Mapping Summary]

### 3.1 Infrastructure

Infrastructure – here meaning that of individual institutions – plays a dual role in the tackling of gender imbalances, as is reflected in the provisional logic frame. First, a strong infrastructure that comprises
efficient and effective systems and processes for the design, delivery and evaluation of approaches can be classed as an input in the development process: without this, approaches are less well-equipped to succeed (Hayward and Spencer 2010; WISE 2014b). However, institutional change, including infrastructural change, can also be an outcome of initiatives and activities. This duality reflects the ideally iterative nature of change approaches explored more fully in section 4.2.

Four aspects of infrastructure were cited in the research documentation as supporting or leading to the tackling of gender participation imbalances: the infrastructure of policies and processes (systems), the infrastructure relating to staff development (human), the infrastructure relating to resource support (resources), and the infrastructure relating to the development of techniques of relation (relationships).

**Systems: providing the foundation**

Key to the infrastructure of systems is strong leadership, the benefits of which with regard to equality and diversity are well known (Equality Challenge Unit 2013: 29; Equality Challenge Unit 2014). This leadership can be reflected in senior management oversight for and involvement in initiatives, institutional commitment reflected in visions, missions and values, as well as incorporation in policies and strategies.

For the most part, the leadership of approaches tackling gender participation imbalances was articulated through reference to equality and diversity more generally: that is senior management oversight of and involvement in equality and diversity committees and initiatives, reference to a drive to equality in the values sections of strategic plans and throughout policies, incorporation of equality impact assessments into validation / auditing / approval activities etc. The assumed implication in referencing this involvement in relation to gender is that strategic leadership of equality and diversity results in leadership of the tackling of gender imbalances.

Some institutions were, however, more specific and noted:

- cross-college action gender groups, such as that set up in Ayrshire College by its Vice-Principal for Strategy, Planning and Performance, to provide strategic oversight for all gender activity;
- short term working groups with senior management representation, such as that established by the University of Stirling for the tackling of male participation in female dominated subjects;
- continuing use of gender equality schemes (in addition to wider equality duties), such as that highlighted by South Lanarkshire College which includes a commitment to tackling gender participation imbalances;
- incorporation within strategic plans and accompanying documentation, such as Ayrshire College’s key objective to challenge gender stereotyping in career and learning choices within its strategic plan, or Glasgow Kelvin College’s commitment to addressing student gender balance in its 2014-2016 context statement.

More often, where gender was specifically referenced, this tended to be in relation to staff equality, such as in the strategic plans of the Universities of Glasgow, St Andrews and Strathclyde which commit to redressing gender imbalance at the professorial level. There is, however, potential in this. For example, the remit of those groups with senior management representation that currently focus on gender equality for staff, such as the University of Edinburgh’s Gender Equality Working Group (the membership of which includes University Court individuals) or other institutional Athena SWAN charter self-assessment teams, could be widened to tackle student participation imbalances. Similarly, broader

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23 Techniques of relation refers to those processes that support and formalise the interactions between individuals (within, between and outwith institutions) that enable sustainable change (Manning and Massumi 2014; Gunn et al 2015 37-40).


25 Working groups that do not have explicit senior management involvement are discussed in ‘relationships’.
The tackling of gender participation imbalances²⁷ are incorporated into these in two ways:

1. By explicitly making the decreasing of these imbalances at the subject level an equality outcome or focus of that outcome²⁸ as at Ayrshire College, Dumfries and Galloway College,²⁹ Edinburgh College,³⁰ Forth Valley College,³¹ (Glasgow Kelvin College),³² (Aberdeen College),³³ Orkney College, Perth College, Robert Gordon University, University of Aberdeen,³⁴ University of Stirling,³⁵ and West College Scotland.³⁶ ³⁷

2. By agreeing to promote opportunities to, explore marketing initiatives for and challenge gender stereotypes about studying courses where there are gender imbalances as at Borders, Dundee and Angus and Inverness Colleges and the Universities of Strathclyde and the West of Scotland.

The presence of these prior to Developing the Young Workforce (Scottish Government 2014a, 2014b) and the ministerial letters of guidance to SFC (Scottish Government 2014c, 2015a) illustrates a pre-existing institutional commitment to and ensuing infrastructural support for the tackling of gender participation imbalances. It is unsurprising, then, that those institutions, especially those colleges, that utilised the 2013 round of equality outcomes for this issue already have a strong portfolio of activities from which others can learn.

Finally, some institutions are exploring the utilisation of other policy areas in order to incorporate their gender work into pre-existing infrastructures:

- University of Stirling began to explore in October 2015 how care policies could be used to improve gender equality in Scotland;
- University of the Highlands and Islands have included women in science as a priority group of their widening access framework alongside the traditional markers of socioeconomic deprivation, articulation and care leavers.

²⁶ See Equality Challenge Unit 2013b and 2013c for an overarching review of the contents of Scotland’s regional colleges’ and universities’ equality outcomes.
²⁷ Rather than, more generally, imbalance in retention and attainment.
²⁸ We have not included here those that note general underrepresentation of which gender might be part. Rather we have focused on only those who explicitly mention gender.
²⁹ Concentrating on women in Construction and Engineering and men in Care, Hair and Beauty.
³⁰ Concentrating on women in Construction and Engineering.
³¹ Concentrating on women in STEM.
³² Gender participation was a specific equality outcome in the legacy outcomes of this college. However, it is now incorporated under general underrepresentation in participation and progression in the new alignment with regional equality outcomes.
³³ The legacy equality outcomes of Aberdeen College, now merged to become North East Scotland College, included an intention to increase the representation of women in STEM courses.
³⁴ Concentrating on STEMM (STEM + Medicine) subjects.
³⁵ Concentrating on women in SET and Sport and men in Nursing, Education and Social Sciences.
³⁶ Concentrating on male underrepresentation.
³⁷ Glasgow School of Art also acknowledges, in their 2015 progress report, that new equality outcomes around female / male student ratios may need to be incorporated in their 2017 revisions. Queen Margaret University also intends to revise their retention outcome in 2017, which focuses on men in Health Sciences and the Performing Arts, to include an intention to increase the representation of male students in Health Sciences.
**Human: building capacity**

A common theme across institutional documentation was the increasing of staff, and sometimes student, capacity to tackle gender stereotypes and imbalances. Again, this was usually articulated through the provision of wider equality and diversity or unconscious bias training. Some institutions, however, noted a specific gender focus either through incorporation into their unconscious bias work through:

**Bespoke workshops with partner agencies:** the University of St Andrews developed and delivered an unconscious bias workshop with Equate Scotland which explored the effect unconscious bias can have on women in the workplace and student admissions. The University of Edinburgh hosted an Institute of Physics event on unconscious bias and gender equality.

**General training:** Ayrshire College and the Open University in Scotland both intend to develop and deliver unconscious bias training as part of their wider gender equality work.

**Admissions and recruitment training:** the University of Glasgow intends to ensure all staff on its Veterinary Medicine admissions panels complete unconscious bias training as part of their work to support and encourage more male students into this field, whilst Glasgow Caledonian University, as part of its overarching gender balance work, intends to provide unconscious bias training for its admissions teams.

Or through delivering specific training on gender equality as at Abertay University, North East Scotland College, Scotland’s Rural College, University of Stirling and West College Scotland.

Similar to broader equality and diversity work, the institutional documentation revealed little explicit mention of the integration of gender equality activities within staff reward, recognition or promotion processes. Rather, as explored further in section 4.3, the pursuance of this activity tended to result from personal motivation and drive. Where mention did occur, this tended to be owing to coincidence rather than fully integrated into institutional infrastructures as seen in the example of Inverness College which highlighted on its website the work undertaken by the winner of its students’ association ‘most inspiring lecturer’ award in her encouraging of women into construction.

**Resources: supporting initiatives**

The primary method by which institutions claimed to be resourcing gender participation initiatives was through the development of knowledge, both internal and external. With regard to internal knowledge, institutions intend to, or are in the process of:

- conducting quantitative and qualitative research in order to develop an understanding about gender participation and progression as at Glasgow Caledonian University, Heriot-Watt University, the Lanarkshire Colleges, Robert Gordon University, Royal Conservatoire of Scotland and the Universities of Dundee, Edinburgh, Stirling and the West of Scotland;
- utilising research already conducted, often at the subject level, for the targeting of gender activities as at City of Glasgow, Dundee and Angus and North East Scotland Colleges and the Universities of Aberdeen, Dundee and St Andrews;
- utilising research already conducted on the experiences of gender minority students as at Edinburgh College and West College Scotland.  

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38 A review of which can be found in Gunn et al 2015: 25-27.
39 These found contradictory results with Edinburgh College’s student research indicating that being the only male/female student in the class can feel isolating, whilst West College Scotland’s research indicated that minority gender students reported that they received support from the majority gender on their courses. New College Lanarkshire noted an intention to conduct similar research through student focus groups.
It is perhaps unsurprising that it was universities who emphasised internal research for the development of activities: this coheres with the sector’s strong research ethos. It was universities too that noted their contribution to the wider theoretical debate on student gender participation and progression through their other research activities such as, but by no means limited to:

- the research outputs produced by Equate Scotland, hosted by Edinburgh Napier University;
- the research of the Scottish Informatics and Computer Science Alliance (SICSA), hosted by the University of Glasgow with academic leadership and input from across Scotland’s universities;40
- University of Edinburgh’s gender-focused work at its Centre for Research in Education Inclusion and Diversity (CREID);
- the research deriving from the Engineering and Physical Sciences Research Council (EPSRC) funded project Engineering the Future – explored again later – led by the University of Glasgow in collaboration with the Universities of Strathclyde and Edinburgh.

This is not to say, however, that colleges do not also utilise research: the examples above on college use of existing research on student participation and experience prove otherwise. Rather, it was not an aspect emphasised in their institutional documentation which concentrated instead on a more action-focused approach.

Further, we should note that when universities mentioned existing internal knowledge this was often a consequence of pre-existing drivers, specifically research conducted because of Athena SWAN charter work41 and participation in ECU’s attracting diversity project. Colleges’ existing research was, rather, separate and independent.42 The value of pre-existing drivers can be seen also in the development of quantitative and qualitative data: whilst many institutions are doing this independently, Robert Gordon University and the University of Stirling are utilising their participation in SFC’s impact for access project to this end.

Other resourcing activities, such as informational resources for continuing professional development (CPD), the resourcing of time and physical capacity and financial resources were not well represented in the documentation. However, we would like to highlight the University of Stirling’s Vice Chancellor’s Fund which supports projects aiming to enhance and enrich the student experience and which, in 2015, funded two projects with specific gender equality foci: the student-led Women in Leadership project and StirHacks, which aimed to encourage young women into STEM. We should also note that much of the external research activities noted above are products of independently funded projects or centres.

**Relationships: networks for change**

The infrastructure of relationships – that is the networks that allow for the collaboration and development of joint projects – is of importance both internally (Gunn et al 2015: 37-40) and externally (MacBride et al 2010) for programmes of change. Externally, the documentation mentioned that robust networks and relationships were already in place. For example, between colleges and universities through articulation hubs; between schools, college and universities through academies and existing widening access networks; with local education authorities; with sector agencies and interest bodies such as WISE (a campaign to promote women in science, technology and engineering), Equate Scotland and Workers Educational Association; professional and regulatory or statutory bodies (PRSBs), especially at the subject level; and with industry. Rather than creating new networks, the institutional

40 Whilst the remit of this alliance is broad, its focus on gender participation imbalances is revealed in its recent allocation of funds for an education short-theme of supporting and recruiting women in computing.
41 It is, thus, unsurprising that *Tapping all our Talents* (Royal Society of Edinburgh 2012) recommended that universities should obtain the minimum of an Athena SWAN Silver award for their STEM departments.
42 Unsurprising, since the Athena SWAN charter is available only to universities. The attracting diversity project was, in its pilot stage, also only open to universities; however, as of September 2015, it opened up to the college sector.
documentation instead highlighted that these existing networks could be capitalised upon for gender equality work. Networks already utilised in this way include:

- Fife College's work on the Fife STEM strategy, which includes such partners as Fife Council, Skills Development Scotland (SDS), Jobcentre Plus, University of St Andrews, Dundee Science Centre, and Scottish Schools Education Research Centre (SSERC). This strategy focuses on, amongst other things, addressing gender imbalances.
- Robert Gordon University’s and North East Scotland College’s participation in the SDS-funded North East Scotland pilot project for women into construction (Women into the Built Environment and Property), which included such partners as Aberdeen City Council, the Aberdeen Construction forum, employers (Balfour Beattie, Bancon, Robertson Construction, Scotia Homes, Transport Scotland, Stewart Milne Homes), Construction Industry Training Board (CITB), Women in Property (WiP), and Equate Scotland.
- Ayrshire and Forth Valley College’s SDS-funded challenge fund projects. The first of these intends to work with East Ayrshire Council, UTC Aerospace and Spirit Aerosystems, Woodward Aerospace, local education departments and schools in a five-year programme of activity aiming to improve female engagement in Engineering and Computing modern apprenticeships. The second intends to work with Forth Valley schools, social work organisations, Opportunities for All coordinators, educational psychologists, NHS, and Jobcentre Plus in a programme of activity to support care leavers and women within, and encourage them to enter, Construction and Engineering modern apprenticeships.
- West Lothian College’s participation in an occupational segregation project steering group, which includes SDS, Jobcentre Plus, West Lothian Council, Mind the Gap, and Engender working together to develop a pilot for a regional approach to the tackling of gender participation imbalances.

Internal networks were less well fleshed out. Again, most institutions referred to the institutional networks created through general equality and diversity work. Where focus was placed on gender, two interactional methods were noted:

1. Working groups (in addition to those mentioned above with senior management involvement and those for Athena SWAN charter activities), such as that at Heriot-Watt University’s School of Mathematical and Computer Sciences, established to explore female underrepresentation, or that at University of Glasgow’s School of Veterinary Medicine, established to improve communication with secondary school careers advisors to encourage male participation.

2. Internal networking of widening participation and equality and diversity, such as at Robert Gordon University in its newly-merged department for the enhancement of learning, teaching and access.

That is not to say that these internal techniques of relation do not exist but rather that they are not explored or formalised within the documentation and, where they are, appear to be in their infancy.

Infrastructure: discussion and summary

Colleges and universities have strong infrastructures in place both generally, in relation to external networking and relationships, and more specifically for the development of equality and diversity initiatives, in relation to leadership, systems and processes, and staff development. Although at the moment the use of these structures for gender equality is only occasionally noted, generally implied or focused on staff, they provide strong potential for the infrastructural support of gender participation and progression work.

Where there is less evidence for infrastructural support for equality and diversity – for example, in promotion, progression, reward and recognition, in financial and temporal resourcing, and in the formalisation of internal interactions – there is, consequently, less explicit support for the tackling of
gender equality. We hypothesise that strengthening, or being more explicit about, the former would enable the strengthening of the latter.

Most of the institutions that utilised the 2013 round of equality outcomes for the tackling of gender participation imbalances, perhaps unsurprisingly, illustrate a strong portfolio of activity, indicating the benefit of external drivers. This was also seen in the influence of the Athena SWAN charter and other equality initiatives utilised for gender (i.e. ECU’s attracting diversity and SFC’s impact for access projects).

Finally, whilst there were no evident patterns with regard to region, the patterns arising with regard to sector were the college sector’s greater likelihood of incorporating the tackling of gender imbalances within their equality outcomes and the university sector’s greater emphasis on research. With regard to subject, however, it was clear that the examples given tended to lean toward women in STEM, especially in Computing, Engineering and Construction. Although male underrepresentation is mentioned in at least three of the institutional equality outcome reports outlined above, the underrepresentation of women in STEM subjects appears to have more traction in this theme at this point in time.

3.2 Influencing the influencers

Chapter four outlines how one of the key elements for the successful tackling of gender participation imbalances is that of what we call influencing the influencers. That is to say, the supporting of those directly involved in the student educational choice process (educators, careers advisors and parents) and those who will become the workforce of tomorrow and so be able to influence the society of the next generations (our current students). The approaches explored under this section, then, incorporate both the externally and internally focused activities of the provisional logic frame for the informing of choice and raising of awareness amongst key influencers (‘access’ and ‘awareness’) and for the increasing of the gender competence of students (‘graduation’) for the development of application, attitudinal and societal change. The approaches are categorised according to the influencer: educators, careers advisors, parents and current students.

Educators

Colleges and universities play a fundamental role in the training of Scotland’s educators – here meaning from early years to secondary school – both in their provision of early years and teacher training and in their support of educator CPD. With regard to the former, it was not possible to uncover, and not clear in the documentation, the extent to which gender equality (including both gender awareness raising and an understanding of the educator’s role in the reinforcement or tackling of societal genderisation) formed part of Scotland’s early years and education qualifications. Nevertheless, an understanding of and commitment to social justice and equality and diversity is part of the General Teaching Council for Scotland’s (GTCS) standards for registration (GTCS Scotland 2012), and equal opportunities more generally are included in Scotland’s national care standards and the Scottish Social Services Council’s codes of practice (Scottish Government 2005; SSSC 2014).

The GTCS standard with regard to equality and diversity is supported by the interactive and theoretically-grounded national framework for inclusion, a framework created to support both teacher education activities and further CPD. The framework was created for the Scottish Teacher Education Committee by a working group comprising representatives from all seven of the university-based teacher education programmes. There is potential in this framework, through its reflective tasks, to embed

43 The only explicit example was that of Ayrshire College which incorporates gender equality in its early years curriculum.
44 http://www.frameworkforinclusion.org/ (last accessed 29.01.2016). This is further discussed in Florian and Pratt 2015. An updated version of the framework can be found at
further gender equality. There is also broader potential: this framework illustrates how institutions can come together, capitalising on their collective and disciplinary expertise, experience and research, to develop resources to support the influencers of educational choice in the tackling of inequality. Indeed, other initiatives also illustrate this potential, such as, but not limited to:

**The Scottish Earth Sciences Education Forum**, founded by a member of staff at the University of Edinburgh, is a network covering schools, local authorities, public bodies and institutions as well as colleges and universities. Its remit includes developing CPD for teachers.

**The Professional Learning and Networking in Computing (PLAN C) project**, delivered by Computing at School Scotland, funded by the Scottish Government, and led by individuals from the University of Glasgow, Perth and Kinross Council and Edinburgh City Council. This project provides CPD for Computing and Technology educators and runs a network of local hubs covering 26 of Scotland’s local authorities.

**Science Connects**, which supports schools in the development of their STEM activities through the brokerage of connections, sharing of best practice and provision of resources.

**Engineering the Future (mentioned above)**, which brought together industry, schools and policy makers to embed Engineering within the school curriculum (see MacBride et al. 2010). Not only did this project influence learning and teaching activities and policy, it also supported teacher development through:

- the project delivery mechanism which supported teachers in conducting pilot projects in the embedding of Engineering in their teaching;
- the creation of STEMCentral, an online resource hosted by Education Scotland, providing teaching and development resources and support. The subsection on this site on gender imbalances in STEM subjects, which includes key research and resources, illustrates how the supporting of influencers in tackling gender participation imbalances can be incorporated into such wider initiatives.

Potential also exists in the more general educator support that institutions, especially universities, offer. For example, Abertay University, Robert Gordon University and the Universities of Aberdeen, Edinburgh and Stirling all offer workshops and/or conferences at the general or disciplinary level for teacher CPD. Although primarily a university phenomenon, Forth Valley College also noted how they would be offering schools teacher training sessions as part of their STEM-assured activity. Whilst such activities have a broader remit than gender (or even equality), they still provide a useful, pre-existing, delivery mechanism for gender equality work.

**Careers advisors**

As with educators, the approaches with regard to supporting careers advisors predominantly focused on potential delivery mechanisms rather than existing initiatives. For example, colleges and universities tend to offer workshops and conferences for careers advisors and attend careers fairs both of which could be utilised for the development of capacity in this area. Indeed, Fife College aims to support their initiatives tackling female underrepresentation in STEM through the creation of experiential careers advice for P6 – S6 school pupils and, as noted above, the University of Glasgow’s School of Veterinary

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http://www.frameworkforinclusion.org/NEW/index.php (last accessed 29.01.2016). This version, however, does not currently contain the interactive reflective tasks of the original site.

45 The Universities of Aberdeen and Glasgow also provide teaching resources on the teacher sections of their websites, something that can be built upon for gender equality work.

46 http://www.educationscotland.gov.uk/stemcentral/ (last accessed 29.01.2016). Resources from STEMCentral are also available on the Glow intranet.

47 Careers education also includes an equalities-focused standard (Education Scotland 2015a: 7) upon which we could capitalise.
Science aims to utilise its connections with careers advisors to support them in encouraging male students to pursue the subject.

Parents

Within its equality outcome 2015 progress report, Dundee and Angus College noted that, despite a range of activities being undertaken for the tackling of gender participation imbalance, little substantial change had occurred and instead that it needed – and intends – to address the issue earlier; that is to younger school pupils and, significantly, to their parents. This intention was echoed by Glasgow Kelvin College which intends to send staff to parents’ evenings, using the opportunity to talk to parents and schoolteachers about, and encourage them to consider for their children, counter-stereotypical careers. Again, there is potential here in current non-gender focused activities, such as Robert Gordon University’s parents’ information evenings.

Current students

The tackling of gender participation and progression imbalances through the educating of current students, that is the workforce and parents of both today and tomorrow, was more widespread in the institutional documentation. The implicit outcome of raising awareness of gender inequality, our place within it and so our role in tackling it, is that by raising the gender competence of our graduates we enable them to effect societal change (as outlined in the provisional logic frame). Again, many institutions referred to the mainstreaming of gender equality issues within education through the broader embedding of equality and diversity.48 Others, however, were more specific and mentioned the:

**Exploration of gender within the curriculum.**49 Nearly all the colleges and just over half of the universities (with no pattern regarding institutional type or geographic location) explicitly mentioned the embedding of gender equality and the exploring of gender stereotyping within their curriculum content.50 Whilst more common in relation to the Social Science and Arts and Humanities clusters, of especial interest here are those examples within imbalanced subjects such as Heriot-Watt University’s lectures on gender equality in Computer Science and gender equality in Science;51 in Ayrshire College’s incorporation of training in its Hair and Complementary Therapy courses which supports students in recognising the signs of, and tackling, domestic abuse;52 or in the open discussions within male-orientated courses organised by Edinburgh College’s students’ association women’s officer for the challenging of sexism.

**Co-curricular activities exploring gender issues** such as Royal Conservatoire of Scotland’s Human Library of 2015, which encouraged the breaking of stereotypes through its thematic focus on gender and sexuality (set up by the students’ association gender equality group), or the University of Stirling’s student-led Women in Leadership and StirHacks projects mentioned above.

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48 See Gunn et al 2015: 20-29. See in particular the inclusive curriculum toolkits and guidance of Glasgow Caledonian University, University of St Andrews and University of the West of Scotland, the institutions engaged in HEA Scotland’s embedding equality and diversity in the curriculum project ([https://www.heacademy.ac.uk/embedding-equality-and-diversity-curriculum](https://www.heacademy.ac.uk/embedding-equality-and-diversity-curriculum), last accessed 29.01.2016), as well as the utilisation of QELTM 2006 by nearly all of the colleges.

49 Here we include only those explicitly mentioned in the institutional documentation. The number is of course larger with the traditional inclusion of Gender Studies especially in Social Science, Arts and Humanities-based courses.

50 11/15 colleges (excluding the University of the Highlands and Islands and Scotland’s Rural College from this, which are instead in the university category) and 11/19 universities. Some also noted the equality impact assessing of programmes of study such as Abertay University, City of Glasgow, Forth Valley and Glasgow Kelvin Colleges, Glasgow School of Art, University of Edinburgh and West College Scotland.

51 In the Schools of Mathematical and Computer Sciences and Engineering and Physical Sciences respectively.

52 Supported by Medics Against Violence: [http://medicsagainstviolence.co.uk/](http://medicsagainstviolence.co.uk/) (last accessed 29.01.2016).
Extra-curricular training of, or the delivery of workshops for, students on gender stereotyping, attitudes to women and domestic violence (sometimes accompanied by participation in the White Ribbon campaign and the running of White Ribbon workshops) as in Ayrshire, Borders, Forth Valley and Glasgow Kelvin Colleges. Consider also the related zero tolerance campaign of Edinburgh College (led by its students’ association women’s officer) and zero tolerance approach of West College Scotland.

Awareness-raising campaigns and events as found in, but not limited to:
- Edinburgh College’s Students’ Association’s film screenings programme that aimed to explore gender equality;
- University of the Highlands and Islands’ hosting of NUS Scotland’s women’s officer for a keynote talk;
- University of Stirling’s Generation W – Celebrating Women in Business and Women in Politics events, connected to International Women’s Day;
- University of the West of Scotland’s year-long Inspiring Women campaign comprising speaker events and networking opportunities;
- poster exhibits and campaigns, with accompanying thematic workshops, of the above two universities as well as of the Universities of Aberdeen and Edinburgh, Dundee and Angus College and Queen Margaret University, timed to coincide with International Women’s Day;\(^5\)
- further involvement in national campaigns such as International Women’s Day, International Men’s Day, Ada Lovelace Day, International Girls in ICT Day, Women in Engineering Day etc. This is seen for example in:
  - Ayrshire College which arranges subject-specific events and the promotion of counter-stereotypical case studies during these campaigns;
  - Forth Valley College which promotes International Women’s Day and the #MakeItHappen campaign through social media;
  - Heriot-Watt University: students were invited to take part in the 2014 Ada Lovelace Day (e.g. by developing awareness-raising case studies). This university also marked the 2014 Women in Engineering Day through the promotion of alumni case studies and a conference on gender equality;
  - Perth College which delivered a variety of awareness raising events as part of Perth and Kinross Women’s Festival 2015, timed to coincide with International Women’s Day;
  - University of Edinburgh’s School of Engineering which timed its fourth annual Women in STEMM workshop to coincide with Women in Engineering Day 2015 (the institution also hosts International Women’s Day lectures);
  - University of St Andrews which developed a Women at St Andrews online initiative for International Women’s Day.

One of the recurring trends of these activities is the involvement of students, students’ associations and students’ association women’s officers. Indeed, the value of either student-led or student-staff co-created initiatives is reflected in the participation of Ayrshire College’s students’ association in the abovementioned cross-college action group and in student involvement in broader equality and diversity events such as City of Glasgow College’s delivery of monthly themed activities or University of Stirling’s co-led One Stirling diversity campaign.

Influencing the influencers: discussion and summary

Despite the supporting of teachers, careers advisors and parents being a key element teased out by the interviews, consultation exercises and further research explored in chapter four, examples for it in the

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\(^5\) These usually comprise posters of female graduates and staff and include discussions of their careers. They were mostly campus-based as at Queen Margaret University, University of Aberdeen (where it toured around the campus, particularly its STEM schools) and University of Stirling. The University of Edinburgh’s campaign was both physical (around campus) and published online.
institutional documentation are not numerous. However, a framework for engagement does exist with the inclusion of equality and diversity in education, care and careers advisor standards; in the existing CPD provided by institutions for educators and advisors through workshops and conferences; in the presence of institutions at careers events and fairs; and in the experience of institutions in developing resources – particularly those at the subject level – for the pre-16 sector. Scotland’s framework for inclusion, the PLAN C project, the Engineering the Future project and its subsequent STEMCentral website are good collaborative models yielding disciplinary-specific resource, CPD and network support on which the sector could build or base future activity.

The development of our current students’ gender competence is more developed. Through the embedding of gender equality in curricula, co-curricular and extra-curricular activity, and the raising of awareness with regard to gender inequalities, colleges and universities are supporting the development of future generations equipped to tackle gender imbalances. The role of students’ associations, and in particular women’s officers, in supporting and delivering this activity cannot be underestimated. However, whilst these activities are discussed by institutions, they are usually done so in order to evidence the mainstreaming of equality; the link between this activity and the tackling of gender participation imbalances is much less explicitly made and could be teased out further within the documentation.

Again, no regional patterns were found within the documentation with regard to this category. Sector trends could be seen in that educator training, CPD and resourcing is – unsurprisingly considering the sector remit – dominated by the university sector. However, the example of Forth Valley College and the college sector’s delivery of early education and childcare courses – as capitalised upon by Ayrshire College – suggest that this sector too has a role to play here. Whilst the university sector discussed more their workshops, conferences and existing networks with regard to careers advisors, colleges concentrated on the potential of their presence at careers fairs. Colleges were also more likely to mention increasing parents’ awareness and understanding, here through the potential of parents’ evenings. Whilst colleges were more likely to mention the embedding of gender equality within the curriculum or extra-curricular training, universities were more likely to discuss co-curricular activity. Both illustrated commitment to raising awareness within the broader campus climate.

Finally, although the embedding of gender equality within the curriculum was found mostly within the Social Science and Arts and Humanities clusters, examples within STEM – particularly Computer Science, Engineering and Physics – and within Hair and Complementary Therapy were found. Nevertheless, most other activities were still dominated by explorations of women in STEM or of general female underrepresentation and inequality.

3.3 Raising awareness and aspirations

The next two sections focus on activities specifically targeted at young people in the process of making education and career choices. In this section, we outline the approaches used for the raising of awareness and impacting on aspirations of school pupils. This involves externally focused activity for the purpose of ‘access’, ‘transition’ and ‘awareness’ as outlined in the provisional logic frame, with the eventual aim of application and attitudinal change. Comprising outreach activities, it is divided into two types: bespoke programmes and school visits.

*Outreach: bespoke programmes*

Appendix five: Select outreach activities, tabularises specific initiatives mentioned in the institutional documentation that are utilised for the addressing of gender participation imbalances. This appendix is by no means meant to be holistic: we are aware that much is occurring that is not accessible in the
institutional documentation.\textsuperscript{54} Further, often the literature referred simply to “outreach events that utilise counter-stereotypical role models” or “same sex taster sessions” etc. without elaboration; these are either not included or, where relevant, footnoted. Nor is the appendix meant to represent outreach activities not currently utilised for gender equality but with potential to do so, which are undeniably vast. Finally, we have also separated outreach intending to raise awareness and impacting on aspirations from that intending to facilitate routes into further study, the latter of which are explored in section 3.4.

The outreach activities mentioned comprise workshops (one-off and regular), tasters, talks, bespoke programmes, clubs and site visits. They have been divided in the appendix into institutionally housed activities and those run in partnership either through collaboration with other post-16 education institutions, with local councils or – more often – with subject agencies (e.g. engineering development trust etc.). With regard to the latter, the focus is wholly on STEM subjects, with especial concentration on Engineering, Construction and, to a lesser degree, Computing. It is only with the institutionally housed activities that other subjects such as Hair, Care and Nursing arise. We can only speculate that this might be owing to fewer, or perhaps less visible, activities and organisations in the broader sector for the support of gender participation imbalances in such subjects.\textsuperscript{55}

The ways in which these activities are utilised vary. At one end of the spectrum are those designed precisely in order to redress gender imbalances (e.g. Girls into Physics and Engineering, Men into Care / Childcare, ScienceGrrl etc.), most – though admittedly not all – of which attract their audience through their single-sex and thematic focus. The other end comprises those that utilise existing access and outreach initiatives, aiming to redress participation through its broad audience, thus naturalising counter-stereotypical participation (e.g. Ashfield Music Festival, Overlooking the Forth Bridge project etc.), an audience again intending to be attracted through thematic foci.\textsuperscript{56}

Two key themes that recur across all activities are the utilisation of a) hands-on activities and b) counter-stereotypical staff, students or industry ambassadors. The former aims to promote active engagements; the latter, to encourage participants’ understanding, through the active involvement of role models, that certain careers can be for “people like me”.\textsuperscript{57} The explicit intended outcomes for these outreach activities were, in order of regularity:

- increase aspirations towards certain careers (75.8% of initiatives);
- increase awareness of career opportunities (60.6% of initiatives);
- increase awareness of counter-stereotypical examples within certain careers (45.5% of initiatives);
- increase interest in subjects (42.4% of initiatives);
- increase understanding of the relevance of school subjects to careers (24.2% of initiatives);
- increase skills in certain subjects (18.2% of initiatives);
- increase awareness of routes to further study (18.2% of initiatives);
- increase confidence in and commitment to further study (9.1% of initiatives);

\textsuperscript{54} We have not at this time included reference to the SFC-funded impact for access projects of Robert Gordon University and the University of Stirling or the SDS-funded challenge fund projects of Ayrshire and Forth Valley Colleges since theses – at the time of research – were still in the planning stages and yet to be fully formed. However, we should note that these aim to redress participation balances through capitalising on existing outreach activities and networks (all), through media campaigns (Ayrshire College in particular) and through utilising counter-stereotypical role models in the form of current students and alumni (University of Stirling in particular).\textsuperscript{55} Cf. the important outreach and research work of MenTeach in the US: \url{http://www.menteach.org/} (last accessed 29.01.2016); cf. Nelson 2002. The work of the Scotland specific Men in Childcare project is explored in section 3.4.\textsuperscript{56} There is strong disagreement amongst institutions as to whether approaches should be single-sex or whether they should normalise non-traditional participation through the opening up of events to all individuals. This is explored further in section 4.2. Interestingly, whilst those who adhere to an opening up standpoint tend not to offer single-sex activities, those who do offer such approaches also deliver activities that are open to all genders.\textsuperscript{57} Cf. WISE’s \textit{People Like Me} campaign which includes a useful resource pack \url{https://www.wisecampaign.org.uk/resources/2015/09/people-like-me-resource-pack}, last accessed 29.01.2016), relevant research (WISE 2014a) and further support.
• increase attainment in certain subjects (3.0% of initiatives).

There was little in the documentation regarding how successful such activities were in achieving their goal; something that institutions in the interviews and consultations noted as needing redressing. However, where it was present, change was evidenced through:

• application change as found to result from both Ayrshire and Orkney Colleges’ Men into Care tasters, Forth Valley College’s School-College Opportunities to Succeed (SCOTS) taster programme and University of Strathclyde’s Engineering Accelerate programme. More tangentially was the change found in City of Glasgow College’s Girls into Engineering taster programme, which led to its new HNC Women into Engineering, a course that has seen over a dozen women enrol in its first year;
• increase in awareness of, interest in and aspiration to a construction career as well as an increase in awareness of routes to entry as found to result from the SDS-funded pilot Women into the Built Environment and Property programme;
• increase in, and strong presence of, specific genders participating within outreach activity as found in University of Strathclyde’s Engineering Accelerate programme and Scottish Space School;
• increase in interest in the subject as found in Ayrshire College’s female-only CoderDojo work.

Similarly to internal awareness-raising activity, some institutions intentionally connected their activities to national events, such as Ayrshire College with regard to all of their gender-focused activities and various campaigns, Orkney College with regard to its Men into Care programme, University of Dundee with regard to its Women in Science Festival (International Women’s Day) and University of the West of Scotland with regard to its Creating the Future event (Ada Lovelace Day). The implicit aim here being that by tying to national events and campaigns, often – though not always – focused on gender equality, the activities gain further traction and impact.

**Outreach: school visits**

Utilised in a similar way to the above are school visits. Whilst all colleges and universities undertake school visits as part of their wider outreach activity, those institutions that explicitly mentioned capitalising on the platform for the tackling of gender participation imbalances were:

• Dundee and Angus College - Computing staff visit S1 – S2 pupils with the aim of raising awareness and influencing counter-stereotypical education and career choice at a younger age;
• Edinburgh College - Built Environment female staff conduct the school visits so as to act as successful role models;
• West Lothian College - Hairdressing staff visit schools in particular to encourage boys to consider a career in the sector;
• North East Scotland College - uses school visits with the aim of dispelling perceptions of stereotypical career choices.

Abertay University, Forth Valley, Perth, and Shetland Colleges, Queen Margaret University, University of the West of Scotland and West College Scotland also note how they utilise student role models for school visits in order to again counter stereotypical perceptions of educational and career trajectories.

The assumption being that students, being closer in age, will be more relatable to their audience and thus have greater impact.

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58 We should note that tasters are not always seen to result in change despite their prevalence here.
59 Forth Valley College through its Interconnect champion, Shetland College through its role model programme and Queen Margaret University through its volunteer programme supported by, if its application is successful, its Widening Participation and Student Retention (WISeR) fund.
Raising awareness and aspirations: discussion and summary

This section illustrates that colleges and universities conduct a lot of activity that aims to redress gender participation imbalances from bespoke initiatives aimed at certain genders to incorporation into wider access work. Nearly all of these employ students, staff or industry contacts to act as role models to inspire young people and to dispel societal stereotypes with regard to gendered careers. Some also purposely link their activities to national campaigns so as to capitalise on wider gender equality work and so gain further traction.

Nearly half of the initiatives discussed are connected to wider programmes of work, many of which are locally focused (e.g. the Heritage Awareness Skills Programme); so there are regional differences according to local authority initiatives and agencies. This is a reflection of the partnership and collaborative ethos of this activity. When it comes to initiative type (e.g. school visit, taster day, workshop etc.), these are spread across the regions. Though, with regard to sector, it is noticeable that colleges are more likely to discuss taster sessions than universities. At this point in time, the bulk of activities again are put in the service of tackling female underrepresentation within STEM, especially Engineering, Construction and Computing, with only institutionally-housed initiatives exploring that of men.

Perhaps, however, the most noticeable trends with regard to raising awareness and aspirations – trends further explored in section 4.2 – are first, that, whilst initiatives have intended outcomes, the evidence-base used to evaluate the extent to which these outcomes have been achieved is rarely discussed and when impact is recorded it tends to be anecdotal. Hence, it can be difficult to understand when impact occurs and why, for example, one taster programme yields change and another does not. A good example to the contrary is the evaluation of the SDS-funded Women into the Built Environment and Property programme. Its programme design incorporated evaluation activity and showed the extent to which it had achieved its aims of raising awareness and aspirations through such mechanisms as comparative surveys. Projects like ECU's attracting diversity programme are also supporting institutions to develop their evidence base and evaluation mechanisms for gender initiatives and so will provide further models from which we can build. Second, and anticipated from section 3.1, it can sometimes be difficult to discern an overarching, joined-up and strategic oversight as to what is occurring within each institution and why, with duplication, scattered and/or contradictory approaches occurring. The move to the stronger strategic oversight mentioned in 3.1 would perhaps enable a stronger co-ordination of approaches within and outwith institutions and so support the maximising of both staff capacity and the impact potential of their work.

3.4 Encouraging applications

Still focusing on the role of Scotland’s colleges and universities in young people’s education and career choices, this section turns from the outreach activities of 3.3 to how institutions market and package both themselves and their courses to support the transition from awareness / aspiration to application. These approaches concentrate on informing student choice, raising aspirations to study, enhancing student preparedness and managing expectations ('access' and 'transition' in the provisional logic frame) in order to effect application and success change. They are categorised here under the approach types of recruitment, marketing and course packaging.

Recruitment

With regard to the recruitment process itself, institution-specific analyses of application and enrolment data illustrate that rarely are there disparities between these stages, suggesting that the process is as

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60 There is, of course, overlap between these and the approaches outlined in section 3.3. For example, an open day approach that aims to attract counter-stereotypical applications might also aim to raise aspirations.
fair as possible with regard to gender.\textsuperscript{61} This is supported by equality impact assessments of admissions processes and policies (as mentioned by City of Glasgow College, Glasgow School of Art and the University of Edinburgh) and by the delivery of unconscious bias training to admissions staff (see section 3.1). This has also been supported by participation in ECU’s equitable admissions projects and current attracting diversity work.\textsuperscript{62}

Further practice in this area can be seen in:

- Edinburgh College’s use of female-only lecturers for its HN Architectural Technology and Civil Engineering course interviews to encourage a sense of belonging amongst minority gender applicants;
- Robert Gordon University’s current analysis of its decliners’ survey conducted to better understand why students from particular genders are not accepting its offered places to inform further student recruitment activity.

Where differences in acceptance rates do exist, this tends to be attributed in the literature to entry qualification disparities with male applicants having fewer entry tariff points than women, as for example for Veterinary or Biological Sciences. This disparity is, then, supported instead by outreach and access activities focused on raising student attainment such as Glasgow Caledonian University’s Caledonian Club (see appendix five). There is, though, admittedly little about this in the institutional documentation.

Hence, whilst keeping their recruitment and admissions processes equitable, colleges and universities are concentrating on targeting priority groups, such as underrepresented genders. One of the methods by which they do this is through their marketing activities.

\textit{Marketing}

There are many ways in which institutions can market both themselves and their courses, both physically and virtually. For the purposes of this research, however, we concentrated on those aspects mentioned most in the institutional literature: prospectuses, websites and open days.

First, prospectuses:\textsuperscript{63} these were utilised for the addressing of gender imbalances in three ways:

1. Using counter-stereotypical imagery: most institutions had at least some form of counter-stereotypical imagery within their prospectuses. In some (both college and university), this predominated within the latter subject pages with stereotypical images being used in the more general first half. The institutions that made the counter-stereotyping seem the most natural – that is to say, those with a mix of stereotypical and counter-stereotypical dispersed throughout – were, in our subjective opinion, those of Ayrshire College, City of Glasgow College and the University of Strathclyde.

\textsuperscript{61} As noted in the institutional data of Borders, Dundee and Angus, and Forth Valley Colleges, Heriot-Watt University and the Universities of Edinburgh, Dundee and Strathclyde.

\textsuperscript{62} Institutions involved in the equitable admissions projects were Borders College, City of Glasgow College, Edinburgh College, Fife College, Glasgow Clyde College, Perth College, Scotland’s Rural College, University of Glasgow and West College Scotland. See Equality Challenge Unit 2012, 2015c. The attracting diversity project’s latest incarnation began in September 2015 and so has not yet seen results. However, the institutions utilising the project for gender underrepresentation are Abertay University, Ayrshire, Dundee and Angus, Edinburgh, Forth Valley, Glasgow region and West Lothian Colleges, Queen Margaret University, Robert Gordon University, Royal Conservatoire of Scotland, Scotland’s Rural College, the Universities of Aberdeen, Dundee, Edinburgh and the West of Scotland and West College Scotland.

\textsuperscript{63} When analysing prospectuses, we utilised the latest version available; owing to the period in which this research was conducted, not all institutions had updated their prospectuses for the next academic year. Hence, some prospectuses were for 2015/16, others for 2016/17.
2. Using counter-stereotypical case studies. Not all institutions utilise case studies within their prospectuses; however, of those that did, examples of counter-stereotypical case studying can be found in the prospectuses of Queen Margaret University, Robert Gordon University, Scotland’s Rural College and the Universities of Edinburgh and Strathclyde. Of interest is the case study of Mental Health Nursing student Aiden Doyle in Robert Gordon University’s 2016 prospectus, during which he is explicitly asked to comment on why there are so few men in nursing.

3. Statements about student gender participation. Whilst all prospectuses contain a generic equality and diversity statement, some were more explicit:
   a. Fife College’s 2015-2016 prospectus, in its section on foundation apprenticeships, talks of the paucity of women in Engineering and how these courses are hoping to address this.
   b. Scotland’s Rural College 2015-2016 prospectus notes that it aims to address the gender participation imbalances within its Farriery and Forework courses.
   c. University of the West of Scotland’s prospectus has a small section under its Engineering Management course highlighting the success of its female students in both attainment and postgraduate employment.

Next, websites: these were utilised in similar ways to prospectuses with counter-stereotypical imagery and some – though this was less common – counter-stereotypical case studies.⁶⁴ Some of these case studies were, like the case of Aiden Doyle above, again explicit as to gender subject imbalances, such as that of Forth Valley College’s modern apprenticeship examples and South Lanarkshire College’s men in Nursing examples.⁶⁵ For the most part, case studies, as in prospectuses, are accessed through subject pages, illustrating the gender-inclusive climate into which interested applicants would be entering. However, in the websites of Forth Valley College and West College Scotland, student profiles are accessed via the students tab and front page respectively, allowing for counter-stereotypical influence without the web user pre-selecting subject choice. Both strategies have potential impact, but the former is predicated on counter-stereotypical education choices already being made; the latter could potentially impact on the choice process.

Counter-stereotyping was also used in the implicit communication of a gender-inclusive environment as found in:

Videos: take, for example, University of Glasgow’s School of Computing Science video which actively discusses women in Computing, or the University of the West of Scotland’s School of Health, Nursing and Midwifery’s counter-stereotypical realising dreams video.⁶⁶

Use of news stories and blogs for the promoting of counter-stereotypical students: as found especially in Ayrshire, Edinburgh and Glasgow Clyde Colleges, Universities of Dundee, Edinburgh and the West of Scotland and West College Scotland.

Use of the Athena SWAN charter:⁶⁷ whilst universities with Athena SWAN awards advertised their achievement through use of both the logo and the presence of Athena SWAN webpages, of especial note are those, like the Universities of St Andrews and Strathclyde, which do not assume that web users would understand the significance of the logo and instead add such phrases as “recognised leader in gender equality” or “supporting women in science”.

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⁶⁴ See especially the website of Sabhal Mòr Ostaig which was awarded second place in a CDN competition owing to its inclusive nature especially with regard to gender and age.
⁶⁷ The use of the Athena SWAN charter is explored further in section 3.5.
**Statements about gender participation imbalances:** such as the learning and teaching page of Edinburgh Napier University’s School of Life, Sport and Social Sciences which notes that they are “committed to empowering women in science and society”.

**Bespoke pages celebrating, and curating information on, underrepresented genders** such as:

- Forth Valley College’s Women in Engineering webpage;
- Glasgow Caledonian University’s Women in Technology webpage;
- Open University’s Women in Mathematics webpage;
- Robert Gordon University’s Men in Nursing webpage;
- University of St Andrews’ Women in Sciences and sex / gender equality webpages;
- University of Strathclyde’s Women in Science and Engineering webpage.

Admittedly, the examples outlined above are not always easy to find and require some curiosity on the web user’s part. However, whilst individually they might be less likely to influence educational choice, cumulatively they implicitly convey a culture of gender inclusiveness that is addressing gender equality, hopefully attracting further applications.

Finally, open days: similar to the outreach activities of section 3.3, institutions utilised open days for the dispelling of societal genderisation primarily through the active attendance of counter-stereotypical staff and students. This was noted in the institutional literature by Abertay University, Glasgow Clyde College and the Universities of Dundee, Edinburgh, Glasgow, St Andrews, Strathclyde and Stirling. We explore the complex nature of role model use more fully in section 4.1.

**Course packaging**

Of course, potential students are not simply applying to a college or university, but rather to a specific course within that institution. It is to this – the programme of study itself and how this is attractive to potential applicants – which some institutions turn. Therefore, we find programmes aiming to attract underrepresented genders through:

**Single-sex foci:** such as City of Glasgow College’s HNC Women into Engineering, developed following research conducted during its connected taster programme (see section 3.3). This also includes single-sex upskilling programmes and courses that act as routes to entry to further and higher qualifications such as:

- City of Glasgow College’s City and Guilds Women in Construction, developed with the support of CITB;
- City of Glasgow and Edinburgh Colleges’ and New College Lanarkshire’s men-only Introductory Childcare courses, delivered in partnership with the Edinburgh-based Men in Childcare project;
- Forth Valley College’s female-only Access to Engineering class, developed in partnership with Energy Skills Partnership;
- Glasgow Clyde College’s Women in IT free six-week summer programme that leads onto its NC IT course;

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70 [http://www.gcu.ac.uk/ebe/study/womenintechnology/](http://www.gcu.ac.uk/ebe/study/womenintechnology/) (last accessed 29.01.2016).
72 [http://www.rgu.ac.uk/areas-of-study/subjects/health-professions/nursing-are-you-man-enough](http://www.rgu.ac.uk/areas-of-study/subjects/health-professions/nursing-are-you-man-enough) (last accessed 29.01.2016).
74 [https://www.strath.ac.uk/engineering/civilenvironmentalengineering/aboutus/wise/](https://www.strath.ac.uk/engineering/civilenvironmentalengineering/aboutus/wise/) (last accessed 29.01.2016).
North East Scotland College’s Girls into Energy Skills for Work National 5 Energy course, sponsored by Shell. A course that, according to the 2013 Education Scotland review, had a “success rate of 92% of learners gaining employment within the oil and gas sector” with 7% progressing to further study;

Perth College’s men-only, evening National Progression Award (NPA) Playwork and Childcare, developed in collaboration with Perth and Kinross Council.

Targeting gendered interests: as in University of Strathclyde’s MEng with International Study degree, developed following internal research in which 60% of female students identified study abroad as an attraction factor. The success of this initiative is seen in that the course has seen 19% - 25% female representation, a figure higher than the national average.

Bringing together stereotypical and counter-stereotypical choices: through such interdisciplinary joint courses as Glasgow School of Art’s and University of Glasgow’s Product Design Engineering, Civil Engineering with Architecture and Biomedical Engineering programmes of study.\textsuperscript{75}

It should be noted that we must be careful with single-sex courses. Whilst they are in theory legally permissible if based on evidence that proves they are a proportionate means of achieving a legitimate aim (i.e. as found in the City of Glasgow example which is based on its own research), they can promote gender segregation and a binary mode of thinking and thus should be carefully monitored for both intended and unintended outcomes. The use of single-sex foci is explored further in section 4.2.

Connected to course repackaging is the utilisation of routes to entry broader than the single-sex versions noted above. The assumed thought process being that by attracting underrepresented genders on to these routes we support the transition into institutional programmes of study. A secondary aspect of such routes is the upskilling of participants to ensure readiness for college and university study. Such routes can be grouped into two categories:

1. The targeting of underrepresentation in existing school-college provision as mentioned by North East Scotland College which, by addressing imbalances on school link courses, saw results in increases in women in its Construction and men in Hair and Care programmes.\textsuperscript{76} Foundation modern apprenticeships have particular potential in this area as noted by Ayrshire and Fife Colleges in their documentation.

2. The targeting of underrepresentation in access courses as noted by:
   a. Glasgow Caledonian University with regard to its Advanced Higher Hub for the addressing of female underrepresentation in STEM.
   b. Robert Gordon University with regard to its Access to Engineering programme for the addressing of female underrepresentation.
   c. University of Strathclyde with regard to its Access to Careers in Teaching programme for the addressing of male underrepresentation.\textsuperscript{77}

Unfortunately, outwith the use of counter-stereotypical role models, which often comprise current or former students, within the marketing material, open days and programme activities, the institutional documentation did not enable us to better understand how this targeting would occur. Nevertheless, such activity does illustrate how the capitalising on existing networks, as suggested in section 3.1, could support application change.

\textsuperscript{75} University of Glasgow delivers the Biomedical Engineering degree, whilst the Product Design Engineering and Civil Engineering with Architecture programmes of study are jointly delivered by University of Glasgow and Glasgow School of Art.

\textsuperscript{76} Dumfries and Galloway College note in their institutional documentation that they also intend to capitalise on such link programmes for the tackling of gender imbalances.

\textsuperscript{77} In particular, through using former participants as role models. This course is run in partnership with the Universities of Glasgow and the West of Scotland with Glasgow City Council.
Encouraging applications: discussion and summary

Thus, the encouraging of applications from underrepresented genders tends to focus on the recruitment process and the marketing and packaging of both institutions and their courses to potential applicants. Recruitment and marketing of institutions are primarily achieved through ensuring equitable processes, using counter-stereotypical imagery, role models and case studies and promoting a gender-inclusive environment. The former has been particularly supported by involvement in ECU projects.

The marketing and packaging of courses are achieved through the reshaping of programmes of study to be attractive to underrepresented genders and the targeting of access programmes. The development of these is often supported by other agencies including local authorities, subject bodies and industry organisations, again illustrating the benefit of such partnership activities. It is with regard to these too that successful application or attitudinal change is mentioned. Unfortunately, without access to evaluation documentation, we can only speculate that value lies here in the shared traits of capitalising on internal research (as in University of Strathclyde’s MEng with International Study and City of Glasgow College’s HNC Women into Engineering), on stereotypical participation (as in the joint programmes) and on existing networks (as in the routes to entry). Whilst it is not surprising that impact is not mentioned with regard to institutional marketing activities – this is more elusive since it is about the creating and communicating of cultures – such evaluation is not impossible (cf. Yazdani and Siddiqi 2008; Bravo et al 2012).

Whilst counter-stereotyping and use of role models are ubiquitous across both sectors and all regions, sector differences are found with regard to course repackaging. Although both sectors include examples of the capitalising on routes to entry, the college sector is more likely to offer single-sex courses and the university sector is more likely to target gendered interests or utilise interdisciplinary joint programmes of study. The two sectors could learn from and support each other here, capitalising on their relative experiences and expertise. With regard to subject, whilst women in STEM, in particular Engineering and Energy, do appear more regularly, the addressing of male underrepresentation in Childcare is found particularly within the repackaging of courses and of men in Nursing within marketing activities. Again, it is perhaps significant that the former has external support through either the Men in Childcare project or through local authority partnership. Despite the research conducted on the underrepresentation of men in Education (e.g. Nelson 2002; Riddell et al 2006), its presence here is a first in this mapping chapter suggesting that there is less concentration on, or less visibility of, initiatives and approaches tackling this underrepresentation, an area that might want to be addressed in future work.

3.5 Supporting success

Finally, we turn back to our current students and the supporting of success. As noted in the introduction, the tackling of gender progression imbalances is as important as that of gender participation. Admittedly, it is on the former that this research and report concentrates, but, as seen in section 3.2, the two are interlinked: the supporting of progression through further study and into counter-stereotypical employment results in a more diverse workforce that can in turn influence the education and career choice process of younger generations. Hence, the approaches explored here should be read in close partnership with those connected to current students discussed in that earlier section. Since gender progression imbalances were not the focus of this research, what follows is but a flavour of the initiatives occurring within institutions. It concentrates on internally-focused activities utilised for the raising of awareness, supporting of student belonging, engagement and satisfaction and increasing of aspirations and readiness to enter professions (‘awareness’, ‘satisfaction’ and ‘graduation’) for the influencing of success and societal change. It is categorised according to the creation of gender-inclusive environments and the enhancing of the student experience, though, admittedly, this is an artificial separation: the two categories are intertwined with the approaches under creating gender-inclusive environments leading to an enhancement of the student experience and vice versa.
Creating gender-inclusive environments

A key aspect of creating gender-inclusive environments is that already explored in section 3.2 in the development of awareness with regard to gender equality. Another is the tackling of environmental and structural barriers. This can also be considered an encourager to application: by ensuring that environment is accessible to underrepresented genders, it removes some of the obstacles in the recruitment process. However, it is incorporated in supporting success since such activity is often – though by no means always – invisible to the potential applicant’s eye and is thus more of an internally rather than externally-focused approach. The documentation does not often discuss the tackling of environmental and structural barriers; however, examples can be found in:

- Ayrshire College which is intending to conduct an audit of its Engineering and Construction courses to explore how female-friendly its environment is (e.g. where are the female changing rooms? Can we access female overalls that do not cost significantly more than those for men? Etc.) to support female retention;
- Edinburgh College which, following research on male use of support services (Berry et al 2011; Woodfield and Thomas 2012), intends to create more informal student service formats to support male retention and attainment;
- Edinburgh College which is also intending to audit its resources and facilities for barriers to women in Construction and Engineering, in partnership with its students’ association;
- University of Edinburgh’s School of Biomedical Sciences’ flexible timetabling and University of Stirling’s School of Health Sciences’ family-friendly timetabling developed to support the retention of students and staff with personal / care commitments.
- Heriot-Watt University’s undergraduate scholarships for women to study Engineering and Physical Sciences, the webpage for which explicitly states that it hopes the scheme will help to address gender participation imbalances.

Perhaps, though, one of the strongest methods by which institutions – or in this case universities – support the creation of gender-inclusive environments is through participation in the Athena SWAN charter. Although aimed primarily at addressing staff gender imbalance, this charter is utilised in the institutional documentation also for the tackling of student underrepresentation, as seen in the fact that departmental awards must include consideration of student progression. We have already seen this charter’s utility in the development of an inclusive culture in relation to infrastructural support for approaches, to the raising of awareness through its development of activities and role models for current students, and to the marketing of a gender-inclusive environment. However, it has also been put to use explicitly for the support of student success, the best example for which can be seen in the University of Dundee’s Athena SWAN webpages. These include a page on Athena SWAN for students, which contains information about its Interconnect champion (to support networking), careers advice (to support progression) and learning and teaching support and student services (to support success).

Enhancing the student experience

The latter aspects of the above University of Dundee Athena SWAN charter example distinctly overlap with what we term the enhancement of the student experience. Perhaps unsurprisingly, given Scotland’s quality enhancement ethos, more attention is given in the institutional literature to this. Indeed, owing

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78 Cf. also national postgraduate scholarships advertised by universities such as that offered by the British Federation of Women Graduates.

79 16 of Scotland’s universities are members of the Athena SWAN charter, of which 11 have been awarded an institutional award. The Open University (across all nations) is also a member and has been awarded an institutional award. Four institutions (as well as the OU) also have Juno supporter, practitioner or champion status, indicating their move to gender inclusiveness as judged by the Institute of Physics.

80 [http://www.dundee.ac.uk/about/athenaswan/aboutathenaswan/athenaswanforstudents/](http://www.dundee.ac.uk/about/athenaswan/aboutathenaswan/athenaswanforstudents/) (last accessed 29.01.2016). Cf. also the University of the West of Scotland’s Athena SWAN page which opens with a video of students talking about its value for their institution ([http://www.uws.ac.uk/athenaswan/](http://www.uws.ac.uk/athenaswan/), last accessed 29.01.2016).
to this ethos, institutions from both sectors already have – and make explicit mention of – robust mechanisms in place for this support from which underrepresented genders benefit. There are also, however, specific initiatives targeting these genders and it is to these that we turn. These mainly focus on the development of peer, cross-institutional and cross-sector relationships for subject and career progression support.

They include mentoring schemes for:

- incoming students, such as that found in the University of Dundee’s former School of Engineering, Physics and Mathematics;
- current undergraduate students, such as that at the University of Stirling which utilises its broader scheme to match mentoring partnerships according to gender;
- current postgraduate students, such as that found in University of Glasgow’s Institute of Cardiovascular and Medical Sciences GEE-WIS (Guiding, Encouraging and Empowering Women in Science) group.

The University of Edinburgh and Ayrshire, Borders and Edinburgh Colleges are also intending to develop mentoring schemes for all first year female and black and minority ethnic students, for all STEM students, for all underrepresented genders and for female Construction and Engineering students respectively.

Initiatives supporting minority genders also include student networking groups. These not only provide networking opportunities but also organise relevant talks and events, often from industry experts, for the supporting of ambition and progression into employment and further study. Examples can be found in, but are not limited to:

- University of Glasgow’s FemEng for female Engineering students as well as its above mentioned GEE-WIS group;
- University of Edinburgh’s Edinburgh University Hoppers group for female students in Technology;
- On-campus Interconnect networking groups for female students in STEM;
- Ayrshire College’s intended women in STEM network group, of which the abovementioned mentoring scheme will be part;
- Forth Valley College’s intended women in STEM network group, expecting to be developed by its Interconnect champion.

Finally, these groups, and institutions more widely, often tap into the work of external organisations for their supporting of the experience and progression of underrepresented genders. Two examples of these organisations are Equate Scotland and WISE. Equate Scotland, of which Interconnect is part, supports female careers in STEM through training, coaching and careers advice, and offers, co-delivers or supports on-campus career awareness raising activities open to all students and staff. With regard to student support in particular, Equate was mentioned as being active in the institutional documentation at Abertay University, Edinburgh Napier University, Forth Valley College, Glasgow Caledonian University, Heriot-Watt University, Universities of Edinburgh, Dundee, Glasgow, St Andrews, Strathclyde and the West of Scotland and West Lothian College. Equate also runs a successful Careerwise placement scheme for all female STEM students in Scotland on which institutions have capitalised for their supporting of gender-balanced progression, as was particularly mentioned by Heriot-Watt University and the Universities of Edinburgh and Strathclyde. WISE aims to inspire girls and women to study and build careers using STEM. It advises institutions on how to best support its female STEM students and staff

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81 We do not include here female staff networking groups.
82 Interconnect is part of Equate Scotland and is a network for female Science, Engineering, Technology and the Built Environment students. On-campus Interconnect networks can be found at Abertay University, Edinburgh Napier University, Glasgow Caledonian University, Heriot-Watt University, Universities of Aberdeen, Dundee, Edinburgh, Glasgow, St Andrews and Strathclyde and Forth Valley College: http://www.equatescotland.org.uk/interconnect/find-us-campus (last accessed 29.01.2016).
and can, amongst other things, offer training (as noted at West Lothian College) or deliver events showcasing women in STEM in order to inspire female students (as noted at Universities of Edinburgh and Stirling).  

**Supporting success: discussion and summary**

Although only a flavour of that which is occurring, when we take the above examples in addition to those outlined under current students in section 3.2, we can see that Scotland’s colleges and universities are working in a variety of ways to tackle gender participation and progression imbalances. The examples here illustrate how this can be done through the development of gender-inclusive environments, the provision of co-curricular and extra-curricular support to underrepresented genders and the raising of awareness about, encouragement to, and support of, transition of underrepresented genders to employment.

A recurring theme throughout this is again the use of industry and other organisations such as Equate Scotland, WISE and ECU. Another is that of the importance of student involvement within these approaches either through their lead (e.g. student societies) or engagement (e.g. as mentors and role models). Whilst we were unable to access the impact such initiatives yielded, chapter four would suggest that these themes are worth replicating.

No patterns were discerned with regard to region. With regard to sector, both colleges and universities noted that they have strong support mechanisms for student success in place. However, with regard to gender in particular, universities were more likely to discuss supporting the student experience through mentoring schemes and networking groups whilst colleges, although noting intentions to develop mentoring schemes, were more likely to discuss the support of minority gender experiences through the tackling of environmental and structural barriers. We would speculate that this might owe something to the strong tradition of student societal activity and involvement within universities. The presence of the first college Interconnect champion at Forth Valley College might perhaps encourage other colleges to follow their example and so enable them to tap into this network of networks for the support of further gender participation and progression work. Finally, although present, activities such as timetabling and the use of bursaries / scholarships were exceedingly rare and unique to the university sector, the latter of which may be owing to differences in resource / budgets between the two sectors.

With regard to subject, concentration was overwhelmingly on women in STEM with only male access to student support mentioned elsewhere. It would be interesting to see whether the support approaches outlined above would be as transferable to male underrepresentation in Care, Nursing and Education. This could perhaps be an area for future action research.

### 3.6 Closing approaches

We close this chapter by briefly highlighting seven key areas of potential development uncovered by the mapping exercise and cutting across all categories that anticipate some of the findings of chapter four.

First, **strategic approaches**: Scotland’s colleges and universities are delivering, and have delivered, many activities, embedded in a variety of approaches, for the tackling of gender participation imbalances. There is potential, however, for stronger strategic oversight that could maximise staff capacity and impact potential. The oversight required for the public sector equality duties reporting and Athena SWAN charter submissions can support this to an extent, as long as they are utilised for their planning potential rather than as records of post-hoc cohesion. SFC’s Gender Action Plan would ideally be a platform from which this potential can be fulfilled, with the framework of chapter four hopefully acting as support.

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83 Scottish members of WISE include the Universities of Aberdeen, Edinburgh and the West of Scotland: [https://www.wisecampaign.org.uk/membership](https://www.wisecampaign.org.uk/membership) (last accessed 29.01.2016).
Second, *mechanisms for success*: related to this are those mechanisms that already exist within institutions that can be capitalised upon for the design, delivery and evaluation of approaches. Scotland’s colleges and universities already have some of the infrastructural support, networks and models of activities needed – as well as the expertise and experience in utilising them – through their extensive equality and diversity, learning and teaching, outreach and access, and student support work. Rather than creating new mechanisms, these could (and in some cases already are) be utilised for gender.

Third, *evidencing impact*: whilst some initiatives were shown to have impact, often with regard to applications or attitudes, there is scope for a more cohesive understanding of approach outcomes which incorporates broader impacts on societal, institutional and cultural change, many of which can be long term and implicit. This does not devalue the activities already occurring, but rather suggests that our understanding of what the results of tackling gender imbalances look like needs developing – as predicted in the provisional logic frame of appendix four – and that approaches should be designed with these broader outcomes, as well as their evaluation, in mind.

Fourth, *external enablers*: it is clear throughout the chapter that whilst institutions deliver a lot independently, the utility of external enablers for supporting this work is vast. Hence, the use of equality outcomes, the connecting with national campaigns, the use of charter marks, the involvement in sector projects and initiatives and the connecting with local authority, subject-focused organisation and industry activities. Through these, institutions are able to capitalise on wider infrastructures, knowledge, support and networks for the furthering of their approaches. Support for the extending of enabler activity as well as for the extending of institutional ability and capacity to connect to that activity could strengthen this further.

Fifth, *student involvement*: one of the key themes arising from each section was that of student involvement, be that through participation in infrastructural support, through co-creation of approaches or through student-led initiatives. Of especial note were the actions of students’ associations, student association women’s officers and Interconnect champions. Such involvement can be, owing to the temporary nature of such positions and the dependence on individual interest, transient. Support for the continuity and capacity of such positions and activities across student activity would go some way towards mitigating this.

Sixth, *cross-sector support*: whilst there were little discernible patterns of activity with regard to region, sector and subject differences were patent. Sector differences could sometimes be attributed to ethos (e.g. the research focus of universities), ability to access external support (e.g. colleges’ lack of access to a gender charter mark), or available resource and budget (e.g. university provision of bursaries). Other differences may merit further investigation (e.g. the willingness of colleges to explore single-sex courses compared to universities). However, the presence of these differences is an opportunity: through cross-sector sharing, colleges and universities could learn from each other’s specific experiences and expertise to develop further their approaches for the tackling of gender imbalances.

Seventh, *subject focus*: with regard to subject, it was clear that women in STEM, especially Engineering, Construction and Computing, dominated. Work around women in Automotive Studies was much rarer and this deserves exploration. With regard to men, approaches tackling male underrepresentation in Care / Childcare, Hair, Nursing and Veterinary Science did exist, only to a much lesser extent. Work addressing male underrepresentation in Education was even more rarely discussed. There is scope to turn further attention onto these imbalances, though work is needed to understand whether the same activities would be as effective or whether different approaches are needed.
4. Understanding what works

Scotland’s colleges and universities have been conducting years, even decades, of activities that could be utilised for the tackling of gender participation imbalances. Nevertheless, many are just beginning to understand their strategic approach to the issue; hence, the rarity of impact findings discussed in chapter three. Owing to this, there is a general perception that we do not have evidence for what approaches actually work. Yet, through the interview and consultation processes, which capitalised on these years of experience, key underlying criteria for and design features of successful and sustainable approaches emerged. It is to these that this chapter turns, presenting the findings of that qualitative research – under the categories of approach focus, approach design and approach support – and comparing them to those outlined in chapter three. We also situate, where possible, these findings within their theoretical context, comparing them with other research outcomes for ratification or refinement, enabling us to begin to unpick the ways forward suggested in chapter five.

As explained in chapter two, the institutions involved in this part of the research are to remain anonymous. It is, however, worth remembering for presentations of regularity that ten institutions (five of Scotland’s colleges and five of its universities) were interviewed and 33 institutions (13 of Scotland’s universities, ten of its colleges and ten sector agencies / interested bodies) consulted. Although there was overlap between the consultation and interview questions (see section 2.1 and appendices one and two), the nature of data collection did differ (e.g. in its form: real-time oral interview vs formal written response vs informal written email, and its intended recipient: independent researchers vs SFC) which may have affected their contents. Hence, differences between the findings resulting from data collection type are identified within the analysis. Generally, very little differences emerged between sector responses, though, again, where significant, these are highlighted.

4.1 Approach focus

When referring to approach focus, we mean here not what is already happening but rather the focus that the response data indicated approaches should undertake in order to be successful. The foci advocated are classified according to the categories of chapter three to enable cross-reference (excluding infrastructure to which we return in sections 4.2 and 4.3). Their appearance within the response data is tabulated according to frequency below.

<table>
<thead>
<tr>
<th>Approach focus</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influencing the influencers: educators</td>
<td>51.2%</td>
</tr>
<tr>
<td>Raising awareness and aspirations: careers</td>
<td>51.2%</td>
</tr>
<tr>
<td>Raising awareness and aspirations: the use of counter-stereotypical role models</td>
<td>48.8%</td>
</tr>
<tr>
<td>Influencing the influencers: current students</td>
<td>32.6%</td>
</tr>
<tr>
<td>Influencing the influencers: careers advisors</td>
<td>30.2%</td>
</tr>
<tr>
<td>Influencing the influencers: parents</td>
<td>25.6%</td>
</tr>
<tr>
<td>Supporting success: creating gender-inclusive environments</td>
<td>25.6%</td>
</tr>
<tr>
<td>Encouraging applications: course repackaging</td>
<td>20.9%</td>
</tr>
<tr>
<td>Raising awareness and aspirations: routes to entry</td>
<td>16.3%</td>
</tr>
<tr>
<td>Raising awareness and aspirations: subjects</td>
<td>16.3%</td>
</tr>
<tr>
<td>Encouraging applications: marketing</td>
<td>16.3%</td>
</tr>
<tr>
<td>Supporting success: enhancing the student experience</td>
<td>11.6%</td>
</tr>
<tr>
<td>Raising awareness and aspirations: confidence</td>
<td>7.0%</td>
</tr>
<tr>
<td>Raising awareness and aspirations: attainment</td>
<td>7.0%</td>
</tr>
</tbody>
</table>

*Influencing the influencers*

Influencing the influencers was most commonly cited in the response data with minimal difference between response type (that is between focus interviews and consultations). Whilst the support of
educators to tackle gender participation imbalances appeared most regularly, all four subcategories appeared within the top six. This contrasts to the mapping exercise in which the evidence for these approaches in action was – excluding current students – least prevalent. However, its dominance here does cohere with current research. Educational choice and aspiration theory has illustrated the influence that teachers, parents and careers advisors have on the educational choice process.\textsuperscript{84} Hence, the recommendations of previous reports on gender equality in education advocate the involvement of parents to raise their awareness and understanding; the development of teachers and careers advisors to be able to challenge gender stereotypes and messages; and the increasing of understanding of all parties as to their role in the genderisation of educational and career choice.\textsuperscript{85}

Whilst colleges and universities can support this through their educator training, provision of resource and their interactions with parents, the support of careers advisors is more complicated. As MacBride et al (2008) note, the current model of careers advice, and the theoretical standpoints to which it aligns, is responsive rather than proactive: that is to say, it operates from the principle of empowering young people to follow their interests and aspirations rather than from one which helps to shape them. Hence, if we are to task our schools’ careers advice services with tackling gender stereotypes we need not only to support development of their gender competence and provide relevant resources but also to consider how we can ensure such activity best fits with their current philosophical approach.

\textit{Raising awareness and aspirations}

Raising awareness and aspirations was explored within the response data with regard to intended outcome rather than approach type. The intended outcomes mentioned followed the list outlined on page 24.\textsuperscript{86} Similarly to the mapping exercise, the outcomes of increasing aspirations to and awareness of certain careers were most prominent in the response data.\textsuperscript{87} Less common was the raising of awareness regarding how subjects relate to careers and routes to entry as well as increasing of confidence and attainment.\textsuperscript{88} The placement of these different outcomes predominantly coheres with their frequency within the mapping exercise. It is, however, interesting to note that raising interest, despite being an intended outcome of 42.4% of the outreach initiatives in section 3.3, did not figure within the response data. The absence of it here again coheres with current theories of education choice and aspiration development. This is expressed most strongly by Archer et al (2013) in regard to STEM who – having illustrated that most young people in their study were interested in, had positive views


\textsuperscript{86} In summary, these were:
- increase aspirations towards certain careers;
- increase awareness of career opportunities;
- increase awareness of counter-stereotypical examples within certain careers;
- increase interest in subjects;
- increase understanding of the relevance of school subjects to careers;
- increase skills in certain subjects;
- increase awareness of routes to further study;
- increase confidence in and commitment to further study;
- increase attainment in certain subjects.

\textsuperscript{87} We should note that whilst there was minimal difference with regard to response type for most of raising awareness and aspirations, interviews were more likely to mention increased understand of careers than the consultations.

\textsuperscript{88} Both confidence raising and supporting increased attainment is noted in the research literature as supporting gender participation imbalances: Tinklin et al 2001; Cann 2009; Donnelly 2014; Childwise 2015; Education Scotland 2015c; Institute of Physics 2015. As Kintrea et al 2011 show, schools have a particular role to play in this. However, we should beware of stereotyping here: Fuller et al 2013, in their analysis of a computer club for girls, illustrate that whilst participation in the club did enhance confidence, the number of participants who felt they were under-confident prior to joining the club was quite small and declining.
about and liked STEM subjects at school but were still not aspiring to STEM careers – argue that we should move away from talking about raising interest to instead "building science capital". That is "science-related qualifications, understanding, knowledge (about science and 'how it works'), interest and social contacts (e.g. knowing someone who works in a science-related job)" (Archer et al 2013: 3).

That is not to say that interest is not a factor in the educational choice process: Kintrea et al (2011) and Henriksen et al (2015) prove otherwise. Rather, raising interest is not enough. Instead, as these theorists show, some young people can have limited knowledge regarding the variety of roles and aspects relating to most careers (yes STEM but also Nursing, Care etc.), limited understanding of routes to entry and a view of professions coloured by societal stereotypes (especially propagated by the media). Hence, Kintrea et al 2011 argue that higher aspirations are not enough, we should focus as well on raising awareness and understanding: aspirations, they argue, are already high amongst many young people; they are just not orientated towards counter-stereotypical careers. Further, even when informed, young people often cannot envisage how these careers cohere with their personal identities; hence, WISE 2014a’s reorientation of the discussion around alignment of personality type to STEM career. Scotland’s colleges and universities cannot influence all of these areas, but, through their outreach activity, teacher / careers advisor CPD and resource development as well as work with current students, they can support it.

A note on role models: as in chapter three, the use of counter-stereotypical role models for the promoting of an understanding that non-traditional careers are for “people like me” was strongly advocated in the response data. Here role models mean industry, staff and students within counter-stereotypical careers / programmes of study who, through their presence, communicate that the learning / career environment is welcome to counter-stereotypical genders and to whom young people could directly relate through outreach and other externally facing activity. Particular concentration was placed on the relatability of student and alumni role models with anecdotal feedback from outreach activities noting the influence of their presence. Two institutions discussed the utility of role models as replacements for a lack of social contacts (an element of Archer et al’s science capital). That is to say, they recognised that many students who choose to study non-traditional subjects do so owing to family, or a close contact’s, experience within the field, and saw role models as plugging the gap for those who cannot access such exempla. There was also, however, dissent with a small minority of responses expressing disagreement about the potential impact of role models. Let us turn to the research literature to better understand this. Much of the research on role models in education focuses on the role of male teachers in influencing the attainment of young men. The common finding in this regard is that there is little connection between the two (Forde et al 2006; Carrington et al 2007; Hutchings et al 2007). However, this is not the purpose to which role models are being put here. Other research advocates the use of role models in relation to gender participation and progression imbalances (e.g. WISE 2012; Institute of Physics 2015) and argues in particular for the impact of female career role models on female participation.

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89 Similar findings regarding interest resulted from the research of Canavan et al 2002 and Henriksen et al 2015.
90 See also Agapiou 2002; Silim and Crosse 2014; Dutton and Wooley 2015.
91 WISE 2014a and Henriksen et al 2015; see also Archer et al 2013’s suggestion that we bust the brainy image of science and science careers.
92 A note of caution: Archer et al 2014a show how a careers intervention in London, whilst increasing participants’ understanding of the careers to which STEM can lead and engaging students previously disengaged, had but a negligible impact on STEM aspirations. They note that more is needed to understand why this particular intervention did not change aspirations.
93 Cf. WISE 2014a.
94 Although, admittedly, there was greater reference within the interviews (80%) than in the consultation data (39.4%).
95 Cf. Robb et al 2015 who researched the impact of male role models in support services and who concluded that whilst shared gender, ethnicity and social background should not be overlooked, the most effective outcomes depended upon “personal qualities and commitment, and on the ability to form relationships of mutual care and respect.”
college students (e.g. Lockwood 2006). Contradictorily, others again suggest that role models have little effect as standalone interventions on gender participation balances, but they can be part of broader solutions (e.g. Blickenstaff 2005; Education Scotland 2015c) with focus instead orientated to equipping teachers and students to tackle gender stereotypes (Archer et al 2014b). We would agree with these latter theorists, who argue from an aspiration theory perspective. However, we would also suggest that when institutions do utilise role models, they do so carefully, considering what messages they want to convey and how well-equipped their role models are to fulfil this remit. It is worth considering WISE 2014b’s suggestion of the provision of training and support for role models so that they are best equipped to encourage aspiration development.

Encouraging applications

Encouraging applications was mentioned less regularly in the response data and was nearly absent from the interviews with only positive action messages receiving mention. This is in direct contrast to its ubiquity in the institutional documentation explored in chapter three. The repackaging of courses and capitalising on routes to entry was mentioned more frequently than that of marketing, particularly in relation to capitalising on attractive opportunities and bringing together stereotypical and counter-stereotypical options. Precedence for this has been seen elsewhere as in Education Scotland’s (2015b: 16) review of Engineering which illustrates how non-direct Engineering programmes, such as Dental Nursing and Design, have better gender balance; or as in the Open University which found that enrolments in Technology courses increased when the curriculum was noted to place technology in a wider, real-world context (Shillabeer and Jackson 2013: 73). There is, however, potential danger here in the possible assumption that certain genders are attracted to certain activities. As Ametlier and Ryder (2015) argue, whilst the introduction of socio-scientific content (the linking of science to everyday life) to science courses can engage and attract female students, it does not attract everyone, with difference within as well as across genders. Further, as Fuller et al (2013) illustrate in their analysis of a computing club for girls, by assuming gendered interests and attempting to capitalise upon them, we can in fact reinforce gender stereotypes. We should rather vary our content (and advertising of) for the broadening of engagement and enrolment.

Although the response data did not mention routes to entry, we cannot ignore their value as noted in chapter three. Archer et al (2013: 5) also suggest an innovative route to entry in the creation of new science courses for the 16-18 age range which focus on increasing science literacy. This would expand those studying science-based courses beyond the traditional and restrictive separate sciences and thus

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96 Interestingly, Lockwood’s research indicated that gender did not affect the impact of role models on men. Lockwood also noted how participants in her study argued that gender was not important in their choice of role models, despite her findings indicating otherwise, perhaps suggesting a lack of self-awareness in this regard.

97 Cf. Cushman 2008 who, reporting on a survey of 250 New Zealand primary school principals, illustrated that when this group called for more male role models, they did so advocating a stereotypical masculinity with traditional alpha male attributes. See also Robb et al 2015 who note a lack of clarity amongst their research participants as to what the term ‘male role model’ meant and WISE 2014a who note that not all counter-stereotypical examples will be effective role models.

98 WISE 2014b references their positive connections guide to support such training: https://www.wisecampaign.org.uk/resources/2012/03/positive-connections (last accessed 29.01.2016).

99 See also the example of Harvey Mudd College who, through re-orientating their first year course from “Introduction to programming in Java” to “Creative approaches to problem solving in science and engineering using Python” (and advertising as such), in addition to supporting underrepresented genders in extra-curricular activities (e.g. taking female students to the annual Grace Hopper conference) and relating curriculum content to everyday reality, saw a 30 percentage point increase in female Computer Science majors: https://www.ncwit.org/resources/how-does-engaging-curriculum-attract-students-computing (last accessed 29.01.2016).

100 Fuller et al 2013 also demonstrated how this course did not lead to greater participation in Computing courses or aspirations to computing careers.
provide colleges and universities with a wider pool of qualified applicants – so long as such a course was recognised as valid for post-16 programmes of study.\textsuperscript{101}

With regard to marketing, this was rarely mentioned in the response data and, when it did, orientated around use of counter-stereotypical examples. Whilst strategic and targeted marketing is useful for the tackling of gender participation imbalances (as seen in the National Centre for Women in Information Technology’s [NCWIT] tried and tested model),\textsuperscript{102} it is but one spoke of activity. Further, although stereotypical marketing can have negative connotations in their reinforcement of gender norms (Leathwood 2013; Mendick and Moreau 2013), counter-stereotypical marketing can also be received negatively if made too obvious or too forced (as noted in the consultation responses from student groups). Thus, a delicate balancing act must be achieved that naturalises non-traditional involvement without seeming too obvious and without reinforcing gender stereotypes. More research is needed to better understand what such a balancing act looks like. Further, it was noted in the response data that an approach solely concentrating on marketing initiatives for the encouraging of applications would be counter-productive, leading to institutions competing for a permanently narrow pool of potential applicants rather than working, as suggested by the research outlined above, towards expanding that pool through impacting on education choice and aspiration development.

A note on positive action: all of the activity outlined in this report is, in some ways, a type of positive action, concentrating as it does on initiatives targeting the underrepresentation of genders. However, when referring to positive action, the response data focused instead only on messaging. That is to say, explicit statements on websites, in prospectuses and within other material that states the institution aims to redress student gender imbalances and encourages non-traditional applications. We saw some examples of this in chapter three. Outwith this, there was disquiet and/or confusion within the response data about the term itself, with especial uneasiness regarding the difference between positive action and positive discrimination. This is reflected in the literature (Archibong et al 2006; Riddell et al 2006). Stronger clarification regarding this, particularly highlighting the range of work that comes under the positive action umbrella, as well as reference to work of other sectors – such as the police, fire brigade and health sectors – could ease this disquiet and provide further guidance and support (Archibong et al 2006; Waters 2009; Ryan 2010).

Supporting success

Mention of supporting success was split in the response data, with the tackling of environmental and structural barriers and creating of gender-inclusive environments appearing more frequently than the supporting of student experiences. The former orientated especially around the utility of the Athena SWAN charter, something noted in chapter three.\textsuperscript{103} The latter mentioned in particular the utility of mentoring: be that peer or staff mentoring of current or incoming students. Peer mentoring has been shown to be effective in impacting on student outcomes / experiences in general (Rodger and Tremblay 2003; Forde et al 2006; Andrews and Clark 2011; Mountford-Zimdars et al 2015) with some evidence for its effect on gender outcomes (Holmes et al 2012; Institute of Physics 2015).\textsuperscript{104}

The general lack of discussion with regard to student experience was likely owing to the questions within the consultation and interview processes, which focused on student intake rather than

\textsuperscript{101} Cf. Silim and Crosse 2014 who suggest broadening the 14-19 curriculum, perhaps through an international Baccalaureate-type model, to widen the pool of school leavers able to take up STEM subjects.

\textsuperscript{102} This centre supports American institutions in attracting diverse cohorts to Computing and wider STEM subjects through its resources, research, case studies and advice. Its strategic, change programme based, model for tackling participation imbalances is utilised with success across the nation: \url{https://www.ncwit.org/project/extension-services-undergraduate-programs} (last accessed 29.01.2016).

\textsuperscript{103} Hence, Royal Society of Edinburgh’s 2012 recommendation that all institutions achieve at the least a silver Athena SWAN award for its STEM departments for the tackling of gender inequality.

\textsuperscript{104} Though Holmes et al 2012 do note that the greatest factor for the efficacy of mentoring is the quality of the relationship created. Cf. the similar finding with regard to role models in Robb et al 2015.
progression. Nevertheless, the importance of this can be seen in the research literature; hence, NCWIT’s inclusion of curriculum, pedagogy and student support in their model for tackling gender participation and progression imbalances. Of particular interest in this organisation’s case studies are those examples that mitigate skill disparities through redesigning programmes of study such as University of Virginia’s Computing Science programme which instituted multiple entry paths supporting experienced and inexperienced students into their course, incorporating structured labs for the upskilling of the inexperienced strand.\textsuperscript{105} This coheres with recommendations elsewhere regarding utilising scaffolded learning and embedding upskilling elements within college and university curricula to support the effective transition and experience of students (e.g. Hulme and De Wilde 2015).\textsuperscript{106}

Much research explores the experiences of gender minorities within colleges and universities (e.g. Rodd and Bartholomew 2006; Danielsson and Linder 2009; Abbiss 2011; Danielsson 2012; Donnelly 2014; Allegrini et al 2015; Løken 2015; Møller Madsen et al 2015). This literature indicates that there are gendered responses to gendered subjects and that being a gender minority forces a negotiation of gendered and subject identity (e.g. “I am a girly scientist”; “I’m just one of the boys”) that might not be present in balanced subjects. Further, it reveals that there can be an internalisation of social discourses regarding gender and subject (i.e. that women prefer the everyday applications of STEM, that men are more confident etc.).\textsuperscript{107} Colleges and universities can react to this through being sensitive to and supporting our students’ identity negotiations and through designing curriculum and pedagogical initiatives that are understanding of genderisation without assuming essentialist standpoints (i.e. that an entire gender group adheres to a certain way of thinking),\textsuperscript{108} whilst encouraging the challenging of those same gendered discourses that are being internalised.\textsuperscript{109} Such initiatives, it must be noted, do not just support student experiences but are also key elements in the creating of those gender-inclusive environments mentioned elsewhere (WISE 2014b).

**Approach focus summary**

Thus, the interviews and consultation responses highlighted approaches that influence the influencers, repackage courses and raise awareness and aspirations with regard to career options and counter-stereotypical examples within these. Although this coheres with the research literature, it relates uneasily to chapter three which, whilst it saw a focus on the latter (that is raising awareness and impacting on aspirations), saw less evidence for the former two (that is influencing the influencers and repackaging courses). Less common in the response data, but found in the research literature, are also


\textsuperscript{106} Note that whilst this could address gender imbalances, it benefits all students.

\textsuperscript{107} This internalisation is found in both students and staff, even in those who proclaim gender neutrality, as noted by McKinlay et al 2010; Burke et al 2013; Francis et al 2014. Cf. also the findings of Ditch the Label’s report on gender which finds not only that “35% of teenage girls believe that their gender will have a negative effect on their career prospects versus 4% of boys” but also that young men were significantly more likely to think that men were better at political, legal, sporting and business management jobs than women (Ditch the Label 2016).

\textsuperscript{108} E.g. Henriksen et al 2015 suggest that we can use this internalisation for targeting activities but that we should ensure assumptions are not explicitly displayed. They give the example of Engineering by suggesting that marketing examples for Engineering degrees might want to mention the contribution of the subject to medical technology in order to support female recruitment but that the student or engineer exemplifying a medical technology career might well be male. Cf. Powell et al 2011 who argue that we should be careful with targeted initiatives since they can reinforce rather than challenge gender stereotypes.

\textsuperscript{109} Examples of the latter can be found in Schäfer 2006 who describes the experience of incorporating gender equality awareness raising within an Engineering course, Verdonk et al 2009 who describe their experiences attempting to incorporate gender awareness activities within a Medical curriculum, and Richards and Finnigan 2015 who share an example of embedding gender awareness within a Sound Arts programme. See Hanesworth 2016 for further examples of, more broadly, incorporating equality and diversity within learning and teaching practices and processes.
those approaches aiming to upskill students, raise young people’s confidence and support their increased attainment.

The disagreement and unease within the response data with regard to role models and the use of the term ‘positive action’ reflects that of the research literature with the latter requiring more clarification and guidance (i.e. on the differences between positive action and positive discrimination) and the former needing to be tempered by incorporation into broader initiatives. Further investigation is also needed as to the efficacy of counter-stereotyping within marketing activities which, it was noted, requires a delicate balancing act of naturalisation.

Balance must also be found between targeting initiatives according to gendered interests and ensuring that activity does not assume essentialist approaches to gender nor reinforce gender stereotypes. The interplay of gender, education choice, aspiration development and identity is complex allowing no single solution to gender participation and progression imbalances. Rather it suggests a multipronged approach comprising all four of our categories in which we can support the development of our students’ identities with regard to subject choice and future employment whilst encouraging both the challenging of gender stereotypes and the willingness of others to do the same.

4.2 Approach design

Three key areas of approach design emerged from the response data: a theory of change approach, considerations of approach practicalities and approach strategy. Let us begin with the theory of change approach.

*Theory of change approach*

Although the term itself was rarely used in the interview and consultation responses, the approach design most advocated by the sector was one of theory of change. That is to say, an approach that is evidence-based, developed from a place of anticipated outcomes and impact, monitored and evaluated for the uncovering of lessons learned, to feed in to a long-term, iterative process of sustainable change (James 2011; Taplin and Clark 2012; Vogel 2012; Valters 2014; cf. Hayward and Spencer 2010; Education Scotland 2015c).

Just over a third of all interviews and consultation responses noted the importance of evidence-based approaches for successful change: that is that initiatives adopted should be based on quantitative and qualitative data as well as theoretical understandings of educational choice and aspiration theory. Indeed, we saw successful examples of this in chapter three with City of Glasgow College’s HNC Women into Engineering and University of Strathclyde’s MEng with International Study. However, as two of the interview responses highlighted, this must be shaped by professional judgement and local knowledge. The theories explored in section 4.1, for example, are mostly based on UK or European research. Differences will exist between the educational choice process of those in the se countries and those elsewhere. Indeed, differences also exist within these countries themselves, as illustrated by Kintrea et al (2011). Further, the majority of research on educational choice process has focused on the STEM cluster: we must shape how we use it according to individual subject needs and may, indeed, need further focused research on the non-STEM clusters. Thus, whilst approaches should, the sector suggests, be evidence-based, the evidence used should also be critically assessed and contextualised within student, subject, institutional and sector trends, characteristics and priorities.

110 Just such an approach underlies the recent framework developed for HEFCE for the support of student outcomes in higher education (CFE Research 2015).

111 E.g. as Vetleseter Bøe and Henriksen 2015 point out, the aspiration development of richer, developed societies differs to that of those in less-developed areas, concentrating as it does on self-realisation and personal well-being.

112 Here showing the difference between three UK cities.
Just over 40% of the response data (60.0% of interviews; 36.4% of consultation responses) advocated for the incorporation of intended outcomes and impact in the design process, a good example for which in chapter three was the SDS-funded Women into the Built Environment and Property programme. There was, however, debate as to what those outcomes and impact should be: what does success look like? Nearly all of the institutions, for example, expressed disquiet about using numerical application change alone to measure impact especially since, as was highlighted, we can be working with such small numbers that application change measurements can in fact exaggerate reality. Further, whilst, as one response said, targets focus the mind, the tackling of gender participation imbalances is, as we have seen, about much more than application change: it is about societal, attitudinal, institutional and success change. As a recurring refrain throughout the interviews asked, how do we measure our impact on society?

When considering quantitative outcome measurements, institutions instead advocated the use of retention, attainment, success and satisfaction data in addition to application change. When considering qualitative outcome measurements, institutions advocated exploring those very changes outlined in appendix four (e.g. the extent to which awareness has been raised, the extent to which aspirations have been affected, the extent to which students feel they belong etc.). Institutions also suggested that, within broader anticipated impact, bespoke outcomes be considered that are fitting to approach type: an outreach activity targeting P6 students may or may not lead to application change (we will likely never know) but what can be measured is experience of that outreach and how far the participants’ own knowledge, understanding and aspirations have changed as a result of it. Similarly, an influencing the educators approach might eventually affect student choice but again this is more difficult – though not impossible – to measure. What can be measured is the impact on, say, educator knowledge, preparedness to challenge stereotypes and reported changes in practice. Further, owing to the effects of subject and institution differences noted above, it was suggested within the response data that institutions, coming from a place of knowledge and expertise about their own remits, shape their own outcome targets in reference to and negotiation with national drivers. Such broadening and negotiation of outcome and impact measures, naturally, affects any reporting mechanisms that may be put in place but has precedence within institutional and regional outcome agreements.

Another consideration with regard to designing for outcomes that emerged from the response data was forethought as to the use of the findings generated. For example, two interviewees and five consultees questioned the extent to which we plan for utilisation of resources generated from our activities beyond our own institutions: i.e. how can we use our findings to support the wider sector whilst not duplicating existing resource? A good example for this is STEMCentral, generated from the Engineering the Future project, discussed in chapter three. Similar to this, and advocated by nearly a third of response data, was the use of approaches to a) test aspiration theories and b) generate further research. The latter is precisely how Robert Gordon University and the University of Stirling are utilising their impact for access projects. The former, as three institutions highlighted, requires that approaches be allowed to fail since it is often through failure that we are best able to determine what does – and does not – work. Again, any reporting mechanisms must be cognisant of this.

Finally, nearly half of the response data (and 90% of the interviews) highlighted that the type of outcomes outlined above (societal, attitudinal etc.) require long-term approaches. Many referenced Medicine and Veterinary Science as examples of the length of time (decades) required for change to

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113 An example provided was with regard to a course with only two male students in which an increase or decrease of just one appears erroneously large in percentage figures.
114 For further thought on this with regard to widening access more broadly, see Bowes et al 2015 and CFE Research 2015.
115 Perhaps unsurprisingly, universities were more likely to mention the use of activities for the generation of further research.
116 Cf. also the recent SDS equalities action plan for modern apprenticeships which focuses, amongst other things, on pilot projects for the generation of further knowledge regarding what works: Skills Development Scotland 2015.
117 Cf. the examples provided by Fuller et al 2013 and Archer et al 2014a.
occur. Indeed, as one institution put it, “we should not consider equality and diversity to be a finite goal; we will always need to adapt to varying contexts, to undergo a continuous cycle of reviews; we are never going to be finished”. This coheres with the theory of change methodology advocated, a model which focuses on the “iterative development of hypotheses” (Valters 2014: 19). That is to say, it is a process of continuous learning and development in which the monitoring and evaluation of approaches are utilised not for the accounting of success or failure but rather for the informing of future iterations, for the continuous enhancement, here, of student participation and progression.

**Design practicalities**

In addition to theory of change design factors, the response data also yielded two further practical underlying criteria for the design of successful initiatives. These are designing for a targeted audience and designing for complexity.

Many of the interview institutions argued that, in order for an approach to be effective, it should be designed according to its targeted audience. First, three interviewees noted the value of opt out rather than opt in activities. Anecdotally, they illustrated how opt out activities had engaged individuals previously disengaged and disenchanted with school, and resulted in ambitions to pursue counter-stereotypical careers. Unfortunately, little mention was made of this in the research literature. Of particular mention as well in the interview responses was that of age: of those who noted age range, all referenced the need to target younger audiences, particularly at the P6 – S2 level. That is to say, prior to subject choices being made. Whilst examples of this were found in chapter three, such as the CU Fridays and Primary Engineer programmes, focus does tend to lie in that S3+ range. The call to earlier interventions coheres with research findings which illustrate that the educational choice process begins young (Archer et al 2013; Silim and Crosse 2014; Childwise 2015; Dutton and Wooley 2015; Education Scotland 2015b). However, education choice and aspiration development is precisely that: a process comprising many critical points (Tolstrup Holmegaard et al 2015). Hence, whilst we might need to be targeting those of a younger age, we cannot neglect those older. Instead, we should, as Silim and Crosse argue with regard to women in Engineering: “make it an attractive option for girls from an early age, and to keep repeating this message throughout their education and in their lives outside of school” (Silim and Crosse 2014: 1). This longitudinal approach, where we support students across their educational choice process, was one also advocated within the response data.

Another aspect with regard to audience which created much debate was that of gender focus: should approaches be single-sex orientated or should they be open to all? This was particularly discussed within the interviews. Some advocated the utility of single-sex courses whilst others suggested that, although outreach activities could benefit from single-sex focus, it would be inappropriate for programmes of study. Two institutions (colleges) had conducted research amongst their own students regarding single-sex courses and found contradictory responses (one institution reported an overwhelmingly negative reaction, the other an overwhelmingly positive). The attractiveness of single-sex options has been implied by the success of City of Glasgow College’s HNC Women into Engineering and the Edinburgh-based Men in Childcare programmes. Indeed, discussions with student cohorts on both these programmes revealed that being able to study in a single-sex cohort not only made them feel “less weird”, but enabled the creation of networks that supported their success. In outreach too, single-sex programmes have proven attractive as found in Fuller et al (2013) who show how past and current members of a computing club for girls reported this being a factor in both joining and continuing with

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118 Archer et al (2013) note how aspirations remain relatively consistent from age 10-14, suggesting a younger audience is needed if we want to influence their development. Silim and Crosse 2014 also argue that, whilst a critical age for the educational choice process is 16 at which time students are narrowing their subject choices further, their choices are predicated on previously-formed attitudes and perceptions, again suggesting that, if we want to affect attitudinal change, we should work with younger children.

119 We should note here that we will not be delving into the single-sex debate with regard to schools. See Forde et al 2006: 21-23 and Institute of Physics 2012: 15 for discussions on this.

120 Though note that Men in Childcare is an access course.
the club.\textsuperscript{121} There is, however, danger here. As noted in section 4.1, the targeting of gender can lead to an essentialist approach, an approach that does not appreciate that differences within genders are often more acute than those across them. Consequentially, this can lead to a reinforcing of gender stereotypes and a lack of impact, as found in the Fuller et al example. Further, such an approach can encourage a binary view of gender, potentially excluding non-binary gender students, leading to unlawful discrimination. Hence, should single-sex foci be taken up, care should be taken to ensure stereotyping does not occur, that it does not promote gender segregation, that it does not unlawfully discriminate against non-binary gender students and that those delivering such initiatives are able to prove that the single-sex orientation is a proportionate means of achieving a legitimate aim. Monitoring and evaluation of the outcomes – both intended and unintended – of such activities would help support and inform future work in this area.

What the above reiterates is that the supporting and influencing of educational choice process and aspiration development is, again, complex. As nearly 40% of the response data argued, we are talking here not about simply underrepresented genders but about each individual student with their own unique background, familial, social and personal influences. Further, we are talking about individuals with intersecting identities whose interacting identity factors affect not only their gender identity negotiations but also the shaping of their aspiration development (Forde et al 2006; DeWitt et al 2011; Kintrea et al 2011; Cooper 2013; Ward 2014). Hence, one-size will not fit all: what works for one sector, one institution, one cohort, one student might not work for others and we must be flexible to this.\textsuperscript{122}

\textit{Design strategy}

The final area with regard to design that emerged from the response data was that of design strategy; that is to say, the strategic design of approaches within and across institutions and the nation as a whole. With regard to internal strategic design, institutions within the response data suggested that approaches tackling gender imbalances should operate from a place of both strong leadership and dispersed operation. The requirement of strong leadership was noted in just over a quarter of responses with one institution highlighting the benefits of this being embedded within current leadership of widening access and equality and diversity initiatives, reflecting the potential outlined in section 3.1. This coheres with the research literature (Donnelley 2007; Equality Challenge Unit 2014; Institute of Physics 2015). Within these same responses, the need for flexibility to allow for dispersed management of subject-specific approaches was advocated. As one interview response reported, allowing for subject focus means that we can capitalise on subject links, focus on subject needs, bridge the gap between policy and practice and develop commitment on the frontline.\textsuperscript{123} This dual model – strong leadership with dispersed operation – requires mechanisms for effective oversight to ensure a joined-up approach is taken in which the independence of subject-specific initiatives is able to be placed within the overarching jigsaw of institutional activity, contributing to and cohering with a cohesive, strategic plan of action. The newly established cross-college action gender group at Ayrshire College is a good example of one of the ways in which this oversight can be achieved.

The jigsaw is not just, however, institutional. As nearly three-quarters of response data noted, and as mentioned in chapter one, the tackling of gender participation imbalances is not just a college or university issue; it is one that needs to be addressed by all levels of society if we are going to achieve real and sustained change. Hence, it was suggested that the work of colleges and universities should be part of a larger, national campaign. Within the interview responses in particular, the role of schools and industry were highlighted (as well as the media).\textsuperscript{124} We have suggested how institutions can support

\textsuperscript{121} 60% of past members and 80% of current members reported this, with 85% of current members giving it as a reason for continuing. Note, however, how only 11% of current members reported it being an essential feature and how 35% of past members reported that it was not important.

\textsuperscript{122} As observed especially by Archer et al 2014a, 2014b.

\textsuperscript{123} As also advocated by Equality Challenge Unit 2013a: 29.

\textsuperscript{124} Cf. WISE 2012 who argue that some girls perceive a greater threat of sexism within STEM workplaces and are thus disinclined to pursue STEM careers.
change in schools and the workplace through their current activities in sections 3.2 and 4.1; they can, similarly, utilise their industry links to support initiatives being undertaken at this level. Further, these sectors are not unaware of their own role and are already taking, and are willing to take, action. However, as Education Scotland 2015c suggests, there can be a lack of awareness and communication across sectors regarding their activities. Indeed, as half of the interview responses suggest, there can also be a lack of awareness and communication across the post-16 education sector itself regarding activities tackling gender imbalances. This in itself is not necessarily negative. The dual model discussed in relation to institutions applies here too: there is utility in a dispersed operation in which each sector and institution within that sector can play to their strengths and needs. However, as with this internal model, external oversight would ensure a cohesive and strategic approach into which institutions would fit. Scotland’s colleges and universities do not need to have this oversight themselves; however, to ensure effective contributions to a national strategy, awareness and sharing of practice across the nation’s sectors would support Scotland’s colleges and universities in their work. Furthermore, inter- and intra-sector working would support this wider national strategy. Nearly half of the response data mentioned that collaborative and partnership working between institutions, between the college and university sector and across all sectors (including schools, industry, local authorities, PRSBs etc.) would enable not only the maximising of staff capacity, expertise and institutional resources, but also prevent unnecessary duplication of activity. We saw effective examples of such partnership activity in section 3.1 with Fife College’s work on the Fife STEM strategy, Ayrshire and Forth Valley College’s SDS-funded challenge fund projects and West Lothian College’s participation in an occupational segregation project steering group, all of which aim to support a regional approach to tackling gender inequality. Such collaboration and partnership is advocated also in the research literature (Riddell et al 2006; Donnelley 2007; MacBride et al 2010; cf. Skills Development Scotland 2015). However, as one interviewee noted, in order for such activity to be effective, it needs to be action and outcome driven. We would further suggest that this does not mean that all activity should be collaborative or in partnership, but rather that — when best for effective outcomes — such activity can complement the independent work of institutions.

**Approach design summary**

Thus, in short, with regard to approach design, the response data, supported by the research literature, advocated a theory of change approach incorporating activities sensitive to their intended audience whilst cognisant of the complexity of gender identities and the educational choice process. The dual model of strong leadership and dispersed operation was also advocated both within institutions and across the nation, yielding a national campaign in which Scotland’s colleges and universities undertake individual, collaborative and partnership activities that are strategically coordinated at the institutional, sector and national level.

### 4.3 Approach support

The third thematic area to emerge from the interview and consultation responses was that of support for institutions and the post-16 education sector in their tackling of gender participation imbalances. This support comprised two types: institutional and sector. We begin with the institutional.


126 Royal Society of Edinburgh 2012’s recommendations would suggest that this was the remit of the Scottish Government.

127 We note that duplication is not necessarily unwarranted if approaches are targeted at local levels.
Institutional support

Response data comments on institutional support matched closely the thematic areas discussed in section 3.1 on infrastructure. With regard to systems, in addition to the leadership and oversight mentioned above, institutions also discussed integration into policies and processes and the utility of effective data, monitoring and evaluation systems. 60% of interviewees and 45% of consultees advocated the integration of gender equality into internal quality mechanisms (e.g. programme validation and reviews, self-assessment processes, ELIR and Education Scotland reviews, enhancement themes etc.), policies and strategies (e.g. regarding widening participation, learning and teaching, strategic plans etc.) and external drivers (e.g. equality outcomes and outcome agreements). Such embedding is also advocated by the research literature (Donnelley 2007; Hayward and Spencer 2010; WISE 2014). Especially noted in the response data was the need to ensure data disaggregated at the subject level was not just accessible by all staff, especially those responsible for learning and teaching and widening access activities, but also incorporated into annual review activities. Finally, with regard to monitoring and evaluation, institutions highlighted that such activity was necessary (as per section 4.2) and that effective systems needed to be in place to support this. However, it was also noted by two interview institutions that the sector is undergoing reporting fatigue and that, in line with the theory of change methodology, this monitoring and evaluation would be best utilised for the internal development of the enhancement process rather than for an accounting of success or failure.

With regard to what we call human in chapter three, the response data suggested the raising of awareness, understanding and skills of staff to tackle gender inequality through professional development activity, a strategy again advocated elsewhere (Faulkner 2006; Henriksen et al 2015; Institute of Physics 2015). The interviews in particular observed how current activity tends to be driven by individual staff or students who are personally motivated in their activities (e.g. because they themselves were a minority gender during their studies or in other employment). Although there is nothing wrong with this, for sustainable change to occur all staff members need to recognise their role in, and work towards, both the genderisation of learning and teaching and the tackling of gender participation imbalances. Whilst embedding in professional development activities goes some way towards this, interviewees also advocated incorporation into the personal development planning process and into workload planning to support motivation towards and capacity for activities.

Unfortunately, internal resource support appeared rarely in the response data and when it did orientated around research activities. This has been touched upon in section 4.2 and will be explored further in sector support below.

With regard to what we call relationships in chapter three, the response data indicated that the dual model outlined in section 4.2 required effective connections. This involves infrastructural mechanisms for the supporting of collaborative and partnership activity both internally and externally (cf. MacBride et al 2010; Education Scotland 2015b), the potential for which, we argued in chapter three, already exists. This also requires, on a more practical level, clear points of contact accessible to those both within and outwith institutions. Indeed, it was noted by three of the interviewees and seven of the consultees that initiatives, especially those requiring partnership work, tended to rely on pre-established relationships and thus were vulnerable to collapse with changing remits or jobs at which times it can become difficult to know who best to contact to maintain the partnership activity. Clear, regularly updated, points of contact relating to job remit rather than individuals, it was suggested, would help to overcome this problem.

Internally, it was also suggested that a) institutions support strong student-staff relationships for the development of student association activity and b) institutions develop infrastructural mechanisms for the interactions of gender equality, access and learning and teaching staff. The former reflects the

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128 Education Scotland 2015b especially advocates the use of college regional outcome agreements for the mainstreaming of gender equality. This reflects the broader suggestion to embed equality and diversity more generally into such systems explored in section 3.1 and further recommended by Gunn et al 2015.
strong work of students’ associations witnessed across chapter three. The latter coheres with Equality Challenge Unit research which argues for the alignment of widening access and equality and diversity more generally (Equality Challenge Unit 2013a) with the incorporation especially of subject specialists. The latter too coheres with a common suggestion within the interviews (7/10) that institutions tap into current widening access initiatives for the development of their gender equality work thus capitalising on, and maximising the use of, existing external connections and internal expertise.

Sector support

Response data comments on sector support have already been anticipated throughout this chapter. For example, a key area which institutions observed would support initiatives is anticipated in section 4.2 in the suggestion of a coordinated and strategic national campaign – which includes media activity – and strategy for the tackling of gender participation imbalances, driven by SFC, SDS and the Scottish Government. This, they suggested, would not only provide impetus and weight to institutional activities but also keep the redressing of the issue as a priority measure. However, even with this, as nearly all of the response data acknowledged, space, time, finance and resource are required.

Although the term was not utilised, a brokerage role for SFC was envisaged as best supporting institutional activity. For example, both response types suggested that this organisation could support the development of the infrastructural mechanisms needed to enable the external relationships required for the collaborative and partnership work outlined in section 4.2 as well as the communication activities required to ensure a national strategic approach. In practical terms, for example, it was suggested by three of the interview institutions that SFC develop a national hub. The form and activities within this were debated (virtual spaces for collaboration similar to the Glow network, conferences, sharing of good practice and relevant research, brokeraging connections between institutions and industry for work placements, hosting and keeping up to date clear point of contact details etc.), but the remit remained the same: supporting the sharing of good practice and collaboration across the sectors. For two institutions in particular, a virtual space (similar to STEMCentral) was advocated as enabling not only this brokerage role but also the collation and curation of good practice resources, of which there are many (e.g. as produced by WISE, Equate Scotland, Institute of Physics, ECU, CDN, HEA etc.), to both support institutional activities and prevent duplication of effort. It was also suggested, to again support this collaborative ethos and a theory of change methodology, that SFC’s reporting mechanisms with regard to gender imbalances continue to allow for both regional and institutional negotiated targets and outcomes in which institutions are given room to experiment to best determine what works and so to better support an iterative process of enhancement.

Finally, support was sought from sector agencies such as CDN, ECU, HEA and sparqs in the form of a) developing further resources and research and b) supporting the development of student and staff capacity and confidence in the redressing of the issues. Indeed, the former of these – the need for further research to better understand what works and resources to support our efforts in this – was echoed across all of the interviews and most of the consultation responses. It was suggested in section 4.2 that the very activities tackling gender participation imbalances could be a method by which resources and research were generated – as long as such outputs were shared effectively and efficiently – and, indeed, that this could be a targeted outcome of gender action plans. Further areas for research have also been noted throughout this report. However, we must not forget that a lot of research has already occurred, especially in relation to STEM subjects, on educational choice process and aspiration development and, as Ryder et al 2015 suggest:

“It could be argued that we already know all we need to know about how young people make educational choices […]. Our perspective is that research activity is still needed, but

129 SDS’ equality action plan (Skills Development Scotland 2015) is a good example of this. The resources developed by WISE, such as the People Like Me resource pack, the Positive Connections guidance, the Science: it’s a people thing workshop pack etc. are also excellent examples for the school sector on which we could build: https://www.wisecampaign.org.uk/resources (last accessed 29.01.2016).
that more effort needs to be placed on the design and long-term evaluation of educational interventions aiming to impact on subject choice.”

(Ryder et al 2015: 364)

That is to say, we turn our attention to testing the theories and models the research suggest could work through the development of longitudinal intervention-based studies to assess and refine their recommendations for our own sectors, institutions, subjects and student cohorts.

Approach support summary

Thus, in short, the supporting of approaches tackling gender imbalances operates at both an institutional and sector level. Institutions should, it was suggested, provide the infrastructural support that allows for the dual model of strong leadership and dispersed operation, embedding the tackling of gender participation imbalances in policies, processes and systems, motivating and supporting their staff to do so through CPD, workload allocations and PDP processes and providing the mechanisms for effective relationships across the organisation but especially between equality and diversity, widening access and learning and teaching staff. Support from the sector was also envisaged as infrastructural, with the supporting and development of mechanisms for collaborative and partnership working, the development of reporting mechanisms appropriate to a theory of change methodology, the provision of brokerage activities and systems as well as of capacity and finance release, and the development of – and support for – further research and resources.

4.4 Closing what works

Therefore, whilst there is a general perception that we do not know what works for the tackling of gender participation imbalances, we have uncovered in this chapter, through the response data and research literature, underlying criteria and design principles for what is thought to be the best ways forward, based on years of expertise and experience. It is in these that value lies. Indeed, as Thomas (2012: 9) argues in her summary of the HEA’s What works? programme, “the exact type of intervention or approach is less important than the way it is offered and its intended outcomes”. Hence, we offer here, by way of a summary, a provisional framework for the tackling of gender participation imbalances that is based not on specific initiatives or activities but rather on the principles explored above. We should note that this framework is exactly that: provisional, a hypothesis regarding ways forward that needs to be tested within the sector. It is illustrated diagrammatically in figure four.

It hypothesises that underpinning approaches tackling gender participation imbalances would be:

- a drive to support the development of young people’s and students’ identities with regard to subject choice and future employment;
- a drive to challenge gender stereotypes and increase the awareness, willingness and ability of others to do the same, facilitating the realisation that it is everyone’s responsibility.

These principles would be braced by the foundations of strong institutional infrastructures and sector support. The former of which comprises robust systems for strategic oversight and institutional commitment, staff development and resource support for motivation and capacity, and mechanisms for the development and support of effective relationships. The latter comprises support mechanisms for collaborative and partnership working, appropriate reporting mechanisms, the brokerage of activities and systems, capacity and finance release and the development of further research and resources.

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130 A programme focused on retention and success but whose lessons are applicable to participation imbalances.
These foundations would sustain and power an approach that incorporates all four of the foci of influencing the influencers, raising awareness and impacting on aspiration, encouraging applications and supporting success. These foci both overlap and feed into one another (e.g. supporting success can result in the influencing of influencers in the increasing of our current students’ gender competence) and encompass the entirety of the educational choice process.

Finally, the approach would be coordinated at the institutional, sector and national level, developed following a dual model of strong leadership and dispersed operation, contextualised by institution, subject and student cohort, in which strategic oversight, direction and coordination enable an understanding of and coherence with institutional, sector and national strategies. Its initiatives would be targeted according to audience, whilst ensuring that they do not assume essentialist approaches to gender nor reinforce gender stereotypes. Finally, it would also, we would argue, be best designed following a theory of change methodology in which longitudinal intervention-based studies are utilised for the enhancement of our understanding of, and resources for, what works as well as for the continuous enhancement of student participation and progression in a process of iterative development and change.

Figure 4: Provisional Framework
5. Ways forward

This research project set out to map the approaches currently being utilised to tackle gender participation imbalances in Scotland’s colleges and universities, and to assess what approaches work best and why. The qualitative analysis conducted has revealed an abundance of activities – mainly focused on outreach, marketing and supporting student success – and areas of future potential for which the groundwork, and strong models, often already exists. This research yielded a variety of exempla of practice from which we hope the sectors can learn and develop, most of which, admittedly, stemmed from STEM subjects (more work is needed for female underrepresentation in Automotive Studies and male underrepresentation generally). However, despite years of activity, many of the institutions within the sectors – and indeed the sectors in general – are just now beginning to address the issue in a strategic manner, bringing together scattered initiatives into an overarching plan of action. Further, it is clear that currently these initiatives are the remit of a select, admittedly extremely motivated and committed, few; more is needed to engender sector-wide commitment and capacity, supporting the realisation that this work is everyone’s job.

Nevertheless, as our analysis uncovered, the sectors have garnered extensive understanding about the underlying criteria and design factors for successful, sustained approaches, from their years of expertise and experience. Capitalising on this, incorporating it into plans of action and utilising their role within the broader educational and societal framework of the nation, Scotland’s colleges and universities have real potential to drive activity that – as part of a broader, collective, national strategy – could impact on educational choice processes, aspiration developments and career trajectories so as to support societal change.

We close this report by offering recommendations that we theorise might support Scotland’s post-16 education sector in their work tackling gender imbalances. These recommendations are based on the approach advocated in section 4.4, which concentrated on methodological underpinnings rather than specific initiative type and composition.\textsuperscript{131} Whilst the remit of the research focused specifically on Scotland’s colleges and universities, we hope it will be of use to a wider range of audiences, and that interested and relevant institutions, sectors and nations will be motivated to use the information to develop their own policy and practice to support the rebalancing of gender inequalities within education systems.

To develop institutional infrastructures, we recommend that Scotland’s colleges and universities begin to, or continue to develop their work to:

1. Develop **institutional commitment** that is reflected in strong leadership and in institutional documentation (e.g. strategic plans, policies, strategies, websites etc.) to cultivate an institutional – and cumulatively sector – ethos for the tackling of gender participation imbalances. Institutions might want to consider:
   a. Capitalising on, and strengthening where necessary, existing commitment frameworks for equality and diversity as well as widening access.
   b. Ensuring gender equality is not subsumed by broader equalities agendas whilst also ensuring that a focus on gender does not subsume other equality and diversity priorities.
   c. Developing further commitment frameworks for gender equality that could be utilised and adapted in the long term for the tackling of other participation imbalances.

2. Ensure **strategic oversight** of institutional approaches that enables activities to be developed from, and ensure they cohere with, an overarching institutional approach to change that has strong leadership but is flexible enough to enable subject-specific variations and foci. Institutions might want to consider:

\textsuperscript{131} Though we should note that discussions within each section of chapters three and four might support the shaping of such initiatives (e.g. with regard to use of role models, mentoring activities etc.).
a. Utilising existing mechanisms for oversight, such as Athena SWAN charter self-assessment teams or equality and diversity groups, whilst developing new mechanisms, such as cross-institution gender action groups with senior involvement, subject-specific leads and action-based remits.

b. Integrating into internal quality mechanisms (e.g. programme validation and reviews, self-assessment processes, ELIR and Education Scotland reviews, enhancement themes etc.) and external drivers (e.g. equality outcomes and outcome agreements).

3. Utilise **existing systems** for the disaggregation of institutional data (participation, success, progression etc.) at the subject level, benchmarked accordingly, and the monitoring and evaluation of existing work for consideration at annual subject reviews, institutional board meetings, senior management planning days etc., for informing the future development of subject and institutional activity.

4. Develop the **capacity and motivation of all staff**. Institutions might want to consider incorporating this work in ongoing continuing professional development activities, aligning to professional standards, developing relevant resources, embedding in professional development planning, promotion and award processes, incorporating within workload allocations and supporting through internal funding.

5. Support internal and external **techniques of relation** through the formalising of infrastructures and mechanisms that enable effective and change-driven relationships to develop. Institutions might want to consider:
   a. Capitalising on existing internal mechanisms whilst aligning those in particular with remits for widening access, equality and diversity, learning and teaching and student association work.
   b. Capitalising on existing external mechanisms for relationship building such as academies, hubs, links with PRSBs, local authorities and industry etc., whilst developing new ones where appropriate for gender equality work that could be reconfigured in the long term for other participation imbalances.
   c. Making clear, within an understanding that everybody has a part to play, specific job remits for the tackling of gender participation imbalances and explicitly communicating points of contact according to job role rather than individual staff.

In the strategic development of approaches, we recommend that Scotland’s colleges and universities begin to, or continue their work to:

6. **Adopt a theory of change methodology**. This involves cultivating evidence-based, outcome- and impact-informed approaches and activities that are regularly monitored and evaluated to feed in to a long-term, iterative process of change.

7. **Develop holistic and longitudinal approaches** that support young people throughout their educational choice process, aspiration development and career trajectories from primary school to post-graduation, targeting activities to audience without adopting essentialist approaches nor reinforcing gender stereotypes, but rather challenging gender norms and facilitating the capacity and willingness of others to do the same.

8. **Adopt a multi-pronged approach** that combines the four foci of influencing of influencers, raising awareness and impacting on aspirations, encouraging applications and supporting success. Institutions might want to consider capitalising on existing approach infrastructures such as, though not limited to, teacher CPD, undergraduate curricula, outreach activity, marketing fora, school visits etc.
9. Support student involvement in approaches through the development of student-led, student-staff co-created, and student-delivered initiatives, maximising especially on the role of gender-focused student societies, liberation officers (especially women’s officers) and Interconnect champions. Institutions might want to consider exploring the viability of equivalent posts for the underrepresentation of men.

10. Work institutionally, in collaboration with other institutions and in partnership with other sectors – as appropriate – for the development of action-focused and outcome-orientated activities, with institutional, sector and/or national oversight, for the maximisation of staff capacity, prevention of unnecessary duplication of effort, and enhancement of impact potential. Institutions might want to consider:
   a. Ensuring strategic oversight of not just institutional activities, but also of how these fit within the larger jigsaw puzzle of sector, regional and national strategies and campaigns.
   b. Enhancing communication and awareness across, within and between institutions and sectors regarding approaches undertaken and lessons learned to share practice and ensure cross-sector support.
   c. Capitalising on existing subject networks for the collaborative maximisation of subject experience and expertise.

11. Utilise approaches, incorporating longitudinal intervention-based studies, to test education choice and aspiration development theories, assess and refine their recommendations for our own sectors, institutions, subjects and student cohorts, and develop resources and research for further incorporation into enhancement activities.

12. Capitalise on external enablers such as national campaigns, charter marks, sector projects and initiatives, local authority activities, other equality and diversity work etc. to embed approaches within wider gender equality work, making the most of external expertise, experience, connections and resources and so gaining further traction and impact.

To support institutional approaches to the tackling of gender imbalances, we recommend Scotland’s sector agencies and wider authorities begin to, and continue their work to:

13. Develop a national campaign and strategy, of which colleges and universities form but a part, keeping the addressing of gender equality a priority measure whilst supporting the activity of educational institutions through broader societal change.

14. Ensure any reporting mechanisms with regard to gender imbalances allow for both regional and institutional negotiated targets and outcomes in which institutions are given room to experiment and best determine what works and so to better support an iterative process of enhancement.

15. Support institutional release of staff capacity, time and space through provision of, or direction towards, financial and resourcing support.

16. Adopt a brokerage role, supporting the development of infrastructural mechanisms for external relationships for collaborative and partnership work and the sharing of good practice. SFC might in particular want to consider creating a virtual and physical hub of and for practitioners for the sharing of good practice, collation and curation of relevant research and resources, hosting of points of contact and connecting of relevant partners.

17. Broaden remits of sector agencies and organisations to support, for example, the Athena SWAN charter’s use in colleges or the development of equivalent organisations to WISE or Equate Scotland for underrepresented men, also enhancing the capacity of institutions to access the organisations’ work.
18. Develop **resources, further research, and staff development support** for the increasing of student and staff capacity and confidence in the addressing of the issues. Institutions, sector agencies and wider organisations might want to consider:

a. Capitalising on existing research and development activities (e.g. of such centres as University of Edinburgh’s CREID, Edinburgh Napier University’s Equate Scotland or of such organisations as the HEA, CDN, ECU, WISE etc.).

b. Funding further research and development activities internally or externally, including for the evaluation of future longitudinal intervention-based studies. We would particularly recommend five further areas of research:

   i. Institutional-research on the student choice process of their own potential, declined and current students for a better understanding of institutional contexts, taking into account the disjunctions between students’ retrospective accounts of their education choice process and their snapshot narratives, as discussed in Ryder et al (2015: 361-364).

   ii. Subject-focused research, especially with regard to the underrepresentation of men, to complement the existing work with regard to STEM subjects.

   iii. A full literature review of national and international research on the tackling of gender imbalances to complement this research report.

   iv. Broader research on the tackling of gender participation imbalances at the postgraduate level.

   v. A complementary piece to this research project concentrating on students as research subjects.
6. Appendices

Appendix one: Scottish Funding Council consultation questions

1. Of the work currently being undertaken by Scottish colleges and universities to address gender imbalances at a student level:
   a. What do you think is working well? Why do you think this?
   b. What do you think is working less well? Why do you think this?
   c. What could be done to improve this work?
   d. What could be done to improve this work and what do you think the gaps are, and how can these gaps can be filled – by the sectors, SFC and SDS?

2. Much of the work to tackle gender imbalances by the sectors requires close partnership working with schools:
   a. How can colleges and universities enhance their work with schools?
   b. What are the current issues in working with schools?
   c. What can SFC do to support this work?

3. The key aims and subject focus for the Gender Action Plan are outlined in the consultation document:
   a. Do you think they are appropriate? Why / Why not?
   b. What outcomes do you think are missing? Why do you think they are important?

4. What are the key activities colleges and universities should undertake to meet these outcomes?

5. How can SFC best support the sectors to deliver these outcomes?

6. What level of change can we expect from both sectors in 10 years?

7. Is there any further evidence you would like to draw to our attention on what works to address gender imbalances?
Appendix two: Focus interview invitation letter

Invitation Letter: qualitative study

Dear Colleague,

**Approaches to tackling gender imbalances at the subject level in Scotland’s colleges and universities: invitation for informal interviews**

The Scottish Funding Council (SFC) has commissioned the Higher Education Academy Scotland to conduct short-term research (September 2015 - December 2015) on the approaches utilised by Scottish colleges and universities in tackling gender imbalances in student participation at the subject level, with particular focus on women in Computing, Construction and Engineering and men in Care, Education and Nursing. The research intends to support the SFC in developing its Gender Action Plan as well as to support Scottish post-16 education providers in working towards this plan.

The research intends to:

- map the current approaches utilised to tackle gender imbalances at subject level across colleges and universities in Scotland;
- determine what approaches work best and why in terms of achieving sustained change in relation to gender imbalance;
- identify what we can learn from the approaches implemented across colleges and universities;
- offer recommendations for tackling gender imbalance to achieve sustained improvements.

In addition to desk-based research, a review of grey literature and consultation with relevant sector agencies, the research team are inviting select institutions to share their knowledge and experience of tackling gender imbalances via an informal interview. The information people give us in interviews will be used to help the research team better understand the barriers and routes to sustained successful approaches as well as lessons learned from previous initiatives. It will also give institutions a chance to input into the research and recommendations informing SFC's Gender Action Plan.

We are contacting you as our nominated equality contact for your institution to find out if you, and/or a suitable individual(s) within your institution, would be willing to share your knowledge, experience and opinions in this area.

Most interviews run for approximately 45-60 minutes and there is more information below on the kinds of topics covered. Interviews are taking place either by Skype or in person (we would liaise with you as to most appropriate medium for you and/or your nominated individual(s)). Owing to the short-term nature of the research – SFC’s interim action plan will be published in December 2015 – we aim to have completed interviews by the end of November 2015.

If you are willing / able to partake in this research and share your experience / views, please email the research lead on pauline.hanesworth@heacademy.ac.uk and we will get in touch regarding dates / times and formalities.

If you feel that someone else within your institution is best placed to discuss this with us, please do forward this invitation on to the relevant individual(s).

We look forward to hearing from you.

Many thanks,
Pauline Hanesworth and Lynda Smith
Further information about the informal interview:
By the end of the informal interview, we hope to have covered the following:

- What approaches is your institution adopting – and has your institution adopted in the past – to tackle gender imbalances at the subject level?
- Why were these approaches chosen by your institution, which of them “worked” (or not) and why?
- What does your institution think are the best ways to tackle gender approaches? Why?
- What has your institution found to be the barriers to developing and delivering successful initiatives for the tackling of gender imbalances at the subject level?
- What is needed to overcome these barriers?
- What has your institution found to be the underlying criteria for successful initiatives tackling gender imbalances at the subject level?
- What changes does your institution think are required at a national, sector, institutional and/or subject level for sustained changes to be made?
## Appendix three: Analytical framework

<table>
<thead>
<tr>
<th>Code*,**</th>
<th>Description (through exemplia type)***</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Context</strong></td>
<td>**</td>
</tr>
<tr>
<td><strong>Discourse mode</strong></td>
<td>Report, legislative requirement, outcome agreement, review, award application, marketing material, strategy, policy, research, informal consultation, semi-formal interview, formal consultation, virtual consultation, face-to-face consultation</td>
</tr>
<tr>
<td><strong>Discourse context</strong></td>
<td>Date, time, capacity, resource</td>
</tr>
<tr>
<td><strong>Discourse author</strong></td>
<td>Individual author, collective author, author’s role in organisation, prior relationship between author and researcher</td>
</tr>
<tr>
<td><strong>Discourse purpose</strong></td>
<td>Regulatory, persuasive, argumentative, conversational, instructional</td>
</tr>
<tr>
<td><strong>Discourse norms</strong></td>
<td>Codes of conduct, discourse conventions, behavioural expectations</td>
</tr>
<tr>
<td><strong>Approach type</strong></td>
<td>**</td>
</tr>
<tr>
<td><strong>Infrastructural</strong></td>
<td>Processes, policies, strategies, capacity building, action research, knowledge generation</td>
</tr>
<tr>
<td><strong>Outreach</strong></td>
<td>Summer schools, school visits, open days, site experiences, conferences, tasters, masterclasses, mentoring, peer observation, information talks, progression schemes</td>
</tr>
<tr>
<td><strong>Marketing and recruitment</strong></td>
<td>Marketing materials, use of role models, naming and advertising of modules, equitable admissions systems, gender equality training of recruitment staff</td>
</tr>
<tr>
<td><strong>Information, advice and guidance</strong></td>
<td>External documents, staff development, information and practice sharing with teachers and parents, staff mentoring, transition activities, online information and support networks, student mentoring</td>
</tr>
<tr>
<td><strong>Co-curricular and student support</strong></td>
<td>Clubs, mentoring, conferences, student union activities, personal tutor systems, financial support, welfare and pastoral support, additional learning and teaching support</td>
</tr>
<tr>
<td><strong>Learning and teaching practices</strong></td>
<td>Pedagogical, curriculum design, content and assessment, skill development</td>
</tr>
<tr>
<td><strong>Learning and teaching environment</strong></td>
<td>Supportive learning environments, encouraging challenging of stereotypes and inappropriate behaviour, challenging dominant voices, creating flexible timetables, intervention and early warning systems</td>
</tr>
<tr>
<td><strong>Approach overview</strong></td>
<td>**</td>
</tr>
<tr>
<td><strong>Stage</strong></td>
<td>Focused on pre-entry, transition, articulation, first year, exit</td>
</tr>
<tr>
<td><strong>Scope</strong></td>
<td>Subject, discipline, faculty, institutional, regional, sector, national</td>
</tr>
<tr>
<td><strong>Target</strong></td>
<td>Gender, intersectional, equality and diversity, widening access and participation</td>
</tr>
<tr>
<td><strong>Duration</strong></td>
<td>New approach, 1-2 years, 2-5 years, 5+ years</td>
</tr>
<tr>
<td><strong>Focus</strong></td>
<td>Short-term, medium-term or long-term change</td>
</tr>
<tr>
<td><strong>Delivery</strong></td>
<td>Individual staff, teams, cross-institutional teams, partnership teams, student involvement</td>
</tr>
<tr>
<td><strong>Partnership</strong></td>
<td>Collaboration with primary school, secondary school, college, university, discipline communities, industry, families, communities</td>
</tr>
<tr>
<td><strong>Approach purpose and development</strong></td>
<td>**</td>
</tr>
<tr>
<td><strong>Rationale</strong></td>
<td>Analysis of qualitative data, analysis of quantitative data, use of theory and research, instinctive, common practice</td>
</tr>
<tr>
<td><strong>Transformational aim</strong></td>
<td>Practice change, policy change, societal change, access and participation change, increase student attainment</td>
</tr>
<tr>
<td><strong>Aspirational aim</strong></td>
<td>Raise student aspirations, raise expectations of students, raise expectations by students</td>
</tr>
<tr>
<td><strong>Practical aim</strong></td>
<td>Enhance student preparedness, manage student expectations, inform student</td>
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</table>
choice, create effective environments, increase understanding, knowledge and skills, raise awareness, enhance curriculum design, promote student engagement, support student transitions, nurture student belonging, encourage challenging of behaviours, attitudes and practices.

<table>
<thead>
<tr>
<th>Infrastructure</th>
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<tbody>
<tr>
<td>Remit</td>
</tr>
<tr>
<td>Whose responsibility is tackling gender imbalances? Equality and diversity staff, widening participation staff, senior management, departments, everyone</td>
</tr>
<tr>
<td>Institutional commitment</td>
</tr>
<tr>
<td>Vision, mission statement, website, prospectus, policies, procedures, strategies, SMT leadership, recruitment, reward, recognition, annual review, encouragement to embed and take part, creation of flexible infrastructure for approaches, support for monitoring and evaluation</td>
</tr>
<tr>
<td>Knowledge enhancement</td>
</tr>
<tr>
<td>Data collection, data sharing, standardised practice, staff CPD, sharing of successes, student CPD, staff with expertise leading on practices</td>
</tr>
<tr>
<td>Resources</td>
</tr>
<tr>
<td>Financial (sector, institutional), human, physical</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Monitoring and evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring frequency</td>
</tr>
<tr>
<td>Approaches monitored and evaluated regularly, informally, formally, not at all, standardised practice</td>
</tr>
<tr>
<td>Monitoring type</td>
</tr>
<tr>
<td>Approaches monitored and evaluated through equality impact assessments, reports, data analysis, qualitative research</td>
</tr>
<tr>
<td>Quantitative success measures</td>
</tr>
<tr>
<td>Number of individuals taking part, increased applications, increased number entering study, increased retention, increased satisfaction and engagement, increased number in employment / postgraduate study</td>
</tr>
<tr>
<td>Qualitative success measures</td>
</tr>
<tr>
<td>Aspiration to study, greater understanding of benefits of studying (parents / teachers / employers), ability to engage and complete, institutional understanding, aspiration to enter profession</td>
</tr>
</tbody>
</table>

* Although codes and categories are general, they are applied specifically – unless otherwise noted – to gender participation and progression. For example, whilst many different learning and teaching practices can be utilised for the furtherance of gender equality, only those that are specifically claimed to be utilised for that aim are counted.

** Distinctions between codes are artificial and used for analysis purposes only; the researchers recognise that overlap exists (e.g. between ‘information, advice and guidance’ and ‘marketing and recruitment’).

*** The exempla provided in descriptions are meant to give a flavour of the focus of each code rather than to fully define them: data coding is not limited to just those given.
### Appendix four: Provisional logic frame

<table>
<thead>
<tr>
<th>Impact</th>
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<tbody>
<tr>
<td>Reduction of gender participation imbalances in post-16 education</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Medium-term outcomes</th>
<th><strong>Application change</strong> with increased applications to subjects from specific genders</th>
<th><strong>Attitudinal change</strong> to subjects and institutions regarding specific genders</th>
<th><strong>Success change</strong> with gender balance of retention and attainment</th>
<th><strong>Institutional change</strong> in policies, practices and processes to attract and retain gender balance</th>
<th><strong>Societal change</strong> through exiting graduates tackling gender imbalances and entering imbalanced professions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short-term outcomes</strong></td>
<td><strong>Access</strong> Raise aspirations to study Inform student choice Inform parents’, teachers’, employers’ and institutions’ understanding</td>
<td><strong>Transition</strong> Enhance student preparedness and manage student expectations Raise expectations of and by students</td>
<td><strong>Awareness</strong> Raise awareness of gender inequality amongst students, staff, and wider public</td>
<td><strong>Satisfaction</strong> Nurture student belonging Promote student engagement Enhance student satisfaction</td>
<td><strong>Graduation</strong> Increase aspirations and ability to enter professions Increase gender competence of students and staff</td>
</tr>
<tr>
<td><strong>Outputs</strong></td>
<td><strong>Externally focused</strong> Gender-balanced participation in outreach interventions Marketing and recruitment activities and processes that embed gender balance IAG that addresses gender-balanced expectations and preparedness for study</td>
<td><strong>Internally focused</strong> Co-curricular and student support activities that encourage gender-balance in relation to subjects Learning and teaching environments that encourage gender-balanced engagement, participation and belonging Learning and teaching pedagogy and curricula that embed gender equality</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Activities</strong></td>
<td>Evidence-based approaches aimed either externally (information, advice and guidance; marketing and recruitment; outreach) or internally (student support; co-curricular activities; learning and teaching environment; learning and teaching practices).</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td><strong>Resources</strong></td>
<td><strong>Human</strong> Cross-institutional teams with the capacity, ability and desire to create change</td>
<td><strong>Finance</strong> Longitudinal funding that can support the effective planning, delivery and evaluation of approaches</td>
<td><strong>Knowledge</strong> Comprehensive subject, institutional, regional and sector qualitative and quantitative data on which to base approaches</td>
<td><strong>Infrastructure</strong> Efficient and effective systems and physical infrastructure for the design, delivery and evaluation of approaches</td>
<td></td>
</tr>
<tr>
<td><strong>Inputs</strong></td>
<td><strong>CPD and training</strong> Recognition and reward Recruitment and promotion Networks / collaborations / relationships</td>
<td><strong>Sector funding</strong> Institutional funding Collaborative funding</td>
<td><strong>Research</strong> Sharing of best practice</td>
<td><strong>Leadership</strong> Vision, mission and values Policies and strategies Data systems Monitoring and evaluation processes</td>
<td></td>
</tr>
</tbody>
</table>

**Assumptions:**
- approaches that are internally focused also affect an external audience, supporting access and participation;
- activities lead to outcomes but position vertically on chart does not suggest isolated causal relation (e.g. that raising access alone will influence application change). Rather every aspect of every stage supports the next;
- all activities, outputs, outcomes and impacts, whether or not explicitly stated, are with regard to gender imbalance.
Appendix five: Select outreach activities

Key: **Audience**  
- P = Primary, S = Secondary  
- SF = Single sex female, SM = Single sex male, A = All genders, NS = not specified

**Outcome**  
1 = increase interest in subjects  
2 = increase skills in certain subjects  
3 = increase attainment in certain subjects  
4 = increase understanding of the relevance of school subjects to careers  
5 = increase awareness of counter-stereotypical examples within certain careers  
6 = increase awareness of career opportunities  
7 = increase awareness of routes to further study  
8 = increase confidence in and commitment to further study  
9 = increase aspirations towards certain careers

<table>
<thead>
<tr>
<th>Initiative</th>
<th>Description</th>
<th>Outcome</th>
<th>Audience</th>
<th>Subjects</th>
<th>Institutions</th>
</tr>
</thead>
</table>
| Broken Bodies | On campus programme of hands-on workshops in areas such as Food Science and Nutrition, Occupational Therapy, Podiatry and Radiography aiming to encourage young women to consider a career in STEM and young men in Nursing / Allied health professions. Delivered where possible by counter stereotypical students and supported by counter-stereotypical staff.  
- Addresses gender imbalance through balanced participation and presence of counter-stereotypical role models. | 5, 6, 9 | S2 target with P7 – S6 participation A | Nursing Allied health professions STEM | Queen Margaret University |
| Caledonian Club | Variety of project-based programmes in schools and on campus for the raising of attainment and aspirations in low progression areas, used in particular to address attainment, aspirations and participation of male learners.  
- Addresses gender imbalance through balanced participation. | 3, 9 | P2 – S6 A | NS | Glasgow Caledonian University |

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132 This includes only those outcomes explicitly mentioned in the institutional literature.  
133 Ayrshire College is also planning a pan-Ayrshire women in STEM event aimed at S2 schoolgirls.  
134 I.e. through ensuring young people of all genders take part in the programme.
| Creating the Future | One-day event comprising inspirational talks from industry ambassadors and interactive, hands-on workshops and demonstrations aiming to raise awareness of and aspirations towards careers in STEM and to increase understanding of how STEM plays a role in our future.  
  • Addresses gender imbalance through single-sex focus and the presence of counter-stereotypical role models. | 4, 5, 6, 9 | S1 – S6 SF | STEM | University of the West of Scotland |
|---------------------|------------------------------------------------------------------------------------------------------------|------------|----------|-------------------------------|-----------------------------------------------|
| CU Fridays | Offshoot of Children's University: three on-campus hands-on weekly programmes introducing targeted genders to subjects to increase interest and aspirations. Included: 1) You are what you eat; 2) Design your own computer game using Xbox controllers; 3) Allied health professions.  
  • Addresses gender imbalance through single sex focus. | 1, 9 | P1 – S1 SF (1, 2) SM (3) | (1) Food Science and Nutrition (2) Computer Science (3) Allied health professions | Queen Margaret University |
| East Renfrewshire Taster Programme | Three-week taster\textsuperscript{135} programme where students are able to actively participate in 18 different course options, aiming to raise awareness of routes to and commitment to further study, raise interest in subjects and challenge gender balances by obliging students to taste non-traditional subjects.  
  • Addresses gender balance through balanced participation. | 1, 7 | NS A | All | Glasgow Clyde University |
| Educated Pass | Six-session programme with boys’ football teams using sports-related courses as a hook to increase commitment to and awareness of routes to further study and giving general advice on education and educational pathways.  
  • Addresses gender imbalance through single sex focus. | 7, 8, 9 | Secondary SM | Sport | University of Edinburgh |
| Engineering Accelerate | One-week widening access summer programme for pupils thinking of going to university, the participants of which have the opportunity to work with mentors comprising current undergraduate and postgraduate students and past programme participants.  
  • Addresses gender imbalance through ring-fencing places for women and presence of counter-stereotypical role models. | 5, 7, 8 | S4 – S6 A | Engineering | University of Strathclyde |

\textsuperscript{135} New College Lanarkshire also mentions taster sessions for male students in female-dominated subjects in its literature whilst Dundee and Angus College note that they intend to utilise taster opportunities for the development of awareness and raising of interest from non-traditional participants.
| Girls into Engineering | Three-day taster course for girls interested in engineering, including talks from engineering professionals and educators and hands-on workshops.  
• Addresses gender imbalance through single sex focus and presence of counter-stereotypical role models.  
4, 5, 6, 9 | S4 – S6 SF | Engineering | Ayrshire College |
|----------------------|-------------------------------------------------|--------------|-----------------|-----------------|
| Girls into Physics and Engineering | A series of workshops for West Lothian schools on activities such as rocket launching, car racing and heart monitoring, aiming to support girls into Engineering.  
• Addresses gender imbalance through thematic focus.  
6, 9 | S2 – S4 NS | Physics Engineering | West Lothian College |
| Man in the Mirror | Workshop exploring male grooming, aiming to increase male interest in hair and beauty subjects and careers.  
• Addresses gender imbalance through thematic focus.  
1, 9 | NS | Hair Beauty | Ayrshire College |
| Men into Care | One-day taster to increase awareness of men in Care and caring careers and to raise aspirations to enter into these.  
• Addresses gender imbalance through thematic focus and presence of counter-stereotypical role models.  
5, 6, 9 | NS A | Care | Ayrshire College Orkney College |
| Men into Childcare | One-day taster to increase awareness of men in Childcare and early education careers and to raise aspirations to enter into these.  
• Addresses gender imbalance through thematic focus and presence of counter-stereotypical role models.  
5, 6, 9 | NS A | Childcare | Borders College |
| School-College Opportunities to Succeed (SCOTS) | Taster day in which school pupils taste eight vocational subject areas – supported to take a subsequent employability award – aiming to raise awareness of routes to and commitment to further study, raise interest in subjects and challenge gender balances by obliging students to taste non-traditional subjects.  
• Addresses gender balance through balanced participation.  
1, 7 | S4 A | All | Forth Valley College |
| Schools Competition | Taster day in which pupils represent their school and compete with each other for a trophy (each team comprising at least one girl and one boy) by tasting a variety of subjects which prepare students for college, support an increase in confidence in their abilities, raise interest in subjects and challenge gender balances  
1, 7, 8 | S3 A | All | Dumfries and Galloway College |

136 Research from this taster led to the college’s HNC Women into Engineering discussed in section 3.4.
137 Different taster sessions at different colleges with the same name and remit.
138 Both colleges intend to repeat the session in subsequent years. Orkney College’s session was combined with a campaign. This college also intends to utilise the model for a women in construction taster session in subsequent years.
by obliging students to taste non-traditional subjects.  
- Addresses gender imbalance through balanced participation.

| Scottish Space School | One-week on-campus summer school aiming to raise interest in and aspirations towards Engineering by highlighting the educational and career opportunities available to those likely to study Medicine or other non-Engineering subjects.  
- Addresses gender imbalance through balanced participation. | 1, 4, 6, 9 | S5 A | Engineering | University of Strathclyde |

| Socrates Club | Club for the discussion of moral issues with regard to science as part of their STEM assured activities for the raising of interest in STEM subjects.  
- Addresses gender imbalance through balanced participation and thematic focus. | 1 | Wider Public A | STEM | Forth Valley College |

| STEM Club | Evening, hands-on, interactive clubs aiming to engage young people in STEM, highlight how STEM relates to everyday life and to showcase the wide range of careers available.  
- Addresses gender imbalance through balanced participation. | 1, 4, 6, 9 | Primary A | STEM | Forth Valley College |

| Women into Construction | One-day taster to increase awareness of women in construction and construction careers and to raise aspirations to enter into these.  
- Addresses gender imbalance through thematic focus and presence of counter-stereotypical role models. | 5, 6, 9 | NS A | Construction | Borders College |

| Ashfield Music Festival | One-day event in which students adopt scientist roles to discover how Physics applies to the setting up of a festival and to develop skills in enterprise.  
- Addresses gender imbalance through thematic focus. | 1, 2, 4 | NS A | Physics STEM | University of the Highlands and Islands [Institute of Physics] |

| Cabaret of Dangerous Ideas | Public talks within the Edinburgh Fringe Festival, organised by the Beltane public engagement network.  
- Addresses gender imbalance through thematic focus. | 5 | Wider public A | STEM | Edinburgh Napier University [Beltane]^{139} |

| Chemistry@Work | Workshops including demonstrations and hands-on experiments – delivered by counter-stereotypical staff and industry ambassadors | 4, 5, 6, 9 | S1 – S4 A | Chemistry | University of St Andrews [Royal Society of |

{^{139} Square brackets in the institutional column indicate partner organisations.}
<table>
<thead>
<tr>
<th>Event</th>
<th>Description</th>
<th>Grade</th>
<th>Subject</th>
<th>Institution(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CoderDojo</td>
<td>Volunteer-led programming clubs that support young people in learning how to code, develop apps, programmes and games and to explore technology to develop interest in the subject.</td>
<td>1, 2</td>
<td>Computing</td>
<td>Ayrshire College Moray College University of Aberdeen University of Glasgow[^140] [CoderDojo]</td>
</tr>
<tr>
<td>Construction and Built Environment Challenge</td>
<td>West of Scotland problem-solving competition around construction-based project tasks. Teams of ten pupils complete the task. Teams are encouraged to be mixed with regard to gender and previously some teams have comprised only female students.</td>
<td>1, 4, 6, 9</td>
<td>Construction Built Environment</td>
<td>New College Lanarkshire Glasgow Colleges Glasgow Caledonian University</td>
</tr>
<tr>
<td>Dragonfly</td>
<td>Annual one-day hands-on workshop for young women in mechanical, chemical and electrical engineering. It aims to further develop interest in STEM subjects and raise awareness of career opportunities. Part of the Headstart programme.</td>
<td>1, 6, 9</td>
<td>Engineering STEM</td>
<td>Heriot-Watt University [Engineering Development Trust]</td>
</tr>
<tr>
<td>Heritage Awareness Skills Programme</td>
<td>Experiential learning programme involving the learning of a range of skills needed to maintain heritage sites and aiming to raise awareness of built environment and construction careers, changing perceptions of the industry.</td>
<td>2, 5, 6, 9</td>
<td>Construction</td>
<td>Edinburgh College [Midlothian Council]</td>
</tr>
<tr>
<td>Inspire</td>
<td>Residential course with hands-on activities, personal development sessions and awareness raising activities regarding careers in STEM. Part of the Headstart programme.</td>
<td>2, 6, 9</td>
<td>STEM</td>
<td>University of Edinburgh [Engineering Development Trust]</td>
</tr>
<tr>
<td>Magnificent</td>
<td>Workshop at aeronautical centre that aims to give young women</td>
<td>2, 5, 9</td>
<td>Engineering</td>
<td>Ayrshire College</td>
</tr>
</tbody>
</table>

[^140]: Involvement can also be found in those institutions that employ staff who independently act as CoderDojo mentors (such as University of Glasgow).
| Women and their Flying Machine | exposure to female industry experts and that comprises hands-on activities in building aircraft and a tour of the facilities.  
- Addresses gender imbalances through single sex and thematic focus. | SF | [Women’s Engineering Society] |
|-------------------------------|--------------------------------------------------------------------------------|----|-----------------------------|
| Overlooking the Forth Bridge Project | Support for one-off event challenging groups of female school pupils to build another bridge: the fourth on the Forth, aiming to raise awareness of the range of construction careers and the relevance of school subjects’ to everyday situations and to raise aspirations through the life stories of successful female construction ambassadors.  
- Addresses gender imbalances through single sex focus and presence of counter-stereotypical role models. | 4, 5, 6, 9 SF | Construction  
Borders College  
[CITB  
The Scottish Building Apprenticeship and Training Council  
The Scottish Painting and Decorating Apprenticeship Council] |
| Primary Engineer\(^{142}\) | Hands-on competition that engages school pupils to increase their skills in, knowledge about and aspirations towards engineering – and other STEM – careers (includes ‘train the trainer’ courses for teachers).  
- Addresses gender imbalance through balanced participation. | 2, 6, 9 | Primary Engineering  
Ayrshire College  
[University of Strathclyde Primary Engineer] |
| Science Festivals | Including British Science Festival, Dundee’s Women in Science Festival and Science Festival, Edinburgh International Science Festival, Fife Science Festival, Glasgow Science Festival, Inverness Monster Science Festival, Midlothian Science Festival, Techfest etc.  
- Addresses gender imbalance through thematic focus of activities\(^{143}\) and presence of counter-stereotypical role models. | 1, 5, 6, 9 | Wider public engineering  
All |
| ScienceGrrl | Events and programmes aiming to encourage young women to consider a career in science.  
- Addresses gender imbalance through thematic focus and balanced participation. | 6, 9 | NS STEM  
Forth Valley College  
University of Stirling  
University of Glasgow  
[ScienceGrrl] |
| STEMNET | Working with schools, colleges and employers to support, motivate, inspire and increase the understanding of young people | 1, 5, 6, 9 | P and S STEM  
Fife College  
University of Glasgow\(^{144}\) |

\(^{141}\) Borders College also note that they have delivered taster courses for gender minorities.  
\(^{142}\) Edinburgh College also noted that they intend to explore the possibility of establishing primary engineer activities in the Midlothian region, and to develop engineering clubs for S1 – S2 school pupils for the widening of gender participation.  
\(^{143}\) E.g. the University of Dundee’s Sewing Bee for a digital age event at the Women in Science Festival attracted 85% women.
<table>
<thead>
<tr>
<th>Program</th>
<th>Description</th>
<th>Reference</th>
<th>Location</th>
</tr>
</thead>
</table>
| Women into the Built Environment and Property | Positive action pilot comprising two week-long programmes of hands-on activities, site visits and talks from industry ambassadors aiming to raise awareness of and aspiration to enter construction careers and routes to entry.  
- Addresses gender imbalance through single sex focus and presence of counter-stereotypical role models. | 5, 6, 7, 9 | North East Scotland College, Robert Gordon University, Skills Development Scotland | University of the Highlands and Islands [STEMNET] |
| | with regard to STEM careers through meeting role models (STEMNET Ambassadors) and engaging in hands-on activities.  
- Addresses gender imbalance through balanced participation and presence of counter-stereotypical role models. | | | |

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144 Through the Science Connects programme.
145 See section 3.1 for a full list of partners.
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