Rewarding Learning

ANNUAL QUALIFICATIONS INSIGHT 2018

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Annual Qualifications Insight 2018

Chief Executive Preface

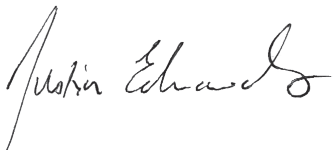
CCEA plays a key role in supporting, recognising and rewarding learning throughout the years of compulsory education and beyond. We provide advice to government on curriculum and assessment, developing and administering a wide range of qualifications, including GCSE and A Level courses. CCEA also acts as regulator for all general and vocational qualifications offered in Northern Ireland.

Each year CCEA generates a significant amount of data, charting participation and performance in Northern Ireland GCSE and GCE examinations. This Insight Report provides an in-depth look at trends and patterns, in both GCSE and A Level, in more detail than we would normally be able to cover during the results period in August 2018.

The report contains analysis based on historic trends and patterns for GCSE and GCE qualifications over the last three academic years.

It aims to promote discussion and engagement on educational matters, supporting policy makers, education professionals and industry to work together to improve education in Northern Ireland.

This year we have also provided additional analyses on important trends such as the narrowing of the gender attainment gap at A Level and the under-representation of female STEM students at A Level.



Justin Edwards
Chief Executive
Council for the Curriculum, Examinations and Assessment (CCEA)

1 Executive Summary

1.1. GCSE

1.1 Overall Entry

In 2018, entries for GCSE have declined slightly on 2017, falling by 0.4% from 171,060 to 170,348 candidates. This follows a decline of 3.2% between 2016 and 2017 and is in line with the overall decline in the Northern Ireland population at that age. Candidates took a total of 5,470,076 GCSEs across the Three Countries (England, Northern Ireland and Wales), making Northern Ireland accountable for 3.1% of the overall entry.

1.1.2 Overall Performance

In Northern Ireland, the proportion of entries awarded A/7–C/4 grades has increased by 0.7 percentage points this year to 81.1%. The A/7 grade increased by 0.2 percentage points to 29.4%.

In keeping with the trend observed in Northern Ireland, Three Country GCSE results have also increased. Statistics show that the proportion of candidates achieving grades A/7 and A/7–C/4 have both increased by 0.5 percentage points to 20.5% and 66.9% respectively.

Female candidates continue to outperform males. They outperformed males by:

- 12.1 percentage points at A/7;
- 8.2 percentage points at A/7–C/4; and
- 0.6 percentage points at A/7–G/1.

This performance gap has largely persisted at GCSE, and this gender trend is replicated across the Three Countries.

Northern Ireland candidates have consistently outperformed those in the Three Countries across all grades and genders.

1.1.3 Mathematics & English

This year, performance in Mathematics increased slightly with 68.1% of entries achieving A/7–C/4 grades, up 1.7 percentage points on 2017. Performance at A/7 increased by 1 percentage point on last year (23.2%).

Performance in English continued to improve with A/7–C/4 grades now representing 80.2% of entries in the subject, a rise of 0.6 percentage points.

1.1.4 STEM, Languages and Arts, Humanities & Social Sciences

The proportion of entries in STEM subjects (Science, Technology, Engineering and Mathematics) has grown by 1.5% over the last three years. On average, 84.4% of candidates achieve at least a C/4 grade in STEM subjects. Proportionally, the split between male and female entry for STEM has remained consistent, with roughly a 55/45% split in favour of male candidates.

Overall, the number of entries for Languages fell in 2018. However, the overall share of the candidature for Languages has remained steady at 6.6% when compared to 2017 (6.7%). French is becoming less popular along with Spanish, while German and Irish have increased in popularity. Language performance still continues to be positive, with 88.2% of all candidates achieving at least a C/4 grade.

Arts, Humanities and Social Sciences are becoming less popular at GCSE, particularly among male candidates. In the last year, almost 750 fewer male candidates studied these types of subjects at GCSE. This has contributed to the overall decline in their popularity. However increases are evident in Drama and Media and Film Studies. Average performance is comparable to STEM in this subject category, with 84.6% of candidates achieving at least a C/4 grade.

1.2 GCE A Level

1.2.1 Overall Entry

GCE A Level results issued to candidates in Northern Ireland in 2018 show a decrease in the numbers taking A Levels. A Level entries decreased by 5.5% from 30,684 in 2017 to 29,004 this year.

The number of A Levels taken in the Three Countries has declined by 2% since last year, from 828,355 to 811,776.

1.2.2 Overall Performance

As with GCSE, Northern Ireland candidates continue to perform well at A Level, with 8.2% achieving the top grade and 30.4% attaining at least an A grade. The overall A*–E pass rate also remains very high at 98.2%.

At the A* grade, male candidates outperformed females by 0.4 percentage points, which is the first time this has happened since the new top grade was introduced in 2010. However, females continue to outperform males at all other grades and at A* in most A Level subjects.

The Three Country results show there is relative stability in performances of both male and female candidates across the grades at A Level. Grades A*, A*–A, and A*–E varied between 0.1 and 0.3 percentage points on the previous year.

In Northern Ireland, female candidates are 4.7% ahead of the Three Country figure at grades A*–A, and 0.6% ahead at grades A*–E. Male candidates in Northern Ireland are 3.1% ahead of the Three Country figure at grades A*–A and 0.5% ahead at grades A*–E.

1.2.3 STEM, Languages and Arts, Humanities & Social Sciences

Participation in A Level STEM subjects remains strong increasing by 0.4% in 2018. Since 2016, the overall share of STEM in the A Level market has increased from 39.7% to 40.1%[1].

81.3% of the STEM cohort achieved at least a grade C, which shows parity with last year.

Entry numbers in Languages have remained relatively consistent over the last three years. Like at GCSE, it is a high performing subject area with 92.9% of candidates achieving at least a grade C.

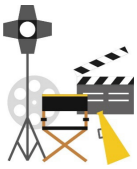
Similar to the trends noted at GCSE, the Arts, Humanities and Social Sciences have fewer entries at A Level. This has been driven by year-on-year reductions in candidates taking subjects such as Drama, English and History. However, Music and Performing Arts have seen increases in 2018. Proportional entry for the Arts, Humanities and Social Sciences has been in decline since 2013 (-1.5%). This mirrors the trends identified at AS and is therefore likely to continue.

Arts and Humanities show slightly weaker outcomes than the other subject categories discussed. On average, 82.1% of all candidates achieved at least a grade C at this level.

[1] In the 2018 results summary JCQ added 'Other Sciences' to STEM. Other Sciences have been added to previous years for comparability.

Overall Northern Ireland Outcomes

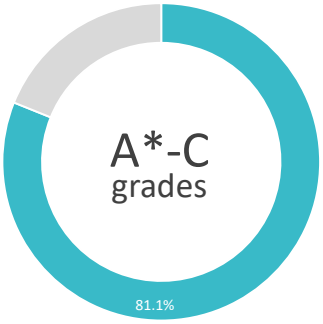
GCSE



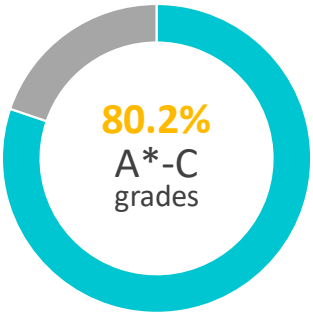
Media/Film/TV Studies
(Moving Image Arts) entries increase by **4.2%**

Business Studies
entries increase by **6.5%**

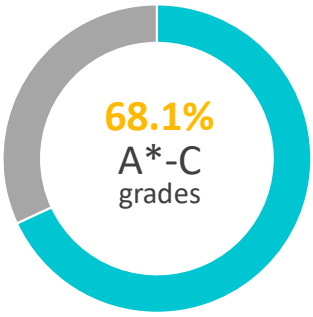
Drama
entries increase by **9.5%**



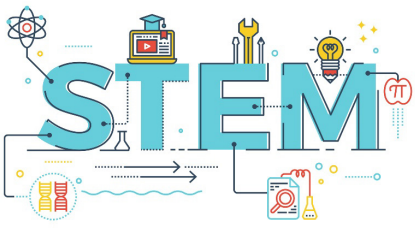
English



Mathematics



81.1% of entries achieved **A*-C grades** the highest pass rate in the UK



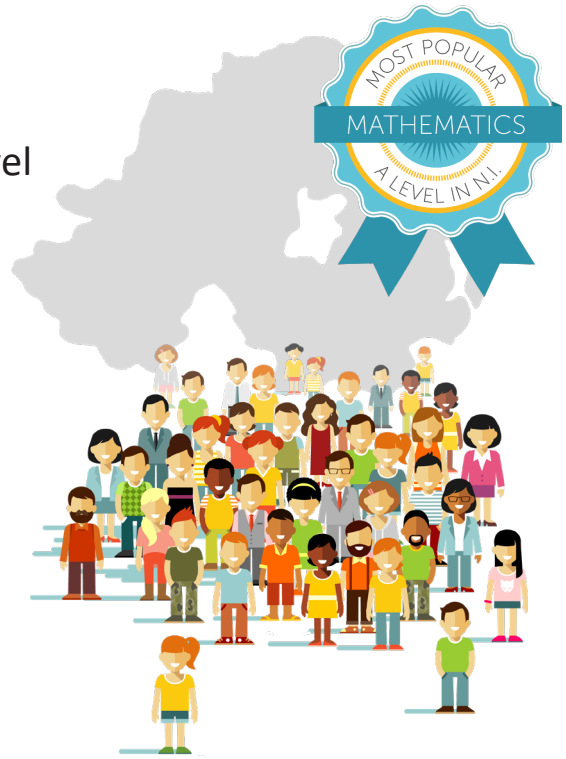
Engineering
entries increase by **9.5%**

Computing
entries increase by **4.6%**

43% of all GCSE entries are STEM subjects

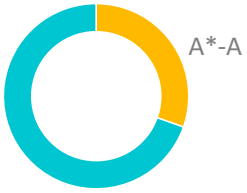
GCE

Mathematics
Most popular A Level

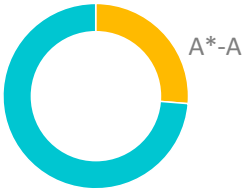


Percentage of entries achieving A*-A

Northern Ireland
30.4%

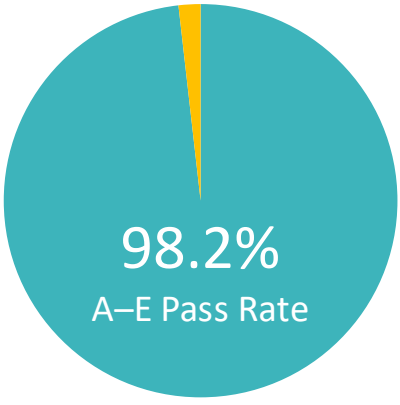


Rest of the U.K.
26.4%

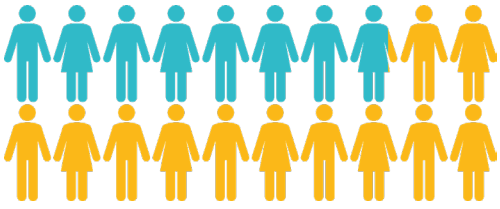


Entries in Computing increased by 15.6% at A Level

98.2% achieving an A–E pass in Northern Ireland



40.1%
of NI students studied a **STEM subject**



2 Introduction

2.1 Background/Rationale

This report contains comparative analysis aimed at identifying trends for all 16-18 year old Northern Ireland students taking GCSE and A Level qualifications with the JCQ awarding organisations. Choice, uptake and performance in GCSE and A Level subjects are investigated. The analysis covers the past three academic years, includes summaries of data and provides insight to encourage debate and discussion on the issues identified.

2.2 Analysis

The original 2015 Insight Report provided information and analysis to a range of stakeholders to promote discussion and engagement on educational matters.

It contained analysis and a broad forecast, based on historic trends and patterns, for GCSE and GCE qualifications. The report has been published each year since 2015. It has developed over the past three years to highlight CCEA's commitment to producing data for analysis and debate. Over time, it is hoped that the content of these reports will encourage new research and promote innovation across the education sector.

2.3 Educational Context

In 2013, the English government announced a reform to GCSEs and a new grading system, using numbers (9–1) rather than letters (A*–G). As a result, the Northern Ireland and Welsh governments reviewed their policy on grading.

In June 2016, the then Minister for Education in Northern Ireland, Peter Weir MLA, requested the following changes to the grading of GCSEs offered by CCEA

'[…] the A grade will be realigned to reflect the level of achievement on the English 9-1 scale, and a new grade C* will be introduced to align with the level of achievement consistent with the grade 5 on the English 9-1 scale.'*
Source: Council for the Curriculum, Examinations & Assessment (CCEA, 2016). *Why the Change?*

To meet the Minister's requirements, CCEA (the Northern Ireland awarding organisation) has introduced a nine lettered scale (A*–G, including C*). This applies to qualifications taught from September 2017 and first awarded in 2019. As such, the GCSE section of this report refers to the 9–1 grades.

The Welsh government chose to remain with the current eight letter grade (A*–G) model, allowing 9–1 graded qualifications where an A*–G qualification was not available.

2.4 Report Structure

The first section of this report provides a summary of entry analysis for GCSE and A Level subjects covering the 2015/16 to 2017/18 academic period. Similarities and differences between the entry figures for each year for all male and female Northern Ireland students are outlined (this includes figures from CCEA and all other Awarding Organisations). Notable entry patterns are highlighted and identified for additional study.

The next section focuses on grade outcomes for students at GCSE and A Level subjects, again covering the 2015/16 to 2017/18 academic years.

After the initial entry and grade analyses, notable trends and patterns are identified for further analysis, which considers economic, political and social data to attempt to explain any identified trends.

The rest of this document is structured as follows:

- Section 3: Entries;
- Section 4: Performance (Grade Outcomes);
- Section 5: Further Analysis; and
- Section 6: Conclusions.

3 Entries

3.1 GCSE Entries and Performance (Overall)

Across Northern Ireland, the 2018 entries for GCSE have declined since 2017, falling by 0.4%. This follows a decline of 3.2% between 2016 and 2017. These declines in entries are in line with the falling school population at this age.

The total number of GCSEs taken across the Three Countries was 5,470,076 (an increase of 0.2% since 2017), making Northern Ireland candidates accountable for 3.1% of the overall entries. The proportionate age profile of GCSE candidates in Northern Ireland remains stable and in line with 2017.

Table 1: Percentage of 15–17 year olds at GCSE 2017/18

Age	2016/17	2017/18	% Change
15 year olds	3,808	4,717	+23.9%
16 year olds	131,728	129,734	-1.5%
17 year olds	35,524	35,897	+1.0%
Total	**171,060**	**170,348**	**-0.4%**

Source: Joint Council for Qualifications (JCQ) - Provisional GCSE Full Course Results (Northern Ireland), 2017-2018

The table below details the five most popular subjects at GCSE in 2018:

Table 2: Most Popular GCSE Subjects[2]

	Overall	Male	Females
1	Science: DA (9.4%)	Science: DA (9.1%)	Science: DA (9.6%)
2	Religious Studies (6.5%)	Religious Studies (5.8%)	Religious Studies (7.1%)
3	English Literature (5.9%)	ICT (5.3%)	English Literature (6.5%)
4	ICT (4.4%)	Science (4.0%)	Home Economics (4.1%)
5	Science (3.7%)	History (4.0%)	ICT (3.5%)

Source: Joint Council for Qualifications (JCQ) - Provisional GCSE Full Course Results (Northern Ireland), 2018

3.1.1 GCSE Subject Categories

The proportion of entries in STEM subjects has grown by 1.6% over the last three years. Proportionally, the split between male and female STEM candidates has remained consistent, with roughly a 55:45 split in favour of male candidates.

Overall, the number of entries for Languages fell in 2018. However, the overall share of the candidature for Languages has remained steady at 6.6%, compared to 6.7% last year. French is becoming less popular, decreasing by 8.7% since last year. Spanish has also seen a 1.5% decrease on last year, while German saw an increase of 113 entries (12.1%) over the same period.

[2] Mathematics and English have not been included in this table as these are compulsory subjects in most schools.

The Arts and Humanities have experienced a small decline in total candidature at GCSE. In the last year, the proportion of students studying these types of subjects at GCSE has declined by 0.3%, this follows a 0.1% decline in 2016/17. However, at this level this decline is not concerning.

Additional analysis will be carried out on the above subject categories.

3.2 GCSE Entry Patterns & Changes

Table 3: GCSE Entries (2015/16–2017/18)

	2015/16	2016/17	2017/18	% Change
STEM				
Biology	4,252	4,077	4,016	-1.5%
Chemistry	3,214	3,085	3,033	-1.7%
Computing	519	630	659	+4.6%
Design & Technology	4,238	4,205	4,096	-2.6%
Engineering	397	389	426	+9.5%
Further Mathematics	3,469	3,445	3,584	+4.0%
ICT	7,862	7,778	7,454	-4.2%
Mathematics	24,827	23,963	24,477	+2.1%
Other Sciences	309	304	329	+8.2%
Physics	2,960	3,035	2,951	-2.8%
Science	7,026	6,331	6,282	-0.8%
Science (Double Award)	14,130	14,254	15,944	+11.9%
Languages				
French	5,179	4,709	4,301	-8.7%
German	1,162	937	1,050	+12.1%
Irish	1,901	1,987	1,991	+0.2%
Spanish	3,593	3,877	3,817	-1.5%
Arts, Humanities & Social Sciences				
Art & Design	4,225	4,085	3,909	-4.3%
Classical Subjects	137	178	201	+12.9%
Drama	1,491	1,309	1,434	+9.5%
English	22,102	21,720	21,820	+0.5%
English Literature	10,301	10,132	10,078	-0.5%
Geography	6,048	5,826	5,903	+1.3%
History	6,751	6,368	6,199	-2.7%
Music	1,582	1,453	1,421	-2.2%
Performing & Expressive Arts	430	362	0	NA
Religious Studies	11,953	11,373	11,019	-3.1%
Social Science Subjects	232	213	255	+19.7%
Other				
Business Studies	3,367	3,658	3,896	+6.5%
Home Economics	4,229	4,191	4,071	-2.9%

	2015/16	2016/17	2017/18	% Change
Media & Film Studies	1,771	1,717	1,789	+4.2%
Physical Education	3,204	3,139	3,026	-3.6%

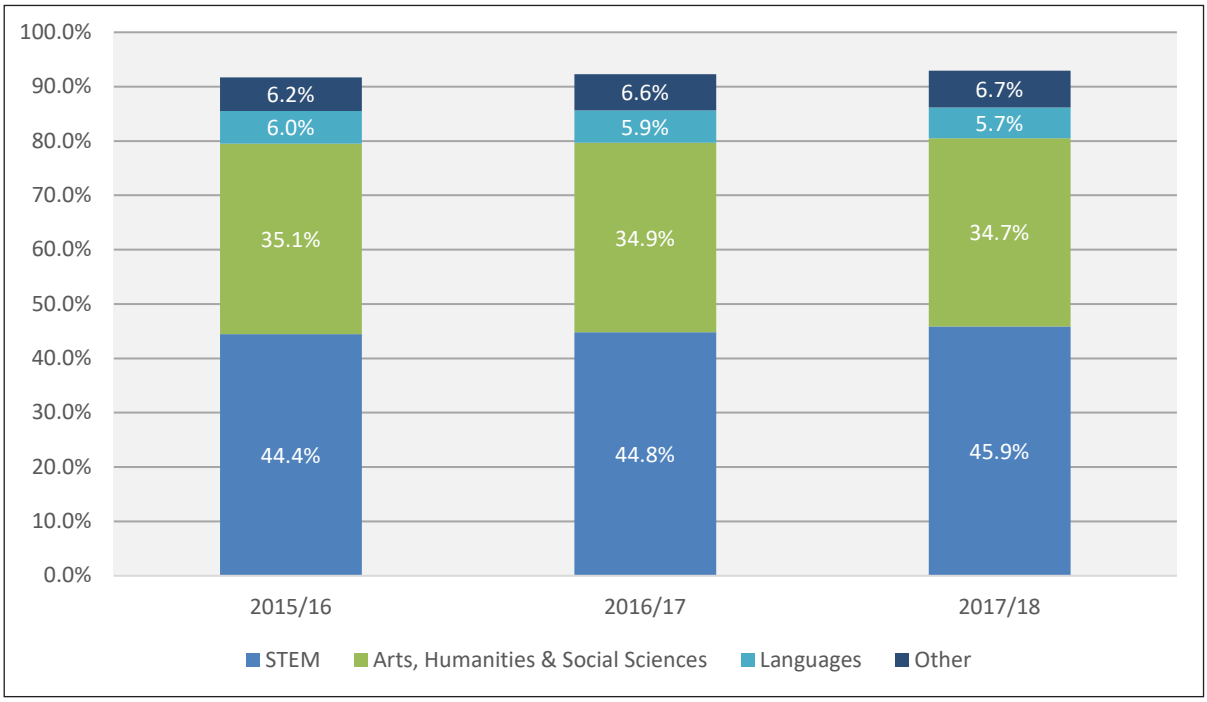
Source: JCQ - Provisional GCSE Full Course Results (Northern Ireland), 2016-2018

Table 4: GCSE Male Subject Trends (2015/16–2017/18)

	2015/16	2016/17	2017/18
	N (% of total)	N (% of total)	N (% of total)
STEM	38,797 (44.4%)	37,937 (44.8%)	37,957 (45.9%)
Languages	5,246 (6.0%)	5,035 (5.9%)	4,687 (5.7%)
Arts, Humanities & Social Sciences	30,609 (35.1%)	29,555 (34.9%)	28,691 (34.7%)
Other	5,410 (6.2%)	5,600 (6.7%)	5,587 (6.7%)

Source: Joint Council for Qualifications (JCQ) – Provisional GCSE Full Course Results (Northern Ireland), 2016–2018

Figure 1: GCSE Male Subject Trends (2015/16–2017/18)[3]



Source: Joint Council for Qualifications (JCQ) – Provisional GCSE Full Course Results (Northern Ireland), 2016–2018

In 2017/18, STEM subjects have become more popular among males, with 45.9% taking STEM subjects at GCSE. This is a 0.4 and 1.1 percentage point increase on 2015/16 and 2016/17, respectively.

The opposite trend can be seen for Arts, Humanities and Social Sciences entries among males, which has shown a small decrease from 34.9% in 2016/17 to 34.7% in 2017/18. Similarly, Language entries among males have decreased over the last three years, from 6.0% in 2015/16, 5.9% in 2016/17 to now 5.7% in 2017/18.

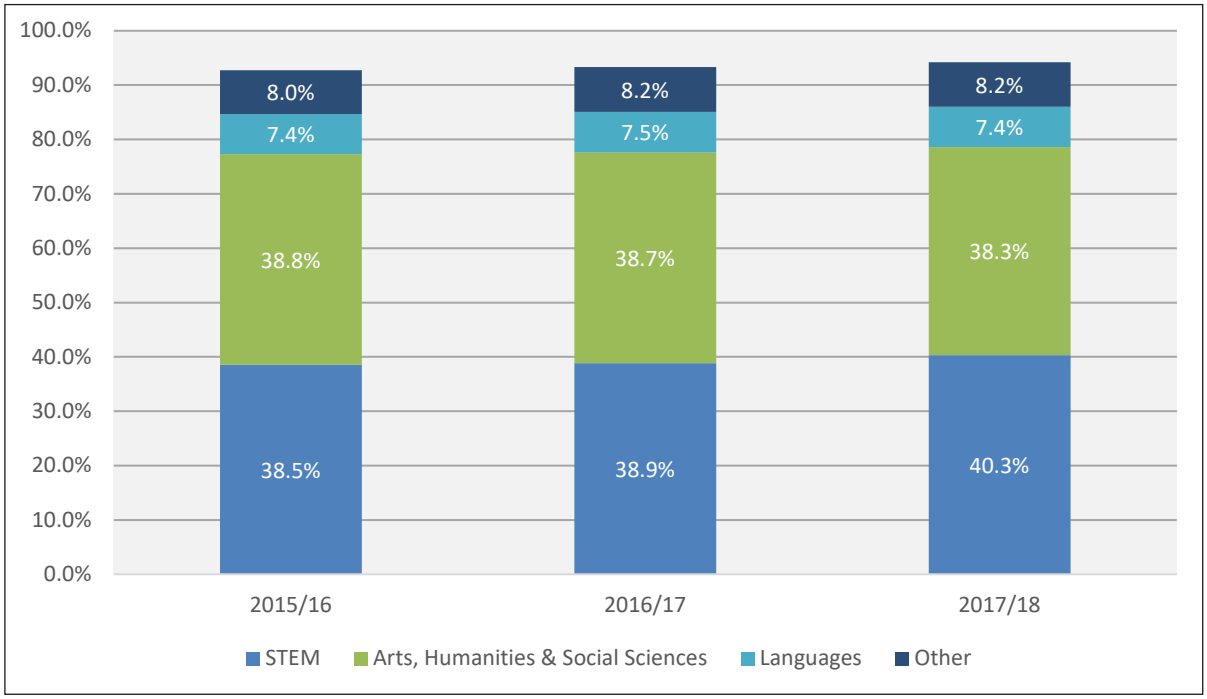
[3] **Please Note:** The % in the bar-graph does not add up to 100%. This is due to the exclusion of subjects with small entries.

Table 5: GCSE Female Subject Trends by Gender (2015/16–2017/18)

	2015/16	2016/17	2017/18
	N (% of total)	N (% of total)	N (% of total)
STEM	34,406 (38.5%)	33,559 (38.9%)	35,294 (40.3%)
Languages	6,589 (7.4%)	6,475 (7.5%)	6,472 (7.4%)
Arts, Humanities & Social Sciences	34,643 (38.8%)	33,464 (38.7%)	33,548 (38.3%)
Other	7,161 (8.0%)	7,105 (8.2%)	7,195 (8.2%)

Source: Joint Council for Qualifications (JCQ) - Provisional GCSE Full Course Results (Northern Ireland), 2016-2018

Figure 2: GCSE Female Subject Trends by Gender (2015/16–2017/18)[4]



Source: Joint Council for Qualifications (JCQ) - Provisional GCSE Full Course Results (Northern Ireland), 2016–2018

In 2017/18, STEM subjects have become more popular among females, with 40.3% taking them at GCSE. This is a 0.4 and 1.4 percentage point increase on 2015/16 and 2016/17, respectively. This trend is in line with the overall entries in STEM, which have increased from 41.6% to 42.8% of the total entries at GCSE from 2016/17 to 2017/18.

The opposite can be seen for Arts, Humanities and Social Sciences entries among females, which have shown a decrease from 38.7% in 2016/17 to 38.3% in 2017/18. This is consistent with overall entries in these subjects, which have decreased from 36.9% in 2016/17 to 36.5% in 2017/18 of all entries.

Language entries among females have remained steady over the last three years. This is in line with the overall trend for Language entries among both males and females, which have decreased by just 0.1 percentage points since last year to 6.6%

[4] **Please Note:** The % in the bar-graph does not add up to 100%. This is due to the exclusion of subjects with small entries.

3.3 A Level Entry Summary

3.3.1 AS Level

In 2018, Northern Ireland entries in AS declined by 3.9% from 2017. This equates to 1,636 fewer AS grades being awarded. In the combined Three Countries, AS entry declined by 52.5%, equating to 381,913 fewer grades being awarded.

As stated in last year's report, the Three Country decline can be explained by the recent policy decision in England to decouple AS qualifications from reformed A Level qualifications, meaning that the AS no longer counts towards the final mark of the full A Level (UCAS, 2015).

Table 6: Three Country, Northern Ireland and CCEA Entries

	Three Country	Northern Ireland	CCEA[5]
2016/17	728,039	41,961	35,173
2017/18	346,126	40,325	35,459
% Change	-52.5 %	-3.9%	+0.8%

Source: Joint Council for Qualifications (JCQ) – Provisional AS Full Course Results (Northern Ireland &Three Country), 2018 and CCEA Internal AS Full Course Results, 2018

3.3.2 A Level

In 2018, the overall A Level entry decreased by 5.5% in Northern Ireland. This equates to 1,680 fewer candidates. The decrease is less pronounced than that experienced at AS.

The Three Country A Level entry experienced a decrease of 2%, which is considerably less than that experienced at AS and in Northern Ireland.

Table 7: Three Country, Northern Ireland and CCEA Entries

	Three Country	Northern Ireland	CCEA
2016/17	828,355	30,684	24,709
2017/18	811,776	29,004	23,920
% Change	-2.0%	-5.5%	-3.2%

Source: Joint Council for Qualifications (JCQ) – Provisional A Level Full Course Results (Northern Ireland & Three Country), 2018 and CCEA Internal A Level Full Course Results, 2018

The table below details the five most popular subjects at A Level in 2018:

Table 8: Most Popular A Level Subjects

	Overall	Males	Females
1	Mathematics (10.2%)	Mathematics (13.7%)	Biology (10.8%)
2	Biology (9.5%)	Biology (7.9%)	Religious Studies (9.3%)
3	Religious Studies (7.0%)	Physics (7.1%)	English Literature (8.6%)
4	English Literature (6.4%)	History (6.4%)	Mathematics (7.4%)
5	History (6.0%)	Business Studies (6.2%)	Geography (5.7%)

Source: Joint Council for Qualifications (JCQ) – Provisional A Level Full Course Results (Northern Ireland), 2018

[5] CCEA figures are based on entry at time of award.

STEM subjects such as Physics and Mathematics continue to remain popular for male students. Arts, Humanities and Social Sciences subjects such as English Literature and Religious Studies remain popular for female students.

3.3.3 A Level Subject Categories

In 2018, STEM candidature increased by 0.4% to 40.1%. Declines in subjects such as Mathematics (-5.3%), Biology (-5.0%) and Chemistry (-4.8%) have largely been in line with the decline in school age population at this level. This has been further offset by increases in subjects such as Computing (+15.6%), and Other Sciences (+224.6%).

In spite of this, it should be noted that A Level ICT has experienced a decline in entry which is much larger than the declining school age population at A Level (-29.8%). This is because the ICT qualifications have been withdrawn by all awarding organisations and replaced with alternative qualifications.

In addition to this, though STEM subjects are becoming increasingly more popular at A Level, the increase in proportional candidature has mostly been male driven. In the last year, the proportion of male candidates studying STEM subjects has increased by 1.2%, resulting in 50% of all male students at A Level studying at least one STEM subject. Female students on the other hand have experienced a small decline in the proportion opting to study STEM at this level. In the last year 32.2% of female students took at least one A Level STEM subject; a slight reduction of 0.3% on the previous year.

The Arts, Humanities and Social Sciences are becoming less popular at this level. This has been driven by year-on-year reductions in candidates taking subjects such as Drama, English and History; this was also observed for these subjects at AS. Proportional entry for these subjects has declined from 40.2% last year to 39.2% this year. This mirrors the trends at AS and is therefore likely to continue.

3.4 A Level Entry Patterns & Changes

Table 9: A Level Entries (2015/16–2017/18)

	2015/16	2016/17	2017/18	% Change
STEM				
Biology	3,107	2,889	2,745	-5.0%
Chemistry	1,864	1,743	1,659	-4.8%
Computing	245	315	364	+15.6%
Design & Technology	987	1,017	972	-4.4%
Further Mathematics	189	199	197	-1.0%
ICT	1,479	1,455	1,021	-29.8%
Mathematics	3,376	3,129	2,964	-5.3%
Other Sciences	107	142	461	+224.6%
Physics	1,414	1,293	1,242	-3.9%
Languages				
French	503	473	429	-9.3%
German	102	100	110	+10.0%
Irish	331	333	332	-0.3%
Spanish	524	529	434	-18.0%
Arts, Humanities & Social Sciences				
Art & Design	921	915	884	-3.4%
Classical Subjects	108	118	80	-32.2%
Drama	463	458	351	-23.4%
English Literature	2,024	1,986	1,853	-6.7%
Geography	1,864	1,702	1,610	-5.4%
History	2,322	2,144	1,740	-18.8%
Music	358	326	382	+17.2%
Performing & Expressive Arts	120	160	214	+33.8%
Political Studies	1,005	998	999	-0.1%
Psychology	600	502	459	-8.6%
Religious Studies	2,066	2,114	2,026	-4.2%
Sociology	914	918	779	-15.1%
Other				
Business Studies	1,461	1,427	1,528	+7.1%
Media & Film Studies	1,250	1,275	1,207	-5.3%
Physical Education	537	562	536	-4.6%

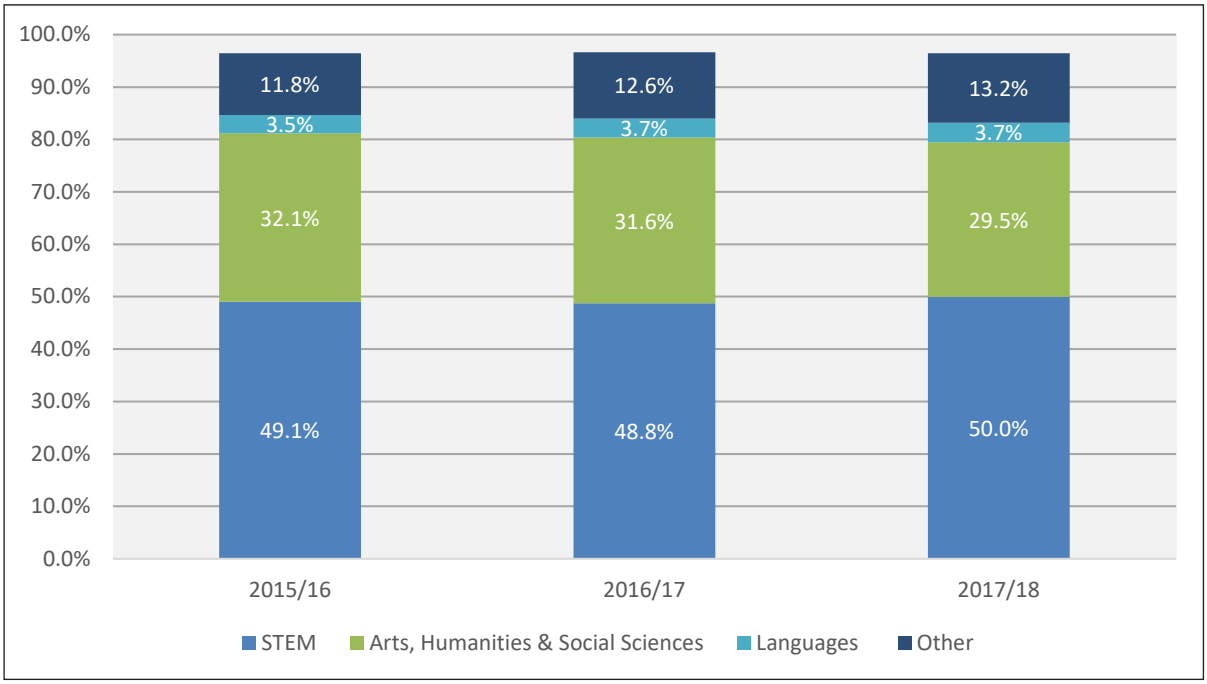
Source: Joint Council for Qualifications (JCQ) – Provisional A Level Full Course Results (Northern Ireland), 2016–2018

Table 10: A Level Male Subject Trends (2015/16–2017/18)

	2015/16	2016/17	2017/18
	N (% of total)	N (% of total)	N (% of total)
STEM	6,912 (49.1%)	6,604 (48.8%)	6,442 (50.0%)
Languages	489 (3.5%)	495 (3.7%)	477 (3.7%)
Arts, Humanities & Social Sciences	4,521 (32.1%)	4,281 (31.6%)	3,806 (29.5%)
Other	1,665 (11.8%)	1,709 (12.6%)	1,707 (13.2%)

Source: Joint Council for Qualifications (JCQ) – Provisional A Level Full Course Results (Northern Ireland), 2016–2018

Figure 3: A Level Male Subject Trends (2015/16–2017/18)[6]



Source: Joint Council for Qualifications (JCQ) – Provisional A Level Full Course Results (Northern Ireland), 2016–2018

In 2017/18, STEM entries have remained steady among males, decreasing by 0.3 percentage points from 2015/16 but increasing by 1.2 percentage points since last year, accounting for half (50%) of this year's A Level entries.

Entries in Arts, Humanities and Social Sciences subjects have shown a decreasing trend among males, decreasing from 32.1% in 2015/16 to 29.5% in 2017/18.

Language entries have remained consistent over the last three years, showing an increase of just 0.2 percentage points between 2015/16 and 2016/17, and remaining stable at 3.7% for the last two years.

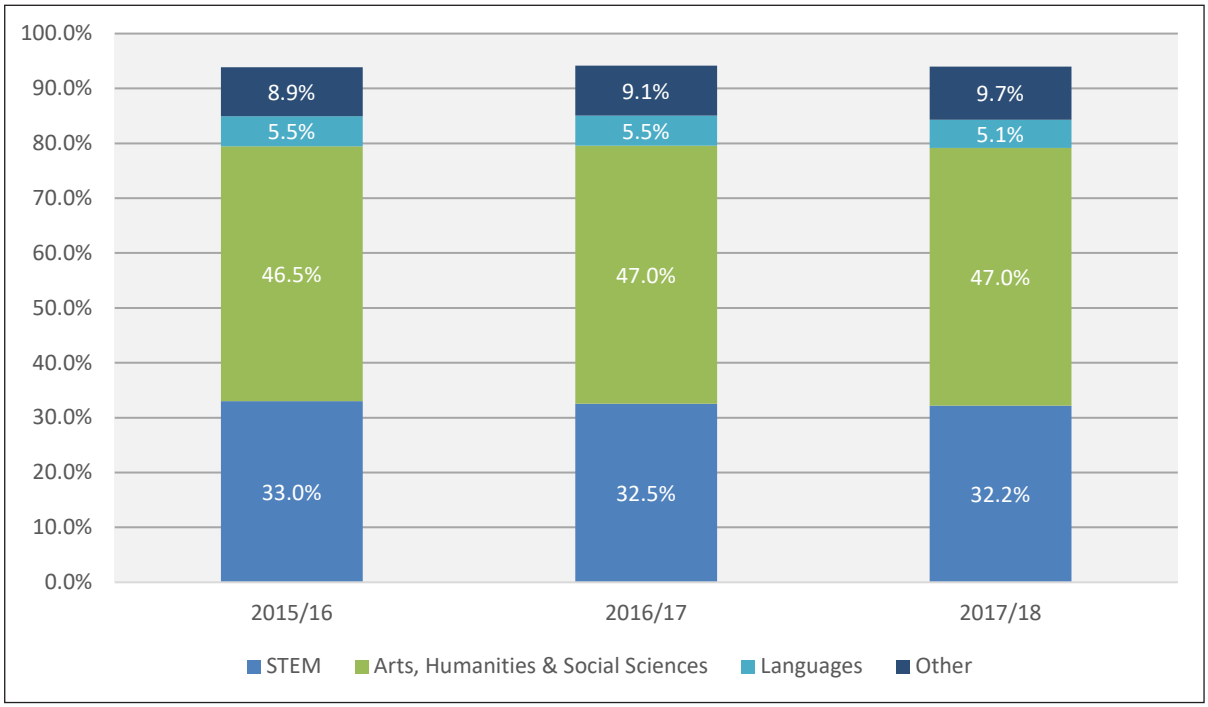
[6] **Please Note:** The % in the bar graph does not add up to 100%. This is due to the exclusion of subjects with small entries.

Table 11: A Level Female Subject Trends (2015/16 - 2017/18)

	2015/16	2016/17	2017/18
	N (% of total)	N (% of total)	N (% of total)
STEM	5,856 (33.0%)	5,578 (32.5%)	5,183 (32.2%)
Languages	971 (5.5%)	940 (5.5%)	828 (5.1%)
Arts, Humanities & Social Sciences	8,244 (46.5%)	8,060 (47.0%)	7,571 (47.0%)
Other	1,583 (8.9%)	1,555 (9.1%)	1,564 (9.7%)

Source: Joint Council for Qualifications (JCQ) – Provisional A Level Full Course Results (Northern Ireland), 2016–2018

Figure 4: A Level Female Subject Trends (2015/16–2017/18)[7]



Source: Joint Council for Qualifications (JCQ) – Provisional A Level Full Course Results (Northern Ireland), 2016–2018

In contrast to males, STEM entries amongst females have shown a slight decline. Over the last 3 years at A Level, entries have decreased from 33% in 2015/16 to 32.5% in 2016/17 and to 32.2% in 2017/18. This trend is the opposite of what is noticed in STEM as a whole, which has increased by 0.4% on the last year.

Entries in Arts, Humanities and Social Sciences has remained the most popular subject category for females. Entries in these subjects showed an increase from 46.5% to 47% between 2015/16 and 2016/17, which was maintained at 2017/18. This is the opposite of the overall trend in these subjects, which decreased from 40.2% in 2016/17 to 39.2% in 2017/18, thus indicating that this decline has been mainly male driven.

Language entries amongst females have remained steady over the last 3 years, decreasing by just 0.4 percentage points from 5.5% last year to 5.1% this year. This is in line with the overall trend for language entries amongst both males and females, which has also decreased by just 0.2 percentage points since last year to 4.5% of all entries this year.

[7] **Please Note:** The % in the bar graph does not add up to 100%. This is due to the exclusion of subjects with small entries.

4 Performance (Grade Outcomes)[8]

4.1 GCSE Performance Trends

4.1.1 Overall

Reporting in this section reflects the different grading issued by awarding organisations in Northern Ireland, England and Wales. The grades shown equate across all the GCSE qualifications. Overall, in 2018, there was a 0.2 percentage point increase at A/7 from 29.2% to 29.4% for Northern Ireland candidates. Grades A/7–C/4 also show a 0.7 percentage point increase to 81.1%.

In Northern Ireland, female candidates continue to outperform males. They outperformed males by:

- 12.1 percentage points at A/7;
- 8.2 percentage points at A/7–C/4; and
- 0.6 percentage points at A/7–G/1.

This gender trend is similar across the Three Countries.

Northern Ireland candidates have consistently outperformed those in the Three Countries across all grades and genders.

Table 12: Three Country & Northern Ireland GCSE Performance (Gender)

2017/18	Overall		Males		Females	
	NI	Three Country	NI	Three Country	NI	Three Country
%A/7	29.4 (29.2)	20.5 (20.0)	23.2 (23.4)	17.2 (16.4)	35.3 (34.8)	23.7 (23.7)
%A/7-C/4	81.1 (80.4)	66.9 (66.4)	76.9 (76.4)	62.3 (61.6)	85.1 (84.2)	71.4 (71.1)
%A/7-G/1	99.1 (99.0)	98.3 (98.4)	98.8 (98.8)	97.8 (97.9)	99.4 (99.3)	98.8 (98.9)

Source: Joint Council for Qualifications (JCQ) – Provisional GCSE Full Course Results (Northern Ireland & Three Country), 2018

4.1.2 English & Mathematics

Language and Literacy, and Mathematics and Numeracy form two of the nine curricular areas of learning at KS4 in Northern Ireland. Both Mathematics and English language are therefore considered separately as well as being assessed in their respective subject categories.

[8] Please note: The figures in brackets are last year's percentages.

Detailed below is information on GCSE candidates' performance in Mathematics and English.

Table 13: Three Country & Northern Ireland GCSE Performance (English)

2017/18	Overall		Males		Females	
	NI	Three Country	NI	Three Country	NI	Three Country
%A/7	22.9 (22.9)	14.1 (13.6)	15.2 (15.5)	9.8 (9.0)	30.6. (30.4)	18.7 (18.5)
%A/7-C/4	80.2 (79.6)	61.8 (62.1)	73.7 (73.7)	54.3 (53.9)	86.8 (85.7)	69.9 (70.9)
%A/7-G/1	99.6 (99.5)	98.9 (98.6)	99.4 (99.3)	98.3 (98.0)	99.7 (99.6)	99.5 (99.3)

Source: Joint Council for Qualifications (JCQ) – Provisional GCSE Full Course Results (Northern Ireland & Three Country), 2018

There was no change in 2018 for Northern Ireland English candidates' attainment at the A/7 grade, which remained at 22.9%. Grades A/7–C/4 show a 0.6 percentage point increase to 80.2%. Grades A/7–G1 increased slightly by 0.1 percentage points. In Northern Ireland, female candidates continue to outperform males. Female outcomes were higher than males by:

- 15.4 percentage points at A/7;
- 13.1 percentage points at A/7–C/4; and
- 0.3 percentage points at A/7–G/1.

Table 14: Three Country & Northern Ireland GCSE Performance (Mathematics)

2017/18	Overall		Males		Females	
	NI	Three Country	NI	Three Country	NI	Three Country
%A/7	23.2 (22.2)	15.8 (15.5)	22.3 (21.4)	16.8 (16.3)	24.0 (22.9)	14.9 (14.8)
%A/7-C/4	68.1 (66.4)	59.4 (59.4)	67.1 (66.3)	59.7 (59.9)	69.1 (66.4)	59.2 (58.9)
%A/7-G/1	97.7 (97.0)	97.4 (97.0)	97.2 (96.7)	97.2 (96.7)	98.2 (97.3)	97.6 (97.3)

Source: Joint Council for Qualifications (JCQ) – Provisional GCSE Full Course Results (Northern Ireland & Three Country), 2018

GCSE Mathematics candidates in Northern Ireland showed an increase of 1 percentage point at the A/7 grade. Grades A/7–C/4 show a 1.7 percentage point increase to 68.1%. Grades A/7–G/1 increased by 0.7 percentage points to 97.7%. In Northern Ireland, female GCSE Mathematics candidates continue to outperform males by.

- 1.7 percentage points at A/7;
- 2 percentage points at A/7-C/4; and
- 1 percentage point at A/7–G/1.

4.1.3 GCSE Performance Summary

Overall, Northern Ireland candidates continue to perform well at GCSE, with 29.4% of candidates achieving an A/7 grade, an increase of 0.2 percentage points from last year. The number of candidates achieving grades A/7–C/4 has also increased by 0.7 percentage points to 81.1%. 84.4% of all STEM candidates achieved a grade C/4. Females outperform males in almost all STEM subjects at grades A/7–C/4, with Biology being the only exception.

GCSE candidates perform better in Languages compared to other subject categories. On average, 88.2% of candidates achieved at least a grade C/4 at GCSE. Females outperform males in all of the GCSE Languages at grades A/7–C/4.

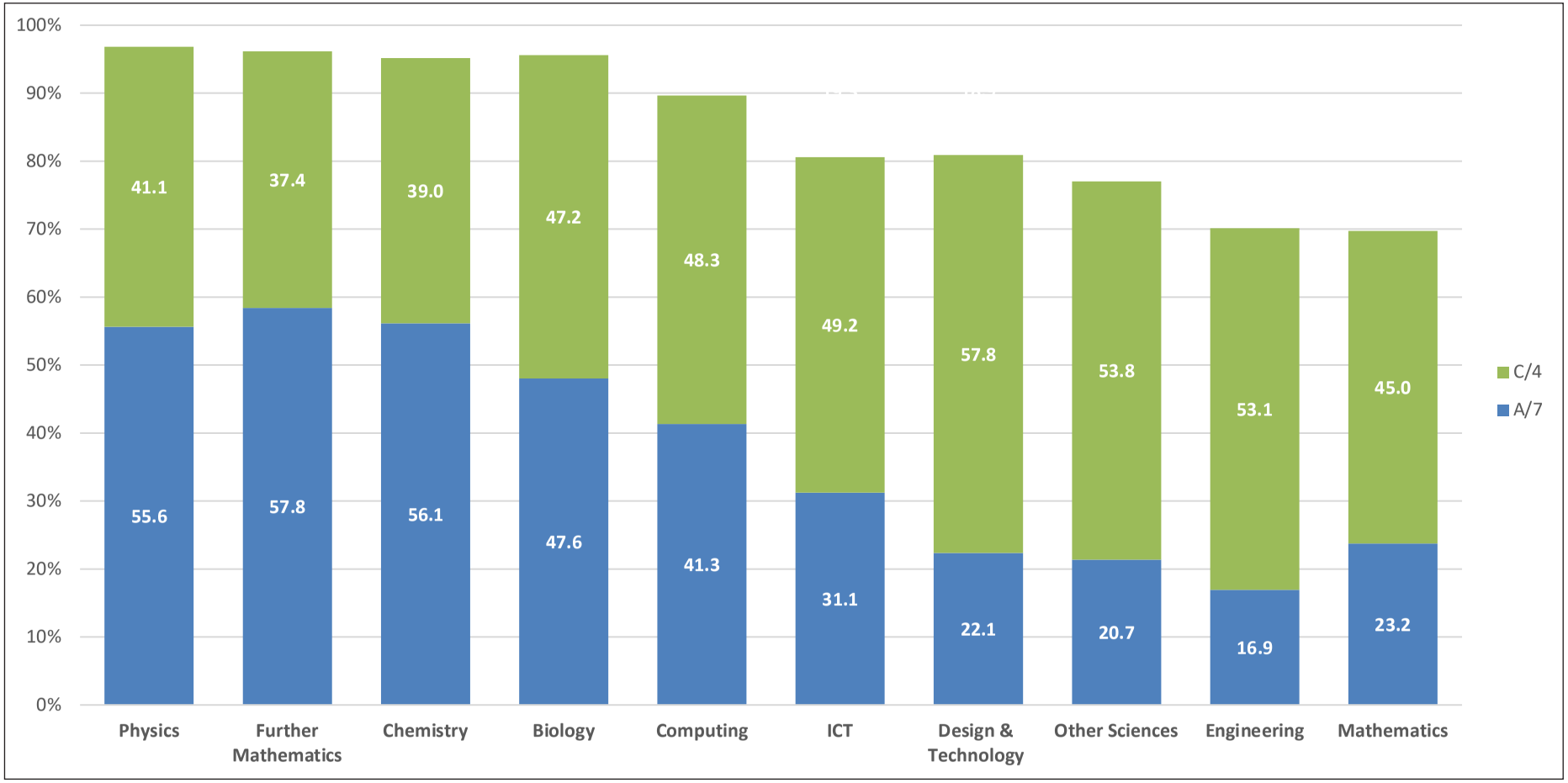
Arts, Humanities and Social Sciences is the only subject area that shows a more mixed performance at the C/4 grade, with females outperforming males in seven of the eleven specifications. While there are less students taking these subjects, average performance has increased from 83.3% achieving at least grade C/4 last year to 84.1% this year.

Further Mathematics is the top performing subject at the A/7 grade, with 57.8% of the candidature attaining the grade.

4.1.4 STEM

The figure below illustrates students' performance at grades A/7-C/4 in GCSE STEM subjects.

Figure 5: GCSE STEM Performance 2017/18 (Grades A/7–C/4)

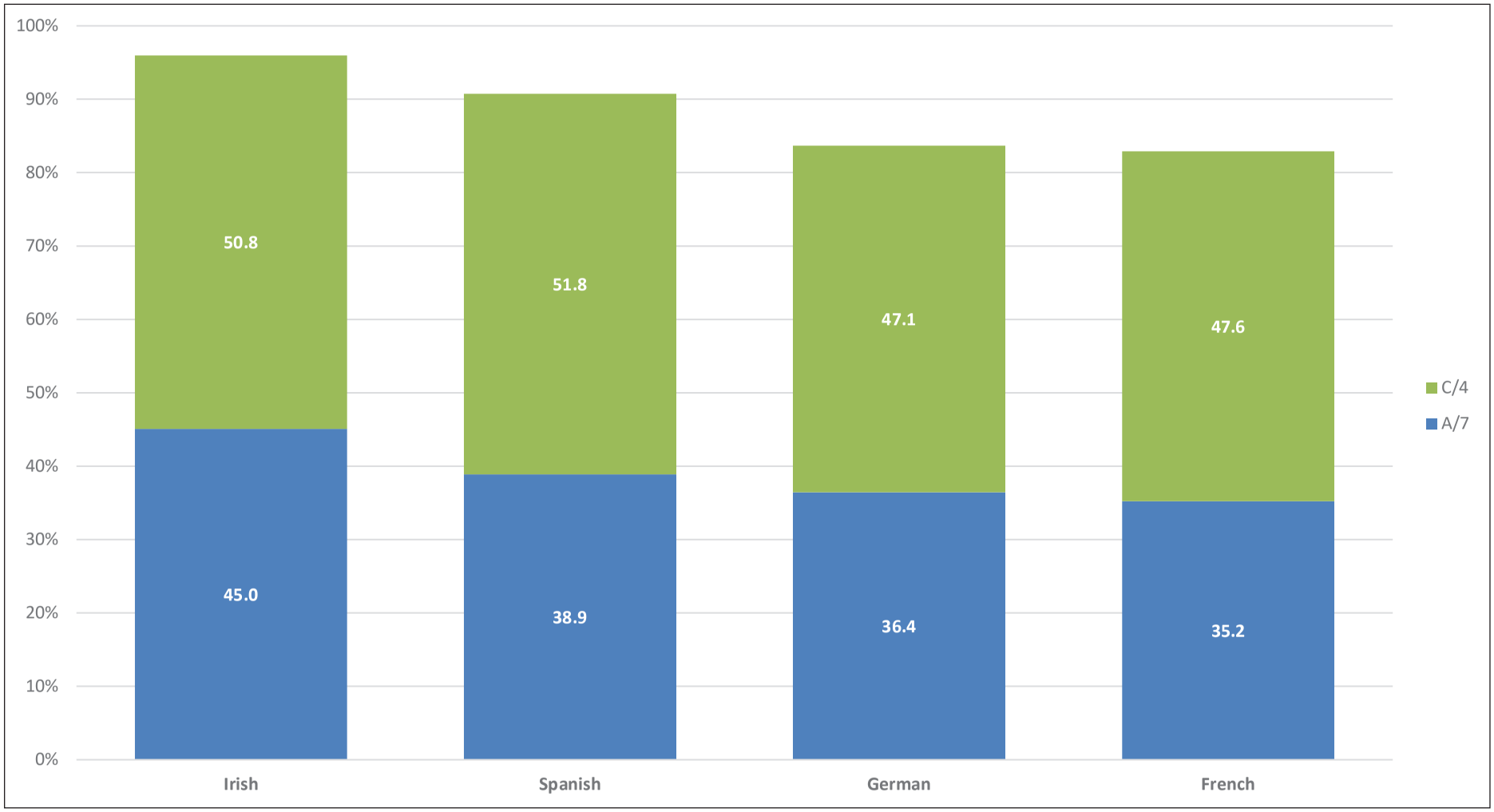


Source: Joint Council for Qualifications (JCQ) – Provisional GCSE Full Course Results (Northern Ireland), 2018

4.1.5 Languages

The figure below illustrates students' performance at grades A/7-C/4 in GCSE languages.

Figure 6: GCSE Languages Performance 2017/18 (Grades A/7–C/4)

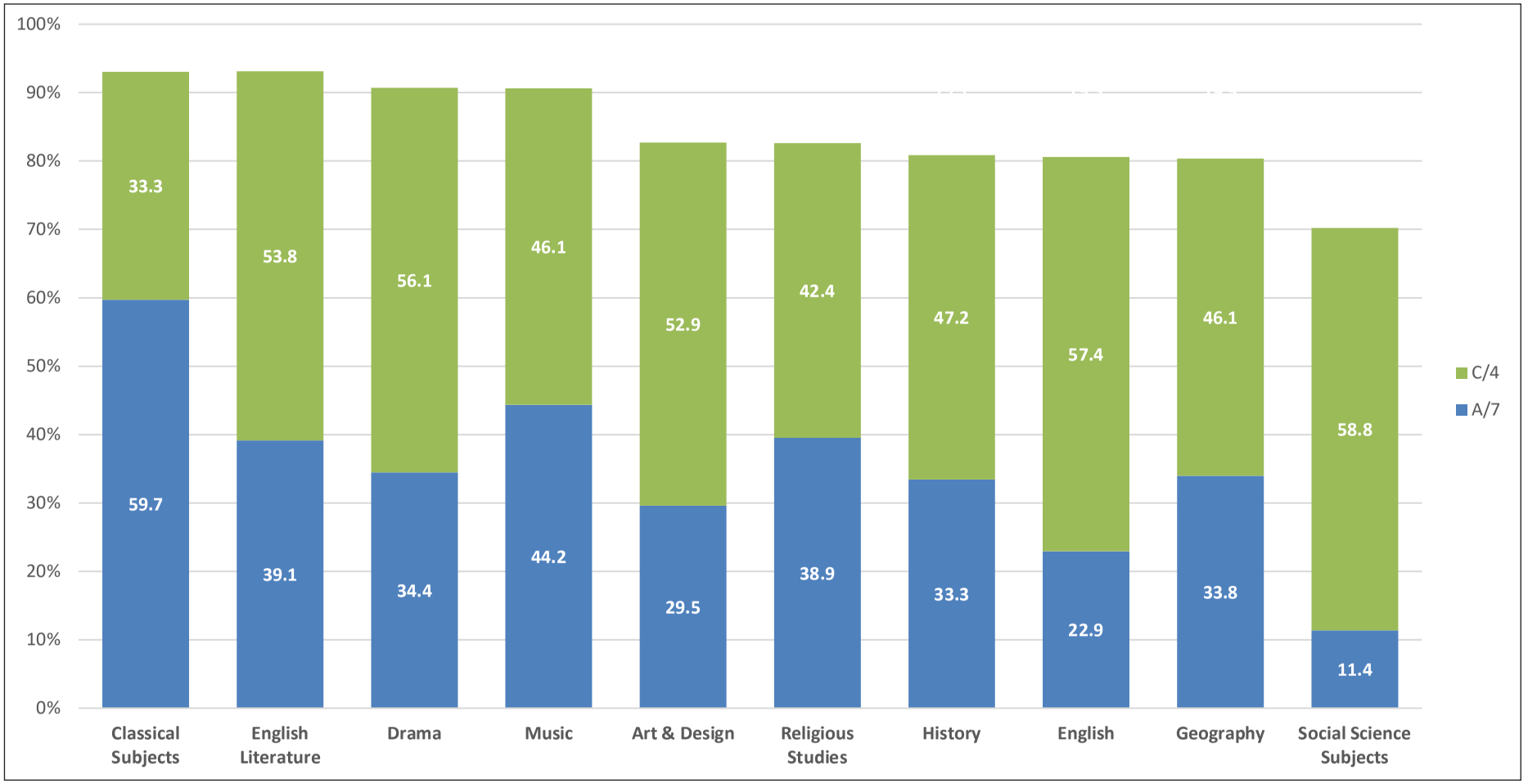


Source: Joint Council for Qualifications (JCQ) – Provisional GCSE Full Course Results (Northern Ireland), 2018

4.1.6 Arts, Humanities & Social Sciences

The figure below illustrates students' performance at grades A/7-C/4 in GCSE Arts, Humanities and Social Sciences.

Figure 7: GCSE Arts, Humanities & Social Sciences Performance 2017/18 (Grades A/7–C/4)

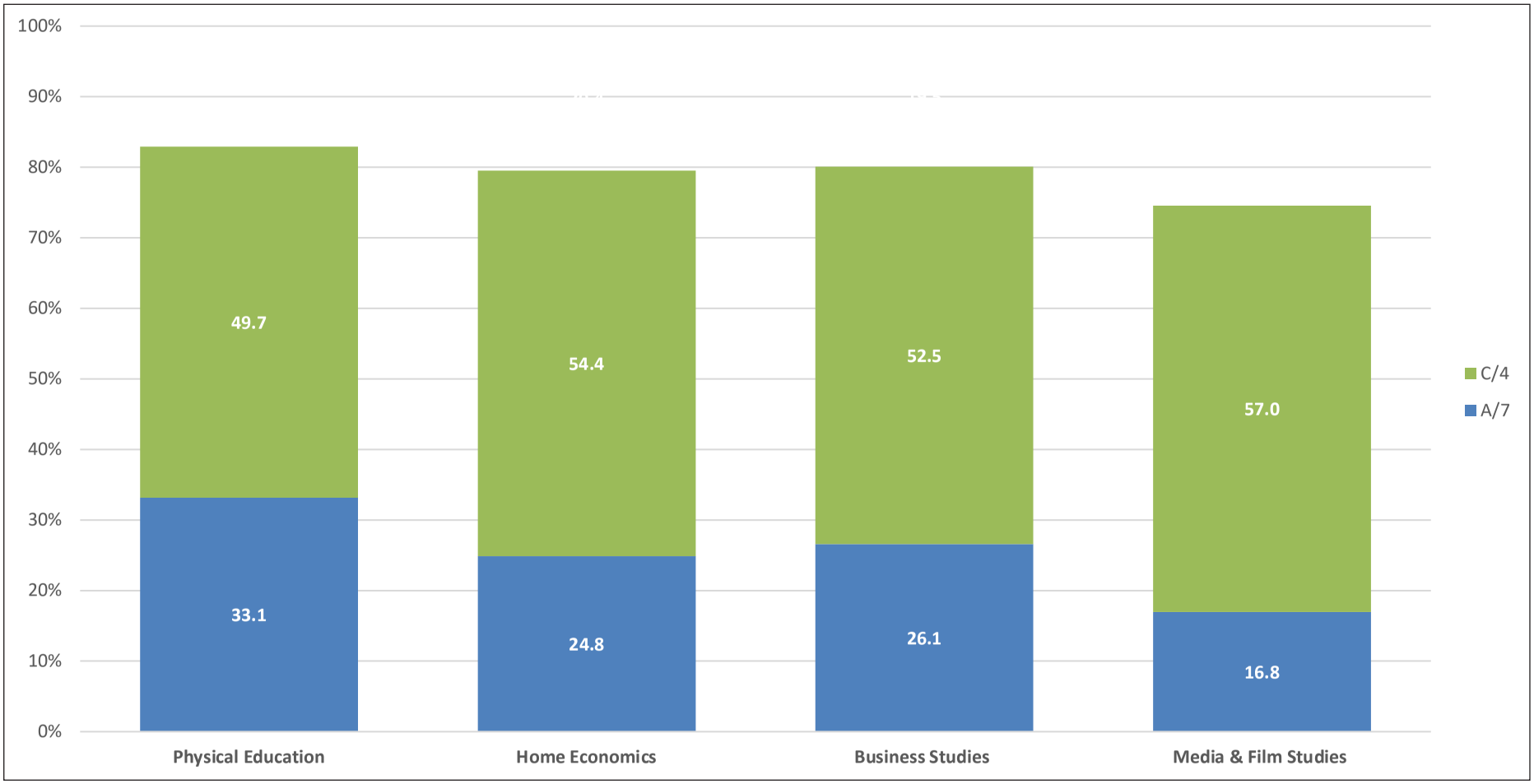


Source: Joint Council for Qualifications (JCQ) – Provisional GCSE Full Course Results (Northern Ireland), 2018

4.1.7 Other

The figure below illustrates students' performance at grades A/7-C/4 in GCSE Other Subjects.

Figure 8: GCSE Other Subjects Performance 2017/18 (Grades A/7–C/4)



Source: Joint Council for Qualifications (JCQ) – Provisional GCSE Full Course Results (Northern Ireland), 2018

The table below presents average male and female GCSE performance at grades A/7-C/4. Additionally, the table illustrates the % change on the previous year's performance for both genders, as well as this year's gender performance gap. Female performance is higher in all but two GCSE subjects.

Table 15: Cumulative A/7–C/4 Grades for GCSE (2017/18)

	Male	% Change	Female	% Change	GenGap
STEM					
Biology	94.9%	3.0%	94.8%	2.7%	**0.1%**
Chemistry	93.9%	-0.2%	96.0%	0.6%	**-2.1%**
Computing	89.5%	6.9%	89.8%	2.0%	**-0.3%**
Design & Technology	75.8%	1.8%	89.3%	2.9%	**-13.5%**
Engineering	70.2%	4.1%	68.1%	-12.7%	**2.1%**
Further Mathematics	93.4%	-0.2%	97.0%	1.0%	**-3.6%**
ICT	76.4%	0.0%	85.8%	2.0%	**-9.4%**
Mathematics	67.1%	0.8%	69.1%	2.7%	**-2.0%**
Other Sciences	69.3%	2.6%	86.1%	13.4%	**-16.8%**
Physics	95.3%	0.0%	98.5%	0.3%	**-3.2%**
Science	66.9%	3.4%	75.7%	3.3%	**-8.8%**
Science (Double Award)	85.1%	-2.1%	90.2%	-1.9%	**-5.1%**
Languages					
French	77.5%	-1.8%	86.3%	-2.1%	**-8.8%**
German	79.0%	-3.3%	88.0%	-2.7%	**-9.0%**
Irish	94.7%	0.4%	96.5%	-1.0%	**-1.8%**
Spanish	86.9%	-0.8%	93.6%	1.3%	**-6.7%**
Arts, Humanities & Social Sciences					
Art & Design	75.7%	1.5%	85.5%	-1.5%	**-9.8%**
Classical Subjects	88.4%	7.2%	96.5%	4.0%	**-8.1%**
Drama	84.3%	3.3%	93.0%	2.0%	**-8.7%**
English	73.7%	0.0%	86.8%	1.1%	**-13.1%**
English Literature	89.8%	0.7%	95.2%	0.1%	**-5.4%**
Geography	74.0%	-2.1%	86.2%	1.3%	**-12.2%**
History	77.6%	0.4%	83.7%	-1.4%	**-6.1%**
Music	86.6%	0.1%	92.1%	-0.6%	**-5.5%**
Performing & Expressive Arts	NA	NA	NA	NA	**NA**
Religious Studies	74.0%	2.2%	86.9%	0.7%	**-12.9%**
Social Science Subjects	51.7%	-11.0%	75.9%	2.4%	**-24.2%**
Other					
Business Studies	73.8%	-0.3%	84.3%	1.5%	**-10.5%**
Home Economics	65.8%	-0.2%	81.1%	0.9%	**-15.3%**
Media & Film Studies	68.0%	1.6%	80.4%	1.9%	**-12.4%**
Physical Education	80.3%	1.3%	87.4%	2.5%	**-7.1%**

Source: JCQ – Provisional GCSE Full Course Results (Northern Ireland), 2018

4.2 AS Level Performance Trends

Table 16: Three Country, Northern Ireland & CCEA AS Level Performance by Gender

2017/18	Three Country			Northern Ireland			CCEA[5]		
	Males	Females	All	Males	Females	All	Males	Females	All
% A	29.5 (24.6)	25.6 (23.1)	27.5 (23.8)	25.5 (25.5)	28.8 (29.6)	27.3 (27.7)	26.2 (27.0)	29.5 (30.9)	28.3 (29.8)
% A-E	90.0 (88.3)	91.3 (90.9)	90.7 (89.6)	94.2 (93.8)	95.8 (95.6)	95.1 (94.8)	94.5 (94.5)	96.2 (96.2)	95.5 (95.5)

Source: Joint Council for Qualifications (JCQ) – Provisional AS Full Course Results (Northern Ireland & Three Country), 2018 and CCEA Internal AS Full Course Results, 2018

Overall AS performance in Northern Ireland remains steady. CCEA results show a slight decrease at grade A but overall performance is the same as 2017.

In Northern Ireland the difference in performance at the overall pass rate is 1.6 percentage points higher for females than males, a decrease of 0.2 percentage points from the previous year.

The Three Country results have been affected by significant changes in the cohort and entry. AS no longer contributes to A Level in England therefore entries have substantially declined.

4.3 A Level Performance Trends

4.3.1 Overall

Table 17: Three Country, Northern Ireland & CCEA A Level Performance by Gender

2017/18	Three Country			Northern Ireland			CCEA[5]		
	Males	Females	All	Males	Females	All	Males	Females	All
% A*	8.5 (8.8)	7.6 (7.8)	8.0 (8.3)	8.4 (7.2)	8.0 (8.7)	8.2 (8.1)	9.1 (7.8)	8.8 (9.8)	9.0 (9.1)
% A*-A	26.6 (26.6)	26.2 (26.1)	26.4 (26.3)	29.7 (26.8)	30.9 (33.3)	30.4 (30.4)	31.4 (28.6)	33.1 (36.1)	32.6 (33.2)
% A*-E	97.1 (97.3)	98.1 (98.3)	97.6 (97.9)	97.6 (97.9)	98.7 (98.6)	98.2 (98.3)	98.0 (98.2)	98.9 (98.8)	98.6 (98.5)

Source: Joint Council for Qualifications (JCQ) – Provisional A Level Full Course Results (Northern Ireland & Three Country), 2018 and CCEA Internal A Level Full Course Results, 2018

Overall A Level performance is very steady in Northern Ireland with a very slight increase in A* outcomes and a very slight decrease in the overall pass rate. Three Country outcomes are also very stable. Northern Ireland outcomes continue to be higher than the overall Three country outcomes at all grades.

In 2018, Northern Ireland results show that the gender difference at grade A* is 0.4 percentage points higher for males than females. This is the first time this has occurred since the new top grade A* was introduced in 2010.

4.3.2 A Level Performance Summary

As at GCSE, Northern Ireland candidates continue to perform well at A Level, with 8.2% achieving the top grade and 30.4% attaining grades A*–A. At the A* grade, male candidates outperformed females by 0.4 percentage points. Across the A Level suite of specifications, females continue to outperform males at A*–C in most subjects. This includes all Languages and most STEM subjects.

81.3% of the STEM candidature achieved at least a grade C, which shows parity with last year.

Languages is the highest performing subject area, with 92.9% of candidates achieving at least a grade C.

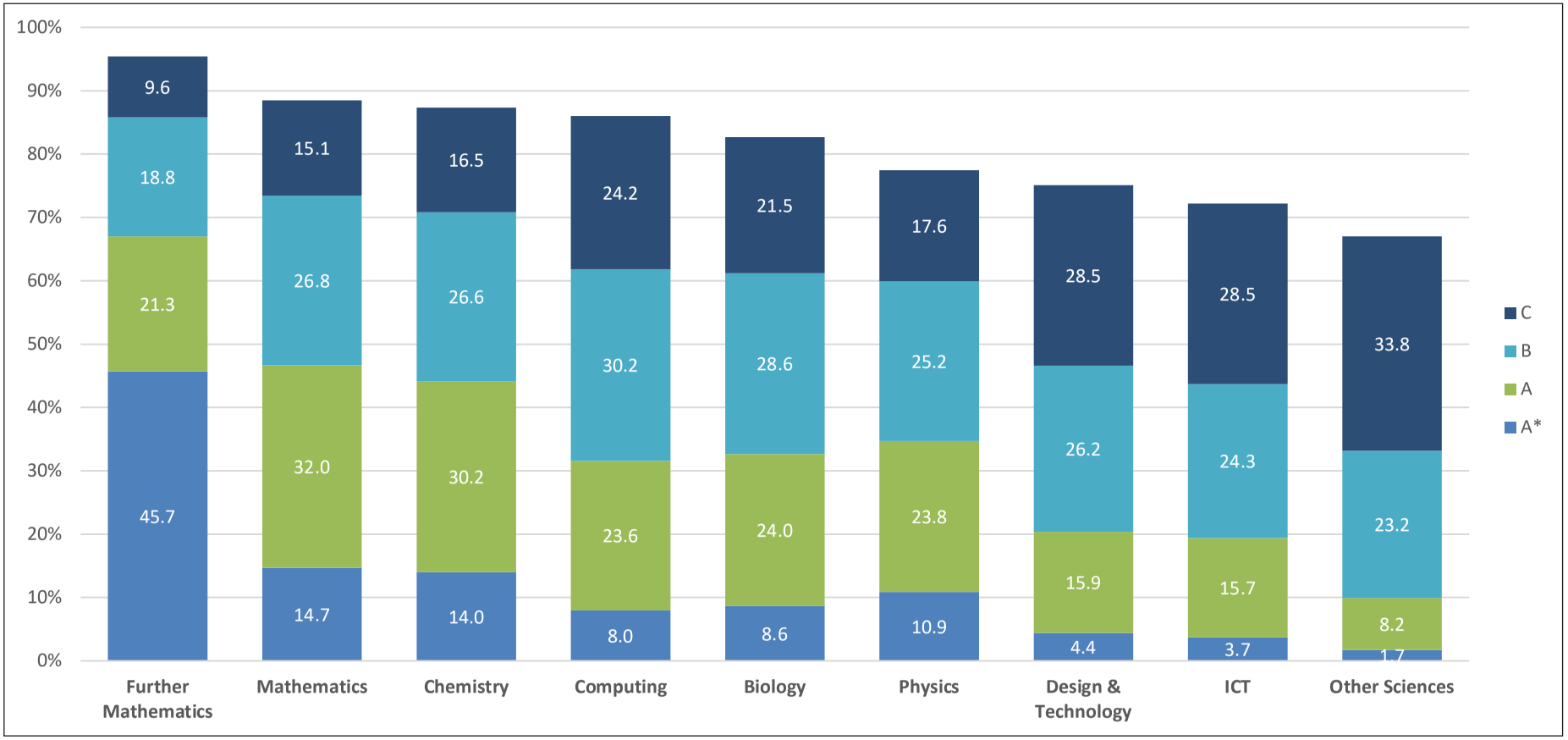
Arts, Humanities and Social Sciences results in 2018 show 84.1% of all candidates achieved at least a grade C at this level. This is similar to performance last year (82.3%).

As at GCSE, Further Mathematics is the top performing subject, with 45.7% of the candidature achieving an A*.

4.3.3 STEM

The figure below illustrates students' performance at grades A*-C in A Level STEM subjects.

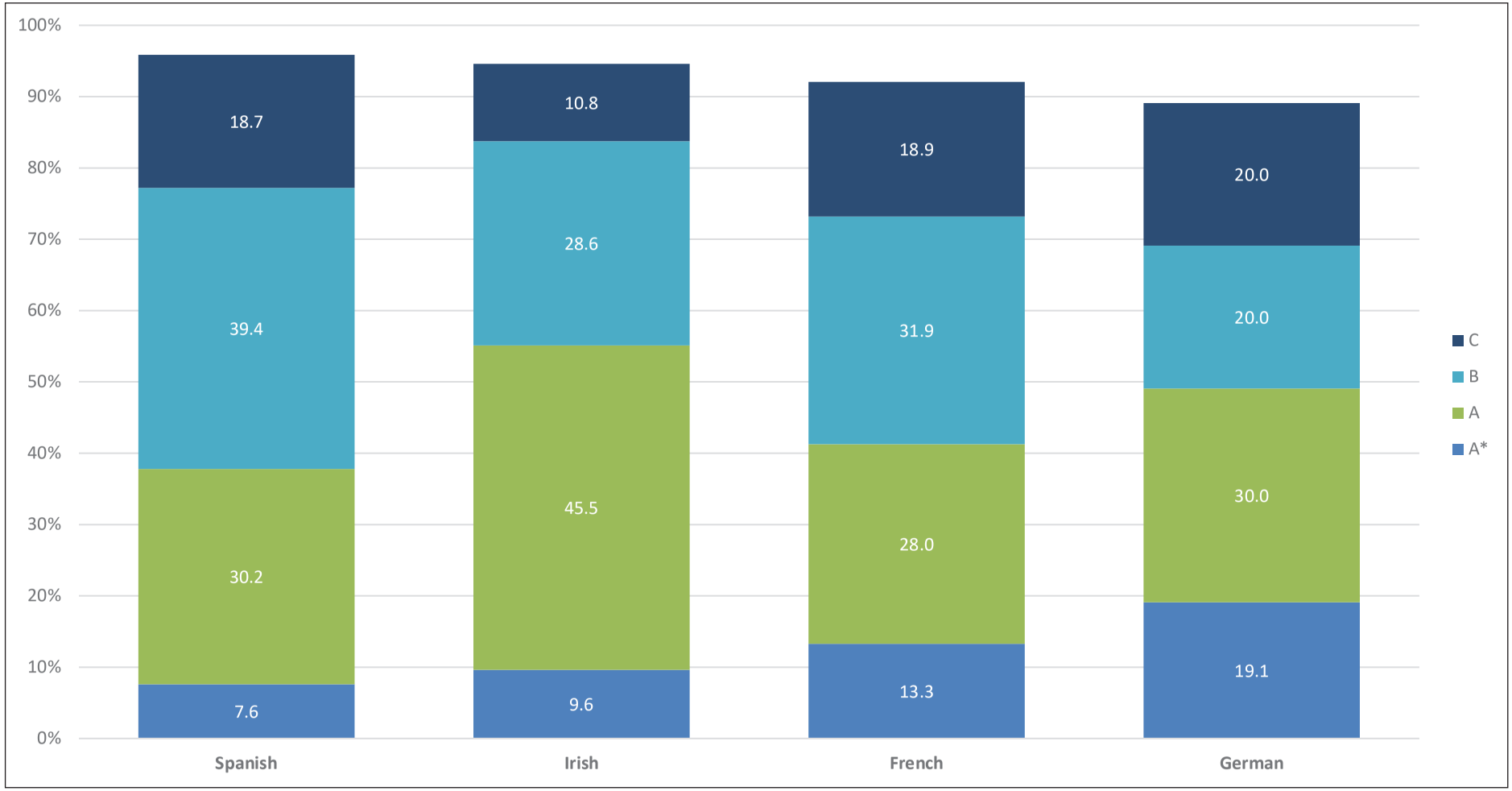
Figure 9: A Level STEM Performance 2017/18 (Grades A*–C)



Source: Joint Council for Qualifications (JCQ) – Provisional A Level Full Course Results (Northern Ireland), 2018

4.3.4 Languages

The figure below illustrates students' performance at grades A*-C in A Level Language subjects.

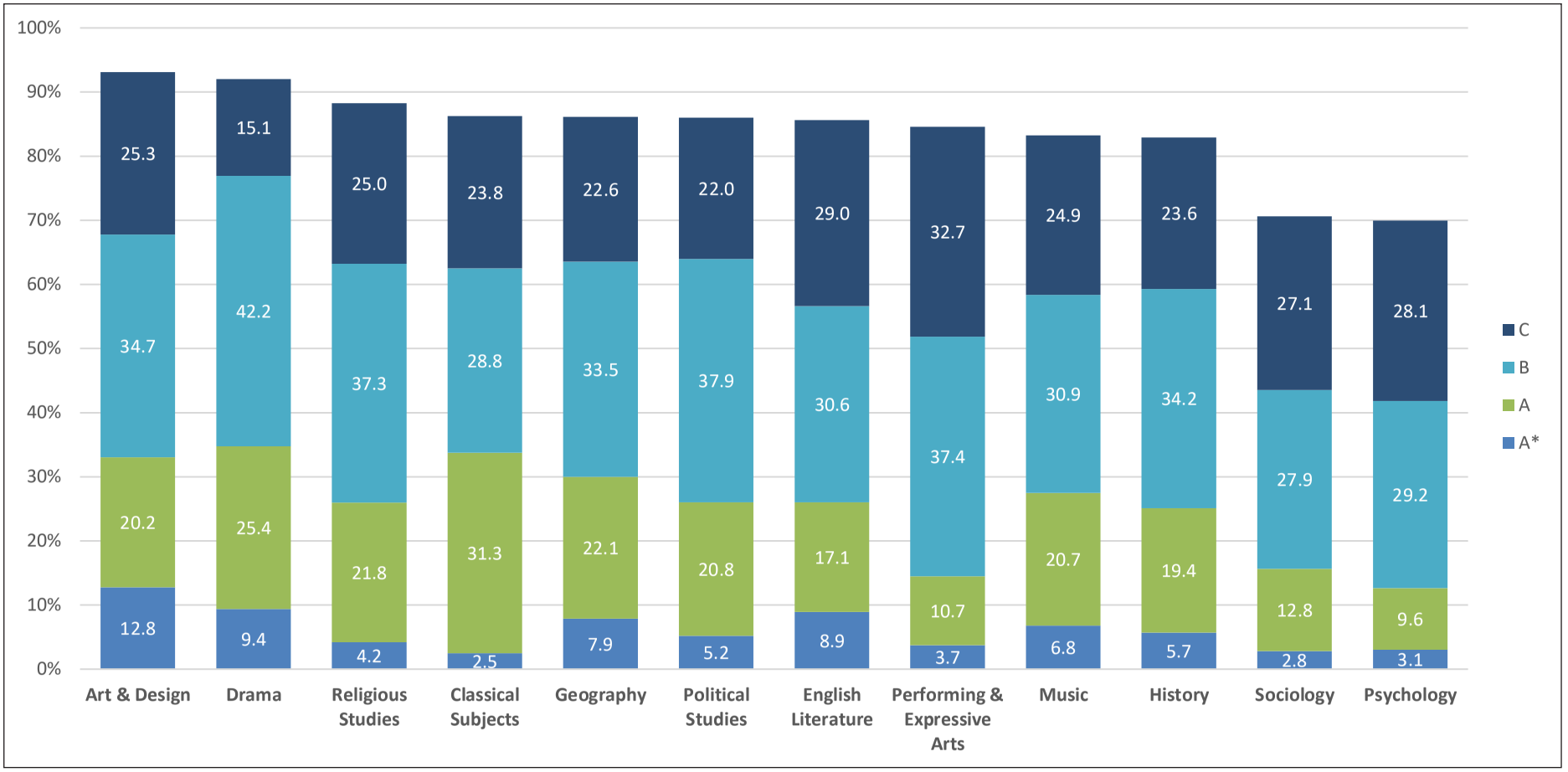


Source: Joint Council for Qualifications (JCQ) – Provisional A Level Full Course Results (Northern Ireland), 2018

4.3.5 Arts, Humanities & Social Sciences

The figure below illustrates students' performance at grades A*-C in A Level Arts, Humanities and Social Sciences.

Figure 11: A Level Arts, Humanities & Social Sciences Performance 2017/18 (Grades A*–C)

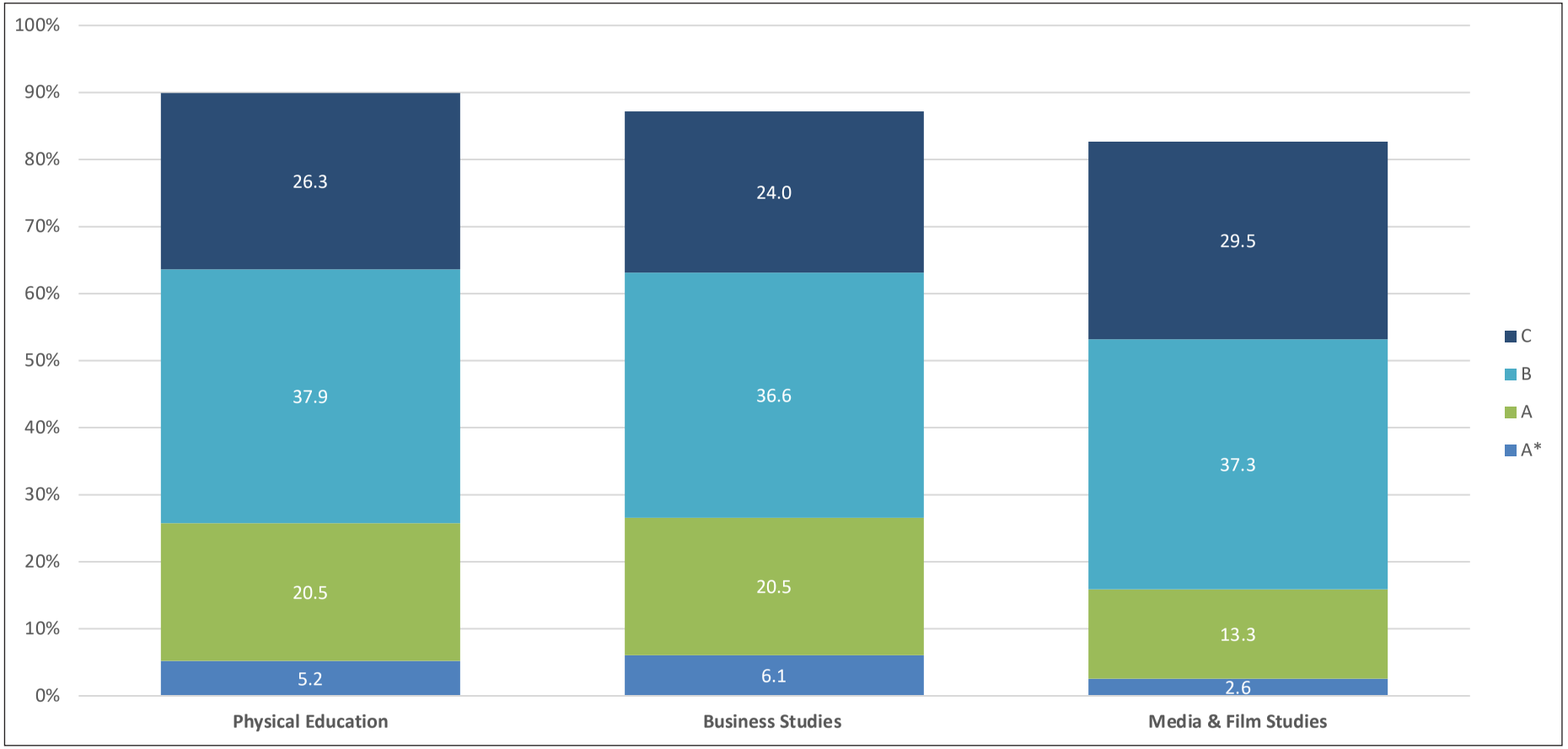


Source: Joint Council for Qualifications (JCQ) – Provisional A Level Full Course Results (Northern Ireland), 2018

4.3.6 Other

The figure below illustrates students' performance at grades A*-C in A Level Other subjects.

Figure 12: A Level Other Performance 2017/18 (Grades A*–C)



Source: Joint Council for Qualifications (JCQ) – Provisional A Level Full Course Results (Northern Ireland), 2018

The table below presents male and female A Level performance at grades A*-C. Additionally, the table illustrates the % change on the previous year's performance for both genders, as well as this year's gender performance gap.

Table 18: Cumulative A*–C Grades for A Level

	Male	% Change	Female	% Change	GenGap
STEM					
Biology	83.0%	2.7%	82.5%	-0.2%	0.5%
Chemistry	86.6%	0.4%	87.9%	-3.6%	-1.3%
Computing	85.4%	1.6%	90.0%	4.5%	-4.6%
Design & Technology	71.4%	-3.2%	84.2%	4.7%	-12.8%
Further Mathematics	94.3%	-1.4%	98.2%	3.2%	-3.9%
ICT	72.2%	0.0%	72.2%	-9.3%	0.0%
Mathematics	87.1%	0.7%	90.6%	0.4%	-3.5%
Other Sciences	64.3%	-16.8%	70.0%	13.8%	-5.7%
Physics	77.3%	-2.9%	77.9%	-4.7%	-0.6%
Languages					
French	91.0%	3.1%	92.6%	-0.5%	-1.6%
German	86.3%	8.8%	91.5%	-6.8%	-5.2%
Irish	91.8%	-4.5%	96.2%	1.1%	-4.4%
Spanish	95.0%	7.0%	96.4%	2.9%	-1.4%
Arts, Humanities & Social Sciences					
Art & Design	91.0%	0.2%	93.9%	1.3%	-2.9%
Classical Subjects	87.5%	-8.0%	85.7%	1.9%	1.8%
Drama	82.5%	-3.5%	96.0%	4.5%	-13.5%
English Literature	80.2%	6.0%	87.5%	2.4%	-7.3%
Geography	81.2%	-2.3%	89.9%	0.8%	-8.7%
History	81.0%	1.7%	84.7%	-1.3%	-3.7%
Music	84.9%	-4.9%	82.5%	-6.9%	2.4%
Performing & Expressive Arts	79.1%	-12.2%	86.0%	6.2%	-6.9%
Political Studies	85.1%	2.2%	86.9%	-2.8%	-1.8%
Psychology	57.4%	-6.6%	73.5%	3.8%	-16.1%
Religious Studies	85.9%	1.7%	89.1%	0.4%	-3.2%
Sociology	71.5%	1.9%	70.4%	-4.3%	1.1%
Other					
Business Studies	85.4%	-2.3%	89.1%	-0.2%	-3.7%
Media & Film Studies	81.2%	1.8%	83.9%	-2.0%	-2.7%
Physical Education	87.9%	12.0%	93.9%	17.2%	-6.0%

Source: Joint Council for Qualifications (JCQ) – Provisional A Level Full Course Results (Northern Ireland), 2018

5 Further Analysis

This section focuses on data and information from previous sections that are of note, and attempts to explain why certain trends exist. The three areas below were identified for further analysis:

- the narrowing of the gender attainment gap at A Level; and
- the underrepresentation of female STEM students at A Level.

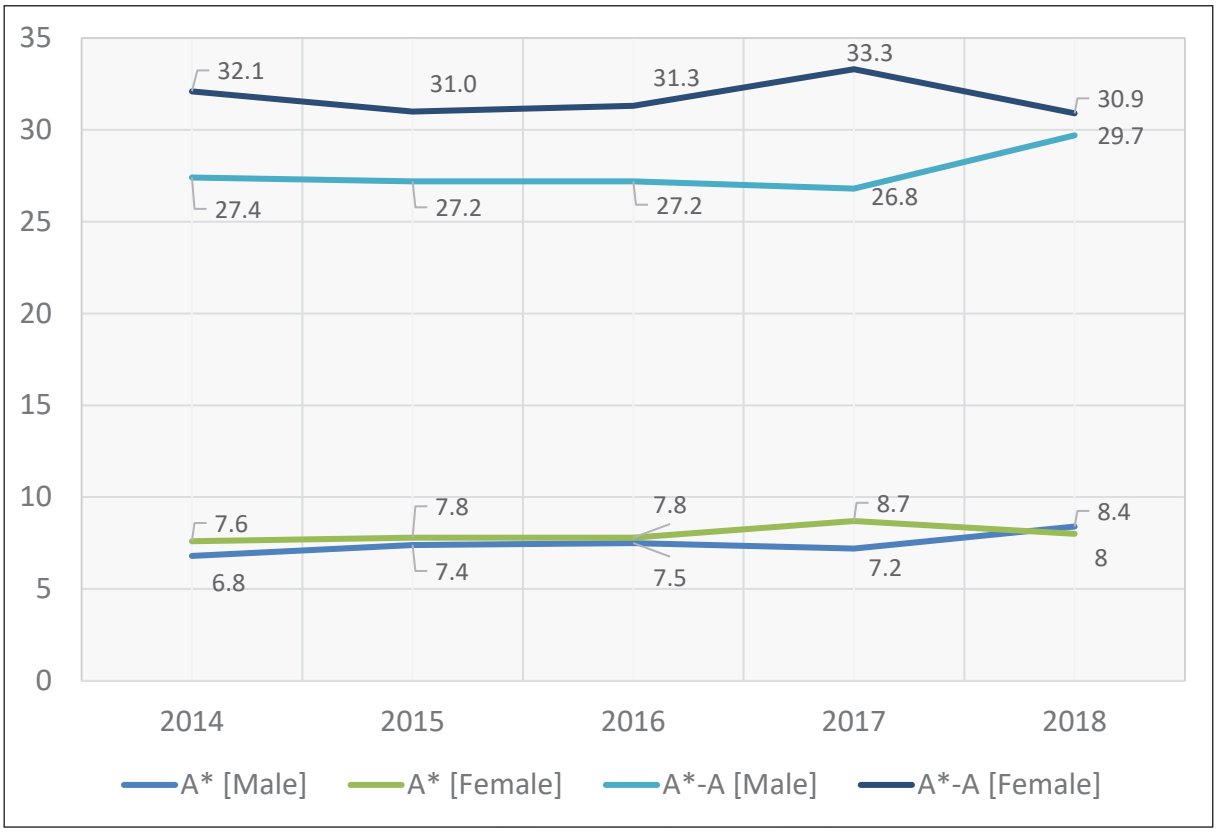
5.1 Gender & Performance

5.1.1 Performance Data

As noted in the previous section, females consistently outperformed their male counterparts at A Level. However, in 2018, for the first time males exceeded female performance at A*. In 2018, females decreased their A* outcomes by 0.7 percentage points to 8.0%, while male outcomes at the same grade increased by 1.2 percentage points to 8.4% (Figure 13).

When A*–A is considered, it was noted that female students have consistently outperformed male students over the last five years. However, in 2018, male students have noticeably closed this gap. Overall, females decreased their outcomes at A*–A by 2.4 percentage points to 30.9%, whereas male outcomes at these grades have increased to 29.7%. At grades A*–A, the gap has narrowed considerably from 6.5% in 2017 to 1.2% in 2018 (Figure 13).

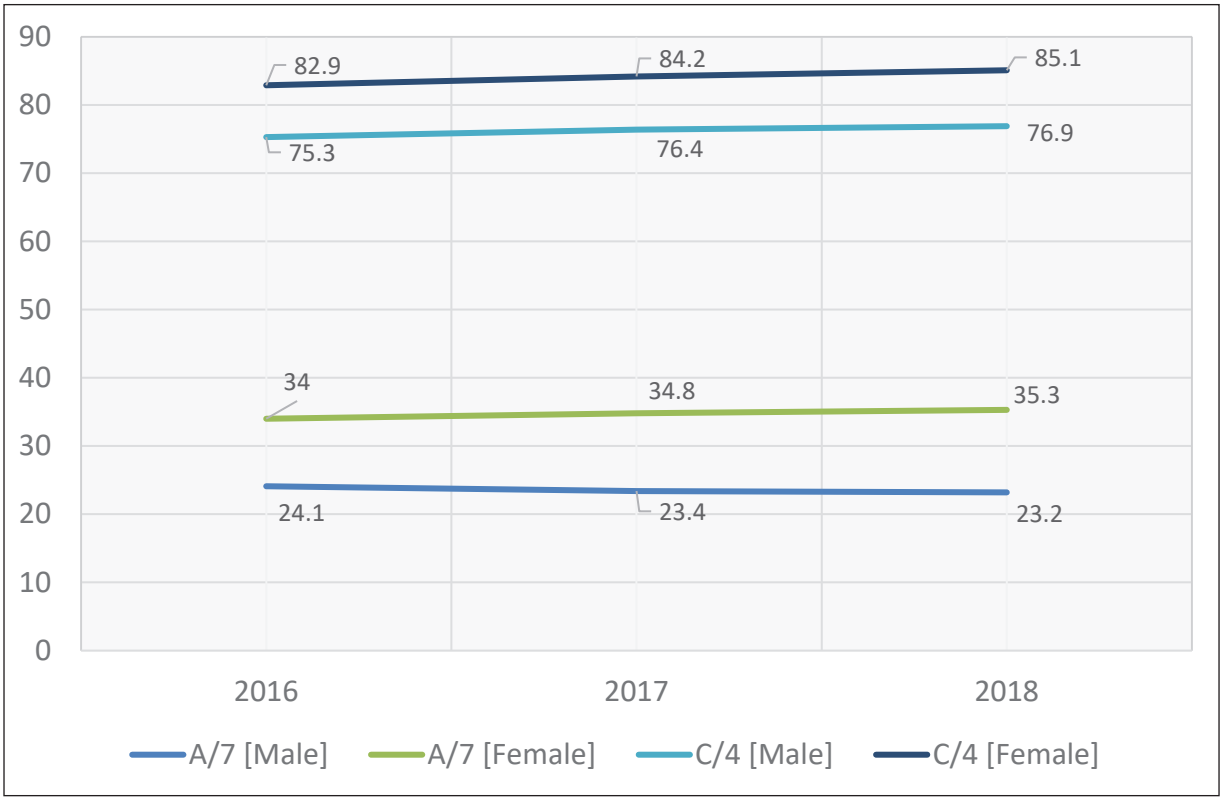
Figure 13: Overall A Level Performance by Gender (A* & A*–A)



Source: Joint Council for Qualifications (JCQ) – Provisional GCSE Full Course Results (Northern Ireland & Three Country), 2018

This trend was not apparent at GCSE level, where females continue to increase the performance differences at the highest grades (A/7) (9.9% in 2016 to 12.1% in 2018). This is also noted at grade C/4. Although both groups have improved on their performance, female attainment is greater than male attainment, with the gap widening from 7.6% in 2016 to 8.2% in 2018 (Figure 14).

Figure 14: Overall GCSE Performance by Gender (A/7 & A/7–C/4)



Source: Joint Council for Qualifications (JCQ) – Provisional GCSE Full Course Results (Northern Ireland), 2016–2018

There are a number of potential reasons why male performance increases to such an extent when they enter post-16 education. The next section explores these reasons and analyses additional data alongside academic literature to attempt to explain these trends.

5.1.2 Introduction

The Northern Ireland curriculum at Key Stage 4 has the following statutory areas of learning: Learning for Life and Work, Physical Education, Religious Education, and statutory skills of Communication, Using ICT, and Using Mathematics. GCSE qualifications are not statutory. However, annually the Department of Education (DE) request benchmarking and target setting data from post primary schools and this includes five GCSEs including English and Mathematics. For this reason many schools choose GCSE subjects that can be used for the DE return.

The performance trends identified at the start of this section could therefore be explained by expectations of schools in regards to compulsory programmes of study. It is important to assess student attitudes and motivations towards subject choice, and learning in general, to see what sort of impact these may have on performance.

5.1.2.1 Student Motivation

The disparity between male and female performance at GCSE level has previously been described as '[...] one of the most marked in the curriculum' (Court, 2002). Taking Modern Languages (MLs) as an example, examination statistics show that in 2018, 81.1% of males in Northern Ireland obtained grades A*–C in the three main MLs at GCSE level (French, German and Spanish), compared to 89.3% of female students.

As expected, this changes at A Level. Although fewer males take MLs at GCE than females, the performance gap is much narrower than at GCSE. In 2018, 90.7% of males obtained grades A*–C in the three main MLs at A Level, compared to 93.5% of females. This indicates that those who choose to take MLs at A Level are potentially more able and motivated than their GCSE counterparts.

This link between students' attainment and subsequent motivation has been found to be much more evident in male students. Using survey data, Patrick, Ryan and Pintrich (1999) found (about general scholastic motivation) that male students tend to be more extrinsically motivated (i.e. motivated by reward and outcomes). Females, on the other hand, were found to be more likely to be intrinsically motivated (i.e. motivated by enjoyment), and typically report greater use of cognitive strategies than males, which offsets the impact of poor academic performance.

Findings from Ghazvinia and Khajehpoura (2011) looked further into the use of cognitive strategies and learning. Their research into the academic performance and behaviour of students indicates that a gender difference in behaviour and performance does exist. They found that females show an internal locus of control, use attitude, motivation, time management, anxiety and self-testing strategies more extensively, and therefore obtain better marks in literature. In contrast, males use concentration and information processing more, and therefore obtain better marks in Mathematics.

This is further supported by a Department for Education and Skills report published in 2007. The report noted that the gender gap at GCSE arises mainly because of differences in language and literacy skills, which are reflected in differences in performance in those types of subjects. The gender gap is small or negligible for Mathematics and Science. These trends have been recognised in historical data going back 60 years.

As noted earlier, a large number of subjects at GCSE focus primarily on language and literacy, for example English, MLs and Religious Studies. This, coupled with information about male attitudes and response to poor attainment, could help to explain why the gender gap exists.

5.1.2.2 Subject Choice & Perceptions

Gender differences in subject choice become more accentuated post-16. Table 19 details these differences.

Table 19: Most Popular A Level Subjects

	Overall	Males	Females
1	Mathematics (10.2%)	Mathematics (13.7%)	Biology (10.8%)
2	Biology (9.5%)	Biology (7.9%)	Religious Studies (9.3%)
3	Religious Studies (7.0%)	Physics (7.1%)	English Literature (8.6%)
4	English Literature (6.4%)	History (6.4%)	Mathematics (7.4%)
5	History (6.0%)	Business Studies (6.2%)	Geography (5.7%)

Source: Joint Council for Qualifications (JCQ) – Provisional A Level Full Course Results (Northern Ireland), 2018

The top three subjects that are most popular among females are Biology (10.8%), Religious Studies (9.3%) and English Literature (8.6%), while for males they are Mathematics (13.7%), Biology (7.9%) and Physics (7.1%).

This indicates that STEM subjects are much more popular among males when compared to females. This is further supported in Section 3, where (in 2018) 50% of males sat at least one STEM subject compared to 32.2% of females. The opposite trend is noted in Arts, Humanities and Social Sciences, where only 29.5% of males took at least one Arts, Humanities and Social Sciences subject compared to 47% of females.

Research has found that male students are particularly receptive to economic arguments about the value of subjects and subsequently select A Level and degree subjects that offer employment prospects (Vidal Rodeiro, 2007). Males are typically motivated by reward and outcomes (Patrick et al., 1999). This should result in higher performance among males in STEM subjects.

Table 20: A Level STEM Performance by Gender (A*–A)

	Males	Females	Diff.
Design & Technology	17.9	26.5	-8.6
ICT	18.7	20.5	-1.8
Mathematics	46.4	46.9	-0.5
Biology	32.7	32.6	0.1
Other Sciences	12.4	7.3	5.1
Chemistry	47.5	41.5	6.0
Physics	36.4	30.1	6.3
Computing	32.5	26.0	6.5
Further Mathematics	70.2	58.9	11.3

Source: Joint Council for Qualifications (JCQ) – Provisional A Level Full Course Results (Northern Ireland), 2018

As Table 20 shows, this assumption appears to be valid. In 2018, males have outperformed females at most STEM subjects at A Level at grades A*–A.

5.1.2.3 Economic Data

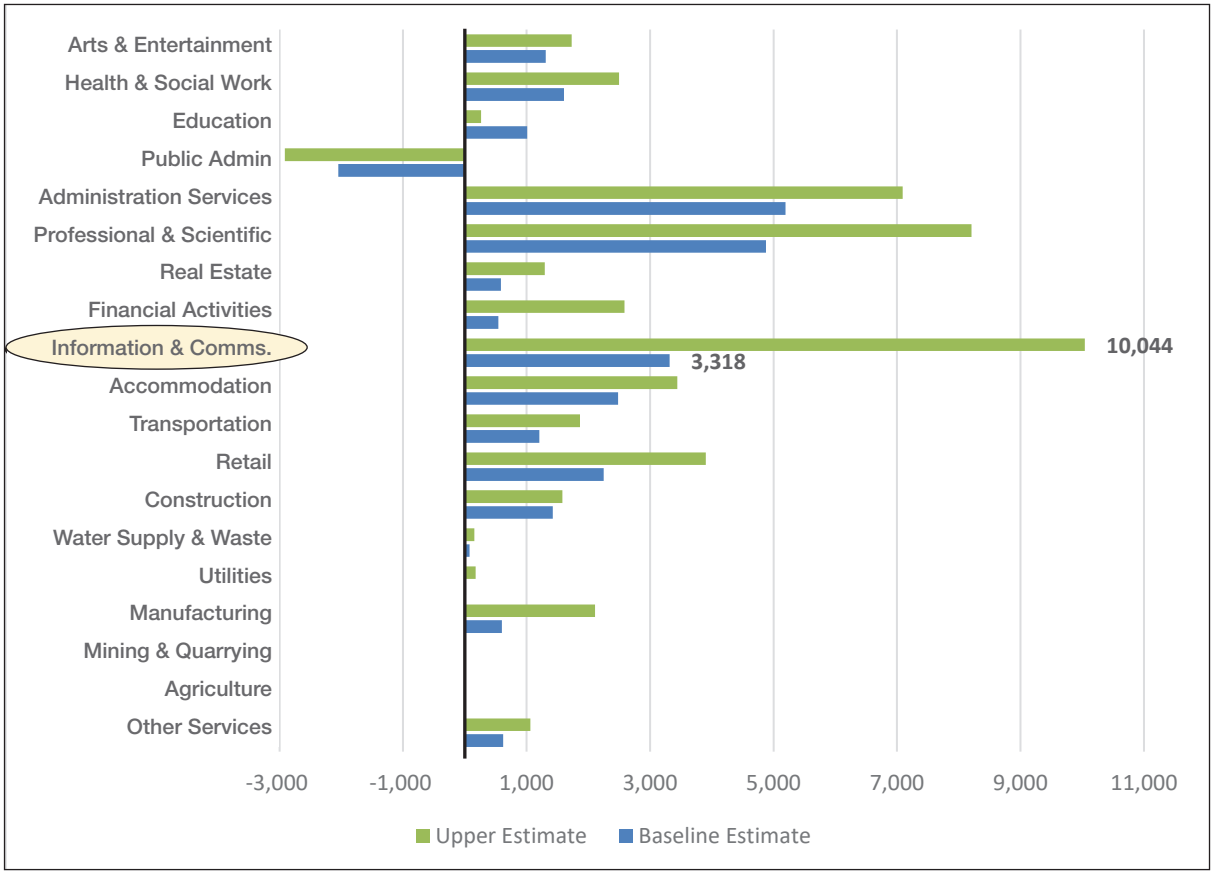
Belfast's Local Development Plan (LDP) (2020-2035) indicates that the city's sectoral mix is heavily weighted towards the private sector and office/retail type employment, with the private sector jobs accounting for two thirds of total employment.

Ulster University Economic Policy Centre (UUEPC) has estimated the growth in Belfast's employment from multiple sectors over the period from 2016-2030 across two scenarios: Baseline and Upper.

In the baseline scenario, administration services contribute more jobs to 2016-2030 growth than any other, adding just over 5,000 jobs. Professional and Scientific and Information and Communication complete the three, adding 4,877 and 3,318 jobs respectively. The nature of the upper scenario, including a reduced corporation tax rate, reflected a shift in sectoral drivers of growth. In this scenario, information and communication is the sector that contributes the most jobs to the 2016-2030 growth - over 10,000 jobs, a quarter of the total.

As mentioned previously, students are receptive to economic arguments when it comes to subject choice (Vidal Rodeiro, 2007) and, as such, it is reasonable to assume that such forecasts could have an impact on entries in Computing, STEM and Business.

Figure 15: Estimated Employment Change (2016-2030)



Source: Belfast City Council: Assessing Employment Space Requirements across the City - 2015-2030: Ulster University Economic Policy Centre- Andrew Webb and Jordan Buchanan

5.1.3 Summary

In summary, it can be assumed that gender gap in performance at GCSE can be partly explained by differences in student attitudes and motivations to learning, students' use of cognitive strategies and the existence of preferential school subject choices at GCSE. The closure of this gap at A Level can also be partly explained by increased male motivation from having greater autonomy in subject choice at this level and choosing subjects that correspond better with their skill set.

Despite this, it should be noted that other factors such as socio-economic status, parental influence and school environment can also play a part in scholastic performance and should not be discounted. This should therefore be considered as an area for future research.

5.2 Female Underrepresentation in STEM Subjects

5.2.1 Introduction

Historically, the recruitment of women in STEM careers has been a lengthy and difficult endeavour (Blackburn, 2017). This is likely due to a number of causes, including poor advising (Lee, 2008), failed recruitment efforts (Wang & Degol, 2016), social factors (Lyon 2013; Thackeray 2016), early classroom experiences (Han, 2016) and institutional structures (Bottia et al., 2015).

5.2.1.1 Barriers

In the past it has been argued that one of the biggest barriers to women taking STEM courses is the perception that it is a 'male-dominated' industry (Lee, 2008). This subsequently leads to a lack of interest in these subjects through factors such as teachers believing females are less capable in STEM, perceptions of parents and peers, as well as psychological barriers in the media, which often promote STEM as male-dominated (Saucerman & Vasquez, 2014). An evolving theme in the research behind this is that females experience a 'chilly climate' at an institutional, department and school level. Seaton (2011) defines a climate as chilly "when individuals within an environment are not treated equally or fairly." Research has shown that females in STEM experience added biases, stereotypes, discrimination and cold classroom environments (Litzler, 2010; Walton et al., 2015). It is clear from current research that this perception and barrier still exists.

Stereotypes

One of the biggest barriers to women in STEM is the stereotype that only males are interested in STEM, which is well documented in popular culture (Moss-Racusin, Molenda & Cramer, 2015). Women in STEM have been found to face gender stereotypes at both school and university (Schneider 2010; Stout, Grunberg & Ito, 2016). Due to the established sociocultural stereotypes about successful cisgender white males in academic STEM fields, women face a phenomenon known as 'stereotype threat' (Chase, 2012; Corbett & Hill, 2015). This is when a person fears they will confirm a negative stereotype about a group they belong to (Jones, Ruff & Paretti 2013; Cheryan et al. 2017) and has been associated with increased levels of stress and anxiety in females (Nguyen, 2016). Stereotype threat has been well documented in women's performances in masculine-stereotyped careers (Ramsey, 2011; Barth et al., 2015; Smyth & Nosek, 2015), and particularly within the field of computer science (Cheryan & Meltzoff 2016; Thackeray, 2016). This can be seen in the Northern Ireland and the Three Country entry data as females are largely outnumbered by males in A Level Computing.

Classroom Environment

Females have been found to be hesitant about asking questions in class (Sobel, Gilmartin & Sankar, 2016) and underestimate their abilities in class, when, it may just be that they have different learning styles to males (Deemer et al., 2014). In comparison to men, women have been found to start and end the term with much lower confidence in Mathematics (Ellis, Fosdick & Rasmussen, 2016). This lowered confidence does not, however, reflect any lowered ability but may result in fewer females entering mathematical university courses.

Identity

An emerging body of literature suggests that the idea of 'science identity' and how women strive to become valued members of STEM are influential factors for women in this discipline (Szelényi, Bresonis & Mars, 2016). Stets et al. (2017) found that a science identity positively influences the likelihood of pursuing a science career. Research suggests that females can overcome barriers such as bias and stereotypes through concentrating on their self-concept, individual identity and self-efficacy (Lee, 2013). O'Brien et al. (2015) found that women frequently report that they feel they do not belong in STEM due to threats to their social identity, such as stereotype threat, not fitting in and sexism. Women therefore often experience disjointed science, academic and personal identities when taking STEM fields (Beals, 2016).

Research has shown that a high sense of self-efficacy can lead to perseverance in STEM disciplines (Aryee, 2017). Self-efficacy refers to a judgement about a person's capability to perform to a designated level (Wise, 2007). Peers, teaching staff and mentors have all been found to have a significant impact on a person's level of self-efficacy (Hogue, 2012; Charleston & Leon, 2016). One study found that while females scored themselves lower on science and mathematical ability, they scored themselves higher on teamwork skills, critical thinking and problem-solving, suggesting that females who stick with STEM subjects have higher self-efficacy (Gurski, 2016).

5.2.1.2 Increasing the Number of Women in STEM

Research suggests that early exposure can be a precursor to pursuing certain careers (Bishop, 2015). Gender differences in attitudes towards and expectations about mathematics ability are evident even in primary school children (Ceci et al., 2014). Valla and Williams (2012) found that focusing on interventions aimed at increasing interest in STEM fields among primary and secondary school children can improve gender diversity. Exposing students to STEM through exploratory mathematics and science courses during secondary school has been found to increase their likelihood of studying a STEM discipline at university (Redmond-Sanogo, Angle & Davis, 2016), as has participating in out-of-school programs (Edzie, 2014). Likewise, attending a STEM-focused school can boost interest in science and mathematics careers (McKnight, 2016; Means et al., 2016).

Teaching has been found to have a large influence on attitudes towards STEM. Studies report that males often dominate classroom communication during discussion and activities, particularly in subjects such as physics (Due, 2014). Other studies have found that gender differences in communication are due to teacher behaviours such as a lack of disciplining (allowing males to dominate) or preferential treatment of males (Jones & Myhill, 2004). These factors are likely to make females less comfortable in STEM classes. Other research has shown that female role models such as teachers, advisors and mentors strengthen young women's mathematics and science attitudes and increase their likelihood to consider STEM careers (Corbett & Hill, 2015). Additionally, a supportive teacher (male or female) can promote an environment that welcomes and values women to foster a sense of belonging (Clark et al., 2016) and can alter beliefs concerning the underrepresentation of females in STEM through incorporating meaningful dialogue in the classroom (Lock & Hazari, 2016).

5.2.1.3 Current Status

Support from higher education and UK initiatives has led to stronger efforts in recruiting women and creating a strong STEM pipeline. Women are motivated now more than ever by a variety of academic and co-curricular influences to choose STEM disciplines as careers.

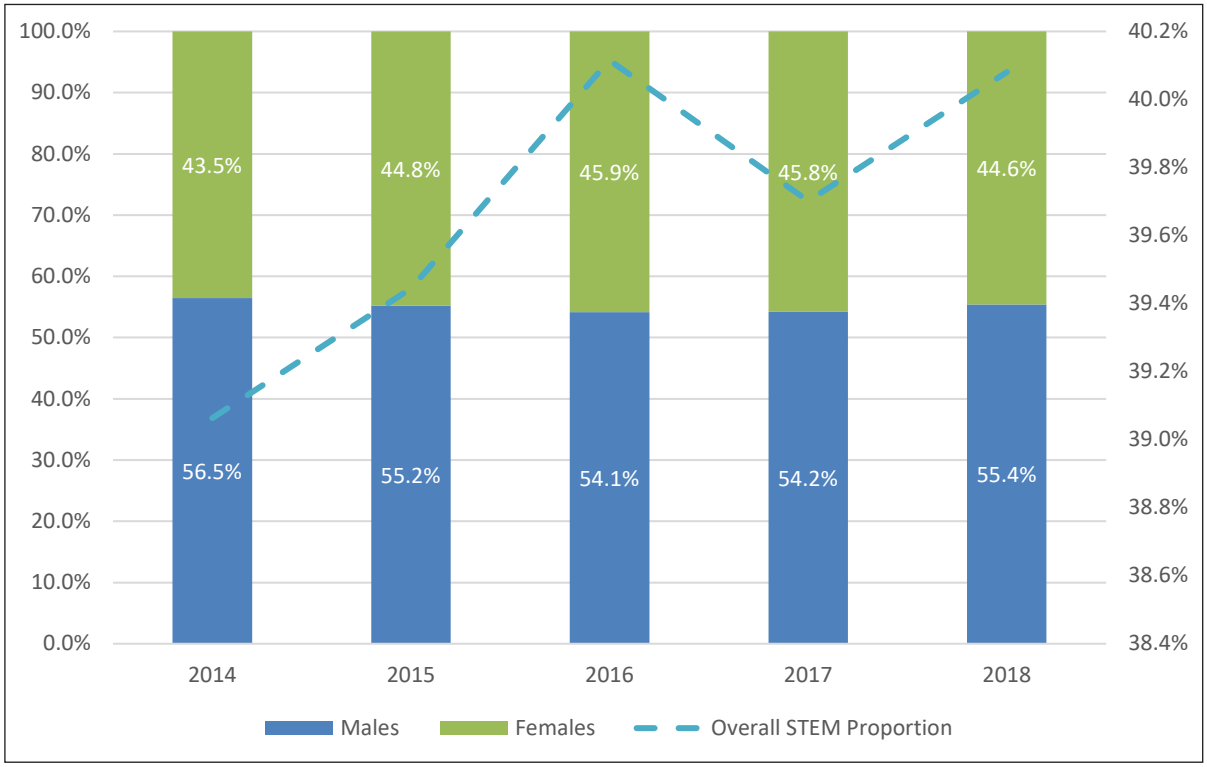
In recent years, many initiatives (e.g., Science and Innovation Investment Framework 2004-2014; STEMNET; YourLife campaign; WISE) have been made to encourage females to study and excel in STEM. However, the high educational performance of females in STEM subjects has not been matched by similar increases in the overall representation of women in STEM. Women represent only 23% (N=864,278) of those in core STEM occupations in the UK (WISE, Women in STEM workforce, 2017). The STEM sector in which women represent the highest percentage of the workforce (44%) is the research professions such as biochemists, physicists, geologists and meteorologists followed by women who work as science and engineering technicians (27%). The most underrepresented STEM professions, where women constitute just 8% and 11% of the total employees, are the skilled traders and professional engineers (WISE, Women in STEM workforce, 2017).

Higher education is in the spotlight to produce graduates to fill the predicted large increases in both Professional and Scientific and Information and Communication jobs anticipated in the UK. The representation of women in STEM is vital. Diversity in the workforce contributes to productivity, innovation, creativity and success. Women's experiences, as well as men's

experiences, should guide the direction of engineering and technical innovation. Yet, self-reports of the lived experiences of females reveal that biases, wavering sense of belonging, chilly climates and stereotypes are still barriers for successful degree completion and career entry. As noted above, however, a focus on gender diversity in class from an early age, having influential mentors and taking extracurricular STEM programs may all help to encourage females to study STEM subjects and subsequently pursue a career in this field (Blackburn, 2017).

5.2.2 STEM Subject Trends

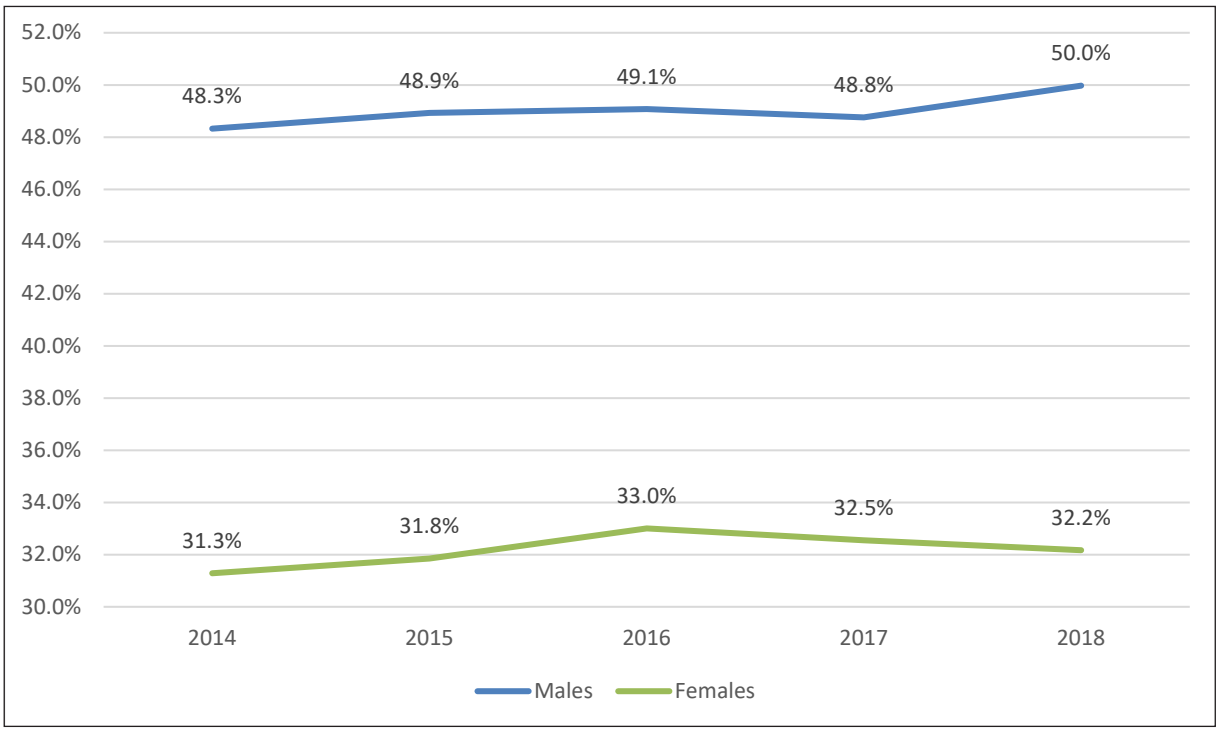
Figure 16: Gender Breakdown of STEM Subjects and Overall STEM Proportion (2014-2018)



Source: Joint Council for Qualifications (JCQ) - Provisional A Level Full Course Results (Northern Ireland), 2014-2018

Over the last five years, the proportion of students taking STEM subjects has fluctuated between 39.1% and 40.1% (see Figure 16). STEM subjects continue to be male dominated. The female proportion of total STEM candidature in 2018 was the lowest it has been in the last 4 years (44.6%).

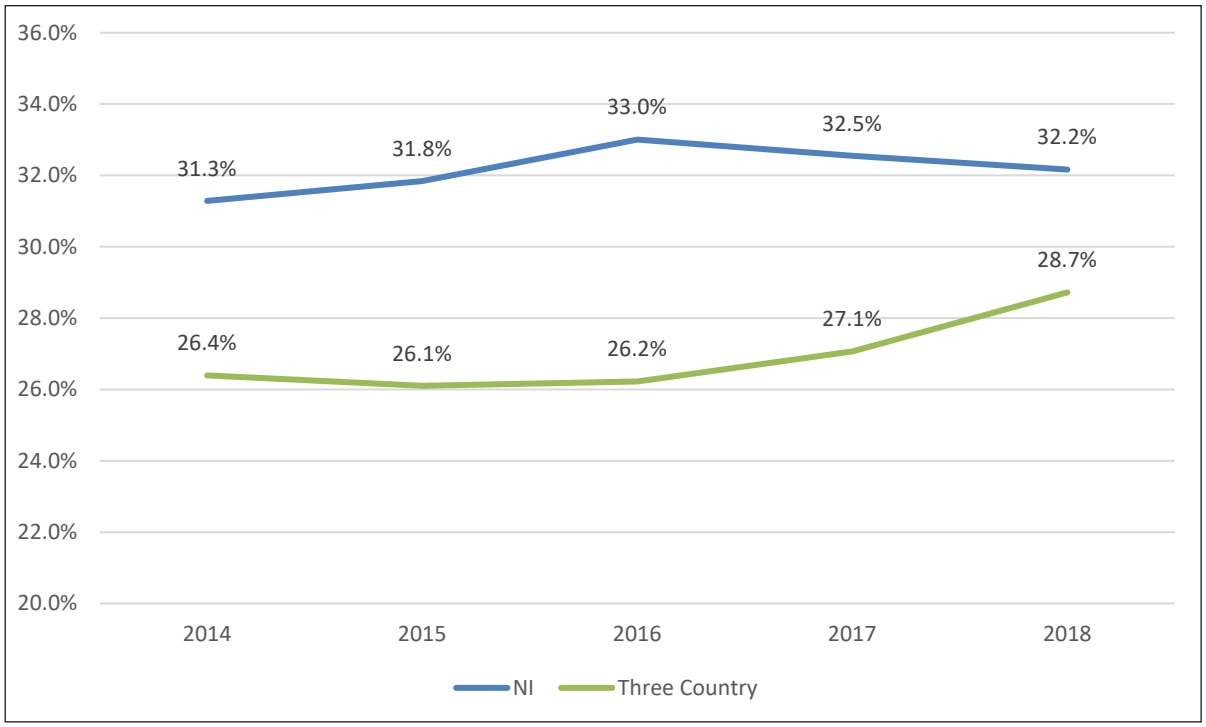
Figure 17: Proportion of Males and Females Taking STEM Subjects Overall in Northern Ireland (2014-2018)



Source: Joint Council for Qualifications (JCQ) - Provisional A Level Full Course Results (Northern Ireland), 2014-2018

Figure 17 highlights the large disparity in the proportion of males and females taking STEM subjects at GCE. Half of male students choose STEM subjects while the same is true for less than a third of females. Over the last 5 years, males have shown a consistent trend in STEM uptake. However, particularly over the last 3 years, fewer females are studying these subjects.

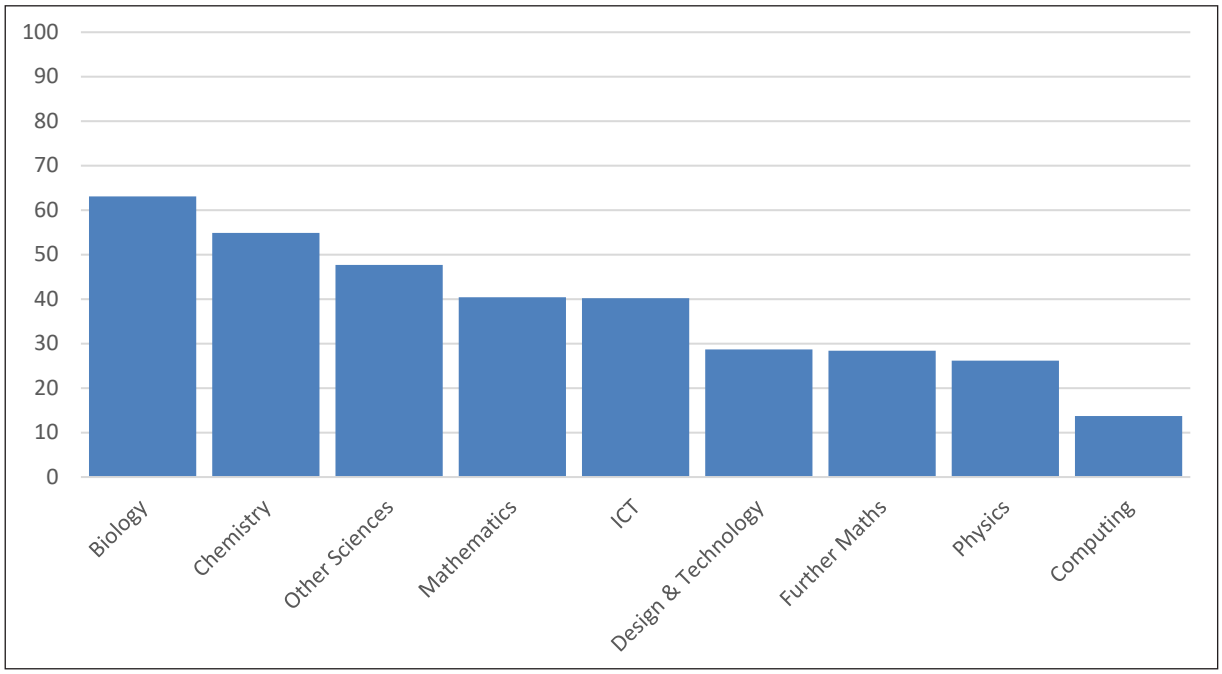
Figure 18: Proportion of Females Taking STEM Subjects in NI and Three Country (2014-2018)



Source: Joint Council for Qualifications (JCQ) - Provisional A Level Full Course Results (Northern Ireland and Three Country), 2014-2018

The graph above shows that the proportion of females overall taking STEM subjects has been gradually declining in Northern Ireland since 2016, while it has been increasing in the Three Countries over the same period. There are still proportionally more female students in Northern Ireland taking STEM subjects than in the Three Countries. However, it should be noted that this gap has been closing each year, dropping from 6.8% in 2016 to 3.5% in 2018.

Figure 19: Proportion of Females Entries in each STEM Subject (2018)



Source: Joint Council for Qualifications (JCQ) - Provisional A Level Full Course Results (Northern Ireland), 2018

In Northern Ireland, Biology and Chemistry are the only two STEM subjects where female entries exceed male.

Further Maths, Physics and Computing are the least popluar STEM subjects among females.

The tables below show that, in 2018, males had higher outcomes in 6 out of 9 STEM subjects at the A*-A grades in Northern Ireland. However grades A*-E indicate that female performance was higher in five subjects.

Table 21: Percentage Point Differences in Performance (Male – Female) at A*-A in GCE STEM Subjects (2014-2018)

[9]	2014	2015	2016	2017	2018
Biology	-1.4	-0.9	0.5	-3.7	0.1
Chemistry	1.2	1.7	4.7	-5.0	6.0
Computing	18.0	-16.0	-29.3	2.3	6.5
ICT	-9.8	-5.4	-10.4	-12.1	-1.8
Mathematics	-4.3	-3.1	-0.6	-5.7	-0.5
Further Mathematics	16.4	5.2	-0.2	5.4	11.3
Physics	-2.4	-2.7	-5.3	-6.5	6.3
Design & Technology	3.6	-2.8	-7.1	-1.9	-8.6
Other Sciences	-5.3	-.14	-18.2	-8.3	5.1

Source: Joint Council for Qualifications (JCQ) – Provisional A Level Full Course Results (Northern Ireland), 2014–18

Table 22: Percentage Point Differences in Performance (Male – Female) at A*–E in GCE STEM Subjects (2014–2018)

	2014	2015	2016	2017	2018
Biology	-0.7	0.4	-0.2	-0.4	0.2
Chemistry	-0.8	-0.7	-0.3	-0.2	0.0
Computing	-2.0	-1.3	0.0	-1.2	-1.3
ICT	-1.0	-1.0	-1.2	-1.4	0.0
Mathematics	-0.8	-0.8	-0.4	-1.0	-2.0
Further Mathematics	-1.4	0.3	2.0	0.0	-0.7
Physics	-1.1	0.3	-0.7	1.2	0.2
Design & Technology	-2.1	-1.9	-0.7	-1.3	-1.7
Other Sciences	-0.4	-1.5	-1.2	-3.6	-0.9

Source: Joint Council for Qualifications (JCQ) – Provisional A Level Full Course Results (Northern Ireland), 2014–18

[9] **Please Note:** Negative numbers represent females outperforming males.

6 Conclusions

This report has presented a detailed analysis for GCSE, AS and A Level subjects and grade outcomes for the period 2016–18. It outlined similarities and differences between the entry figures for each year for male and female candidates in Northern Ireland and highlighted notable entry patterns. The report analysed the gender gap in grades, gender differences in subject choice, qualifications and the economy, and the differences in males and females doing STEM subjects.

Using entry patterns it is possible to predict areas for future support, such as STEM subjects for females. Much work has been done in the Northern Ireland curriculum to encourage females to take computing courses and STEM subjects in Northern Ireland but, as yet, this has not shown in the A Level subject choices.

The patterns in the report show a wide range of subjects are taken by students in Northern Ireland and research suggests that subject choices are affected by motivational factors, enjoyment, school preferences, the Northern Ireland job market and access to careers. CCEA will continue to offer a range of subject options that are engaging, have currency with employers, colleges of further education and universities, and will work closely with stakeholders to support schools and learners.

It is clear from the data in this report that Northern Ireland students continue to perform well at both GCSE and A Level. These results have continued to remain the highest of the Three Countries.

The report provides a large quantity of evidence that will help facilitate rich discussions between various stakeholders, including educationalists, policy makers and employers and will inform future debate.

7

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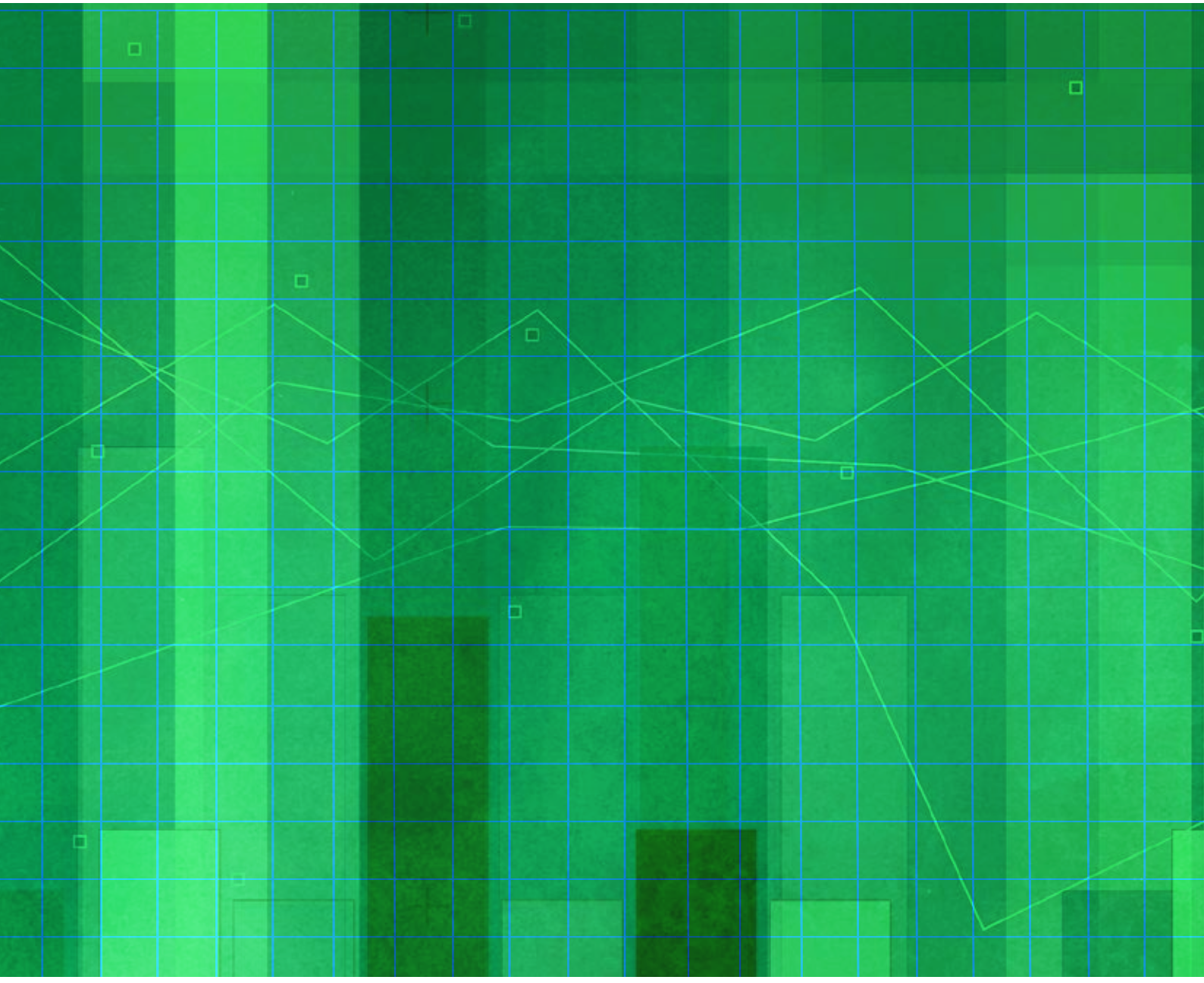

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