# LEAVING CERTIFICATE 2015 draft

## STEM and STEAM

This note examines aspects of participation and performance in the Leaving Certificate examinations 2015 and some trends and result patterns in that participation. It comments on an aspect of the new 2017 Points System.

Technological advance and global innovation emphasise the future importance of qualifications and occupations in Science, Technology, Engineering and Mathematics i.e. STEM qualifications and occupations. This note focuses on Leaving Certificate subjects preparatory to entering Higher/Further Education STEM courses and STEM based occupations.

It is argued that STEM qualifications need to be complemented with other skills such as communication and multilingual skills, with design and innovative capacities. This leads to the addition of the letter “A” representing broad Arts, covering communication and languages, art and humanities. Broader STEAM qualifications are thus promoted. This note also examines subjects preparatory to acquiring such enriching skills.

The 2015 Eurostat Report “Being Young in Europe To-Day” reminds us again that Ireland has the youngest population in Europe with the highest proportions both under 15 and under 30. It has the lowest median age in Europe. This presents both a challenge to provide the highest quality education to these young people and an unprecedented opportunity through enabling them to exploit their talents in Ireland. The Leaving Certificate programme and its assessment and their comparative quality at the end of schooling are key elements in meeting this challenge.

**Overall Examination Entries 2015**

In 2015 there were approximately 370,000 Leaving Certificate examination entries from 55,000+ candidates. This confirms again the common practice of full-time students to take seven subjects. The Leaving Certificate is a broad programme with different levels.

Of these entries about 232,500 (62.7%) were at Higher Level and 129,000 (34.8%) at Ordinary Level. The Foundation levels of Irish and Mathematics contributed 9,156 entries, 2.5% of the total. If Mathematics and Irish, the two subjects with both the lowest proportions at Higher Level and these Foundation Levels, were removed, then the remaining 30 subjects were 70.9% at Higher level.

The candidates were 27,817 female and 27,192 male. Females took a majority, 122,907, (52.9%) of the Higher Level examinations while males took 109,565 (47.1%). (*In the UK, in 2015, A-level subject* *entries were 54.9% female*.) Males formed a majority 68,651, (53.2%), of the Ordinary Level entries with females accounting for 60,413, (46.8%).The Foundation Level 9,156 entries were 58.1% (5,320) male and 41.9%, (3,836), female.

The “universal” subjects English and Mathematics had 53,123 and 53,570 entries respectively, up 849 and 1,189 from 2014. Between them they account for almost 29% of Leaving Certificate entries. These two “universal” subjects, enablers of the study of other subjects and proven strong predictors of persistence and success at Higher Education, are key subjects in relation to the quality of the Leaving Certificate programme. Being “universal”, they enable the direct comparison of school leaver achievement – and schools.

The number of births 18 years ago in 1997, a factor affecting the 2015 Leaving Certificate numbers, was 52,775. In 2014 there were 67,462 births. The Leaving Certificate programme will continue to grow in enrolment. It must meet the complex educational needs of people, in a changing world, with a great variety of aptitudes, abilities and ambitions, from diverse family and national backgrounds.

**Higher Level Broad Subject Choice**

The Leaving Certificate Higher Level is the highest school level examination. Table 1 gives the breakdown of the 2015 examination Higher Level entries by broad subject choice and by gender. The major subjects Mathematics, English and Irish are distinguished and the remaining 29 subjects are divided into broad discipline groupings in the **central column.**

**Table 1: Higher Level 2015 Entries: Broad Discipline and Gender**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **% at Higher** | **Total Higher** | **Subject Area (No.)** | **Male Higher** | **Female Higher** |
| 27.4% (30.6%)41.8% (45.2%)67.9% | **14,691 (6.3%)****19,460 (8.4%)****36,059 (15.5%)** | **Mathematics (1)****Irish (1)****English (1)** |  7,695 (7.0%) 7,149 (6.5%)16,167 (14.8%) |  6,996 (5.7%)12,311 (10.0%)19,892 (16.2%) |
| 61.4%73.6%74.0%76.2%76.6%82.6%84.6% | **25,252 (10.9%)** **8,754 (3.8%)****21,075 (9.1%)****29,719 (12.8%)****45,397 (19.5%)****18,373 (7.9%)****13,692 (5.9%)** | **Other Languages (8)****Home Economics (1)****Business Stud (4)****Humanities (4)****Sciences (5)****Tech/Engineering (5)****Arts (2)** |  9,772 (8.9%) 659 (0.6%)10,873 (9.9%)15,817 (14.4%)20,989 (19.2%)16,404 (15.0%) 4,040 (3.7%) | 15,480 (12.6%) 8,095 (6.6%)10,202 (8.3%)13,902 (11.3%)24,408 (19.9%) 1,969 (1.6%) 9,652 (7.9%) |
| 62.7% | **232,472 (100%)** | **Total Higher (32**) | 109,565 (100%) | 122,907 (100%) |

The **first column** gives the percentage of candidates choosing the Higher Level in each subject area. (The percentage for Mathematics and Irish in brackets arises if Foundation Level is omitted.) There are clearly great subject variations in the proportions choosing Higher Level. Mathematics and Irish are the two lowest subjects in Higher choice. (French is next lowest at 57.5%. By contrast, the subject Music had 92.7% of its candidates, the highest proportion, at Higher Level.)

The **second column** gives the pattern of overall subject area choice at Higher Level. Higher English is by far the largest Higher subject entry with 36,000+, 15.5%, of all Higher entries. STEM related subjects, Sciences, Technology/Engineering and Mathematics, contribute overall 33.7% of Higher entries. Languages overall constitute 34.8% of Higher entries.

The **last two columns** reveal the contrasting patterns of male and female Higher Level choices. While there is major overlap there is also major difference. Females form a majority, 52.9%, of all Higher entries in 2015.

* Females form a large majority, 59%, of all Higher Language entries.
* Females dominate the Arts, with 70.5% of their entries. Arts form 5.9% of the total.
* Home Economics has a large Higher entry, 8,754, which is 92.5% female.
* Science entries, 19.5% of the total, had a female majority of 53.8%, largely because female students studying Sciences, as noted below, are more likely to take the Higher Level.

One large subject discipline area of male dominance is Technology/Engineering, 7.9% of the total. It formed, in 2015, 15.0% of male Higher entries and only 1.6% of female ones.

* Males formed a majority, 52.4%, of Higher Mathematics candidates.
* Males also were a majority, 53.2%, of Humanities entries, which are 12.8% of the total.
* Business related subjects, 9.1% of the total, had more balanced gender entries.

When combined, STEM subjects form 41.2% of male Higher entries and 27.2% of female Higher entries. STEM patterns are examined now in more detail. Some comparisons by subject and of male and female performance are made.

**STEM Subjects –Sciences**

Table 2 gives information on the 2015 Science subject Higher Level examination entries.

**Table 2: Science Higher Entries: 2015**

|  |  |  |
| --- | --- | --- |
| **Total Higher** | **Subject** | **Male Female** |
| 25,596 56.4% 7,533 16.6% 6.067 13.4% 5,764 12.7% 437 1.0% | **Biology****Chemistry****Agric. Science****Physics****Physics and Chem** | 9,686 (37.8%) 15,910 (62.2%)3,276 (43.5%) 4,257 (56.5%)3,565 (58.8%) 2,502 (41.2%)4,196 (72.8%) 1,568 (27.2%) 266 (60.9%) 171 (39.1%) |
| **45,397 100%** | **Total Science** | **20,989 (46.2%) 24,408 (53.8%)** |

Biology is the dominant Science with more than half, 56.4%, of all Higher Science examination entries and 65.2% of female entries. There is some change in the Higher subject pattern. Since 2011 both Physics and Chemistry have increased by a little more than 20% in entries. Agricultural Science increased more slowly, by 14.7%. Biology increased by 12.9%. Few sit the broad subject “Physics and Chemistry”. National future skills planning should address the Science subject pattern.

The right-hand column shows the male and female contrasting patterns of Science uptake. Males dominate Physics and form a large majority in Agricultural Science. Females form a large majority of Biology students. They are a majority in the physical science Chemistry also. Table 3 contrasts the male and female results and their proportions in each Science subject taking the Higher Level.

The left-hand column in Table 3 shows that in each Science subject a larger proportion of the female candidates do the Higher Level. Furthermore, the right hand column shows that in four of the five Science subjects a higher proportion of females get high, A/B, grades at Higher level.

(*Of those* *receiving undergraduate awards in 2014 in Natural Sciences, Mathematics and Statistics 48.6% were male and* 51.4*% female*.)

**Table 3: Sciences: Proportions Choosing Higher and Proportions getting Higher A/B Grades:**

|  |  |  |
| --- | --- | --- |
| **% Choosing Higher**Male Female | **Subject** | **% Getting Higher A/B Grades**Male Female |
| 72.1% 77.8%82.0% 86.1%75.0% 85.7%74.5% 83.6%77.3% 82.2% | **Biology****Chemistry****Agric. Science****Physics****Physics and Chemistry** | 43.1% 46.4%50.6% 50.3%34.0% 46.0%44.3% 48.8%43.1% 47.4% |

 **STEM Subjects – Technology/Engineering**

Table 4 gives information on Leaving Certificate subjects related to Technology and Engineering.

**Table 4: Technology/Engineering Subjects at Higher level 2015**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| % at Higher | % Male | **Subject** | Total Higher | Change since 2011 |
| 83.2%82.0%78.2%90.0%87.9% | 91.8%94.3%87.3%75.0%83.15 | **Construction****Engineering****Design and Comm****Applied Maths****Technology** |  6,877 4,408 4,192 1,729 1,167 | +0.0%+11.3%+05.0%+35.7%+67.0% |
| 82.6% | 89.3% | **Total** | 18,373 | +09.3% |

The Technology/Engineering subjects, as the first column shows, are largely taken at Higher Level. The second column informs us that these subjects are largely male. (*Of those receiving* *undergraduate awards in 2014 in Engineering/Manufacturing/Construction 86.6% were male and 13.4% female. Of those receiving such awards in ICT in 2014 82.2% were male and 17.8% female.)*

Applied Mathematics, which has the lowest male proportion in Table 4, still has three male students at Higher Level for every female. Higher Mathematics and Physics – both with male majorities – attract some to Higher Applied Mathematics. Of the males doing this subject in 2015 18.1% achieved an A1 grade and 30.1% a grade A1 or A2. Higher A/B grade was achieved by 58.1% – clearly many are capable of a more challenging subject. Of the few doing Ordinary level 36.9% got a grade A!The PISA 2012 results strongly suggested the need for the promotion of male/female high Mathematical achievement. The Applied Mathematics syllabus, being reviewed, dates from 1971.

The proportion of Higher students getting A/B grades was Construction 40.5%, Engineering 44.8%, Design and Communications 48.7% and Technology 49.1%.

The final column gives an indication of enrolment change. Construction, the largest subject, is at its 2011 level. Engineering has had an 11.3% increase since 2011 and Design a 5.0% increase. Applied Mathematics and Technology have had large % increases but from comparatively low numbers.

**STEM Subjects – Mathematics**

Mathematics, a “universal” subject of the Leaving Certificate, is of central importance to intellectual development and in the study of many other disciplines. It was the subject with the largest number of entries at its three levels. In 2015 27.4% of its candidates, 14,691, took the Higher Level a largely increased proportion since the introduction of the flat bonus for passing Higher Level Mathematics. The number was 8,237 in 2011. In 2015 13,925 students became eligible for the 25 point bonus.

Female participation in Higher Mathematics has increased more strongly than male. In 2011 females formed 45.6% of Higher Mathematics candidates, and 46.95% in 2014. In 2015 this had risen to 47.6%. In 2015 about 700 more males than females achieved the 25 point flat bonus. As these bonus-driven changes have occurred the pattern of Mathematics results has also changed. Table 5 shows the % result pattern change for male and female candidates passing at Higher and Ordinary.

**Table 5: % Result Patterns. Mathematics: H and O Male, Female Candidates.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Higher A/B** | **Higher C/D** | **Ordinary A/B** | **Ordinary C/D** |
| **Male 2011** |  9.3% |  9.7% | 30.1% | 40.8% |
| **Male 2015** | 12.9% | 18.0% | 24.7% | 38.4% |
| **Female 2011** |  7.8% |  8.2% | 38.3% | 38.6% |
| **Female 2015** |  9.2% | 18.0% | 27.7% | 39.8% |

The result pattern has changed. Higher A/B grades have increased in proprtion but a much higher proportion in 2015 get C/D Higher grades, the grades proportionately rewarded more by the flat bonus. Ordinary A/B grades have declined in proportion but Ordinary C/D grades are little affected.

**ARTS Subjects: Languages**

The fact that English is consolidating its position as the dominant world language brings to Anglophone countries and individuals the risk of both complacency in relation to English language standards and indifference to the advantages of multilingualism. Ireland can gain major advantages by becoming the Anglophone country with the highest standards of English and the highest levels of multilingualism. The Leaving Certificate programme has a major role in this ambition and in the implementation of a national language policy.

**Table 6: Language Entries at Higher Level 2015**

|  |  |  |  |
| --- | --- | --- | --- |
| **% (H and O) at Higher**Male Female | **Total** | **Subject** | **Male (%) Female (%)** |
| 61.5% 74.2% | 36,059 | **English** | 16,167 (44.8%) 19,892 (55.2%) |
| 35.6% 53.9% | 19,460 | **Irish** |  7,149 (36.7%) 12,311 (63.3%) |
| 51.1% 62.2%65.7% 75.0%58.2% 66.6% | 15,408 5,154 3,655 | **French****German****Spanish** |  5,812 (37.7%) 9,596 (62.3%) 2,110 (40.9%) 3,044 (59.1%) 1,419 (38.8%) 2,236 (61.2%) |
|  |  1,035  | **Others (5)** |  431 (41.6%) 604 (59.0%)  |
|  | 80,771 | **Total** | 33,088 (41.0%) 47,683 (59.0%) |

Table 6 shows that French is the dominant modern language. Since 2011, at Higher Level, French has increased by 10.9%, German by 23.1% and Spanish by 51.8%. The category “Others” contains the important languages ltalian, Russian, Japanese and Arabic with smaller enrolments. The 2015 National Employer Survey, in listing foreign language proficiency skills in demand, cites French, German, Spanish, Italian, Chinese, Dutch, Portuguese and Russian in that order. It is important that STEM Higher Education students, who have Higher Language skills from the Leaving Certificate, be given the opportunity to build professional fluency and competence in that language.

In 2015 a further 1,361 candidates sat the important non-curricular EU languages. Polish constituted half of them, 671, and Lithuanian (247), Romanian (138) and Portuguese (92) were also included.

The left hand column of Table 6 shows that in all languages a much smaller proportion of the male candidates took the Higher Level examination. Irish had the smallest proportion of males taking its Higher Level. A change in assessment seemingly has caused an increase in the numbers taking Higher Irish. More than half the females, 53.7%, taking Higher or Ordinary Irish in 2015 took the Higher course. (Only 35.6% of the males did.) The result pattern in 2015 in Irish, a compulsory school subject, is interesting (Table 7). There is a sharp contrast between the male and female results. The female Higher A/B and the male Ordinary C/D percentages are noteworthy.

**Table 7: Irish Language: % of Higher and Ordinary: Result Patterns 2015**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Higher A/B** | **Higher C/D** | **Ordinary A/B** | **Ordinary C/D** |
| **Male**  | 16.9% | 18.4% | 15.2% | 45.6% |
| **Female** | 30.4% | 23.1% | 18.6% | 26.8% |

Table 8 gives the proportion of Higher candidates, male and female, who achieved high A/B grades in the main languages. The female Higher Irish grades A/B proportions are noteworthy. In 2011, when fewer did Higher Irish, the proportions of Higher Irish candidates getting A/B grades were male 45.1% and female 51.7%. The Irish language results deserve an explanation.

**Table 8: Main Languages: % of Higher Candidates getting A/B Grades: 2015**

|  |  |
| --- | --- |
| **Subject** | **% at Higher getting A/B grades****Male** **Female** |
| **English****Irish****French****German****Spanish** | 32.2% 39.1%47.6% 56.7%36.6% 41.2%37.6% 44.2%47.2% 50.6% |

Fewer males study languages. A smaller proportion of those that do sit the Higher examination. Of these, Table 8 shows, a smaller proportion get high A/B grades.

**Art and Humanities**

Table 9 gives information on the uptake at Higher Level in 2015 of Humanities and Arts subjects.

Geography dominates the Humanities with two in every three of the its candidates. Males form a majority of the two main Humanities subjects.

In the two Arts subjects females form large majorities. Table 10 gives the proportions of candidates in 2015 at Higher Level who achieved Higher A/B grades in the main subjects. By this Higher A/B measure, females outperform males in Arts and Humanities.

**Table 9: Art and Humanities: Higher Level 2015**

|  |  |  |
| --- | --- | --- |
|  **% at Higher**Male Female | **HUMANITIES** |  **Candidates 2015**Male Female |
| 77.5% 80.2%66.3% 73.2%87.5% 85.7%87.1% 92.9% | **Geography****History****Relig. Education****Classical Studies** | 10,520 9,275 4,591 3,850 469 541 237 236 |
|  | **Total** | 15,817 (53.2%) 13,902 (46.8%) |
|  | **ARTS** |  |
| 68.7% 84.7%91.4% 93.3% | **Art****Music** |  2,256 5,570 1,784 4,082 |
|  | **Total** |  4,040 (29.5%) 9,652 (70.5%) |

**Table 10: Higher Humanities and Arts: % Achieving A/B**

|  |  |
| --- | --- |
| **Subject** |  **% Higher getting A/B**Male Female |
| **Geography****History** | 37.0% 42.8%43.3% 50.6% |
| **Art****Music** | 27.0% 42.1%64.3% 68.7% |

 The results in the Arts subjects are exceptional. The Art syllabus dates from 1969. Fewer males do the subject Higher Art and their number declined in 2015. Those who do, lag seriously behind the female candidates. Music, the subject with the largest proportion at Higher level, had also the highest proportion of Higher A/B grades in 2015. Two in every three achieved a Higher A/B grade. Clearly Music students are capable of a higher standard examination.

(*Of those receiving undergraduate awards in 2014 in Humanities and Arts – including languages – 40.4% were male and 59.6% female.)*

**Business Subjects and Home Economics**

To complete a discussion of Leaving Certificate subjects Table 11 gives information on Business related subjects and Home Economics.

**Table 11: Business Related Subjects and Home Economics: Higher Level 2015**

|  |  |  |
| --- | --- | --- |
|  **% At Higher****Male Female** | **Subject** |  **Candidates 2015****Male Female** |
| 70.7% 73.3%74.3% 72.4%80.5% 81.8% | **Business Studies****Accountancy****Economics** | 5,801 6,3532,403 2,3452,618 1,470 |
| 49.7% 76.6% | **Home Economics** |  659 8,095 |

Business Studies is the dominant Business subject in terms of enrolment. The subject Accountancy is exceptional in that a higher *proportion* of males took the Higher Examination. In the subject Economics, where males form a majority, a very high proportion of candidates choose the Higher course. The 2015 Predictability Study of the Leaving Certificate tells us that the Economics syllabus was designed in 1969. Since then, the Nobel Prize in Economics has been conferred on 75 Laureates at 46 ceremonies, supportive of the view that the subject has developed since that syllabus was written. (Another subject, Agricultural Economics, had a small enrolment.) A low % of males doing Higher Home Economics got A/B grades (Table 12).

**Table 12: Business Subjects and Home Economics: Higher A/B grades**

|  |  |
| --- | --- |
| **Subject** |  **% Higher A/B Grades**Male Female |
| **Business Studies****Accountancy****Economics** | 37.5% 41.4%52.7% 52.3%41.1% 45.0% |
| **Home Economics** | 24.0% 45.4% |

**New 2017 Points System**

A new grading system, with H and O grades at 10% intervals , is to be introduced in 2017. In that system the grouped grades of Tables 5 and 7 will read H1.H2.H3, H4.H5.H6, O1.O2.O3 and O4.O5.O6. Accompanying this will be a new Points System.

A new feature of the Points System from 2017 will be the award of points for the first time for achieving 30-39% at Higher Level, the new H7 grade. This is intended as an incentive to students to take the Higher Level option. (It may also, unintentionally but importantly, provide an incentive to underperformance by some Higher Level students through providing a lower, points yielding, safety net.) The points for H7, which overlaps the present E grade, will equal those for O3 (70-79%).

Table 1 illustrates the major differences by subject in Higher Level choices. Languages, at the lower end, contrast strongly with, say, Engineering subjects or Art subjects, a contrast that may reflect inherent or perceived comparative difficulty. Important issues of level purpose and choice, subject by subject, need to be discussed for the 2017 Leaving Certificate.

The two subjects with the lowest Higher Level choice, Mathematics and Irish, have both increased their Higher proportion in recent years.

* In Mathematics the result pattern has changed (Table 5). The real need now is to increase Ordinary level grade achievement, so important to many Technical Courses and careers.
* In Irish (Tables 7 and 8) the 2015 result patterns, different for males and females, require explanation.
* English, the “universal” subject, has the highest number of Higher Level entries and yet, in 2015, of the 6,900+ females who did its Ordinary Level 621, 9.0%, got an A grade.

The new 2017 points for the H7 grade makes it interesting to examine the proportions of 2015 Higher students who received an E grade. It is also instructive to examine the percentage at Ordinary Level who received an A grade, prime targets for any incentive to switch to Higher Level. Table 13 shows the top ten major subjects ranked both by the percentage of Higher students getting Higher E grade and the percentage of Ordinary Level students getting A grades in 2015.

**Table 13: % at E Grade Higher: % at A Grade Ordinary: 2015**

|  |  |  |
| --- | --- | --- |
| **% at E Grade Higher** | **RANK** | **% at A Grade Ordinary** |
| Physics 7.2%Agri.Science 6.8%Chemistry 6.3%Business 6.2%Accounting 5.2% | **1****2****3****4****5** | Applied Maths 36.9%Accounting 18.3%Physics 14.4%History 14.3%Economics 11.2% |
| Applied Maths 4.9%Mathematics 4.5%Economics 4.5%Biology 4.3%Construction 3.8% | **6****7****8****9****10** | Business 10.5%Design/Comm. 9.6%English 7.1%Chemistry 6.4%Mathematics 5.5% |

Three Science subjects have the largest proportion of Higher E grades. Indeed, in 2015, of males who sat Higher Physics, Agricultural Science and Chemistry 10.6%, 9.8% and 9.3% respectively did not achieve a passing grade.

There are seven STEM subjects in the top ten E list. Seven subjects appear on both lists in Table 13.

Physics in 2015 had the highest % of Higher students getting an E grade. Indeed of 4,196 males who took Higher Physics, 442 of them, 10.6%, did not get a passing grade. (In contrast, of 4,082 females taking Higher Music, 13 of them, 0.3%, did not pass!). A high proportion, 14.4%, of Ordinary Physics students got an A grade with 20.5% of the female candidates gaining this grade. (One fifth of female Ordinary Accounting students also got an A grade.)

A smaller proportion of History students choose the Higher course (Table 9) compared to Geography. Yet History has a much higher proportion, 14.3%, of Ordinary students getting an A grade compared to Geography (4.3%).

Languages, which generally have a lower Higher Level choice (Table 1), are not amongst the top ten subjects by % of E grades at Higher Level. Only English appears on the top ten Ordinary A Grade list.

On the left column E grade list, Mathematics is the only subject where the male % of E grades is less than the female %. On the right hand A grade list females have a larger % of A grades than males in 9 of the 10 subjects. The outlier Applied Mathematics is the exception.

**Ranking of Subjects 2015**

Subjects can be ranked for male and female candidates by their number of examination entries in 2015 at Higher Level. Table 14 gives that ranking.

The ranking of table 14 shows both the the degree of overlap and difference in male and female subject choices. Both lists share four of the top five and seven of the top ten. The subject English is top on both lists. Irish and Mathematics retain their higher rankings of recent years on both lists.

Again female choices are more concentrated. Of their choices 54.5% are from five subjects, including three languages in the top four positions. Four out of five female choices come from ten subjects.

**Table 14: Higher Subject Entries 2015: Male and Female: Ranking**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Male Entries** **%** | **Male Subjects**(Change since 2014) | **RANK** | **Female Subjects**(Change since 2014) | **Female****Entries %** |
| 16,16710,520 9,686 7,695 7,149 46.7% | **English****Geography****Biology****Mathematics****Irish** | **1****2****3****4****5** | **English****Biology****Irish****French****Geography** | 19,89215,91012,311 9,596 9,275 54.5% |
|  6,317 5,812 5,810 4,591 4,196 24.4% | **Construction****French****Business****History****Physics** (+1) | **6****7****8****9****10** | **Home Economics****Mathematics****Business****Art****Chemistry** |  8,095 6,996 6,353 5,570 4,257 25.4% |
|  4,159 3,661 3,565 3,276 2, 618 15.8% | Engineering (-1)Design/Comm (+1)Agric Science (-1)ChemistryEconomics | **11****12****13****14****15** | MusicHistoryGermanAgri ScienceAccounting (+1) |  4,082 3,850 3,044 2,502 2,345 12.9% |
|  2,403 2,256 2,110 1,784 1,419 9.1% | Accounting (+1)Art (-1)GermanMusicSpanish | **16****17****18****19****20** | Spanish (-1)PhysicsEconomicsConstruction Relig. Education (-1)  |  2,236 1,568 1,470 560  541 5.2% |

The male list has three Engineering subjects in the top twelve. Clearly the Applied Scientific and generic skills developed by these subjects is of key importance to the male Leaving Certificate. Construction earns the 19th position on the female list. Applied Mathematics does not appear on the top 20 male list.

Biology is the top Science, in the top 3 on both lists. A physical Science, either Physics or Chemistry, is in 10th position on both lists.

Geography, the dominant Humanities subject, is in the top 5 on both lists. French, the dominant modern language, is high on both lists. Business Studies is number 8 on both lists. Home Economics is the sixth choice of females.

*For comparison Table 15 shows the 2015 subject ranking from a different system. It gives the male and female A-Level subject ranking across the UK and in Northern Ireland (NI).*

*There is major difference between the UK male and female choices. Mathematics and Physical Sciences feature strongly on the UK male rankings. Males in Northern Ireland have six STEM subjects in their top eight. Only one language, English, appears in the top 10 UK rankings.*

**Table 15: A-Level Subject Ranking 2015: UK and Northern Ireland**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NI Male** | **UK Male** | **RANK** | **UK Female** | **NI Female** |
| MathematicsHistoryPhysicsBiologyICT | MathematicsPhysicsChemistryHistoryEnglish | **1****2****3****4****5** | EnglishPsychologyBiologyMathematicsArt/Design | BiologyRelig. StudiesEnglishMathematicsHistory |
| GeographyChemistryDesign Technol.Relig. StudiesBusiness | BiologyEconomicsGeographyBusinessPsychology | **6****7****8****9****10** | HistoryChemistrySociologyGeographyRelig. Studies | GeographyChemistryArt/DesignBusinessSociology |

**Conclusion**

With high (90+%) age cohort participation rates and growing numbers the Leaving Certificate Programme has to cater for complex educational needs. Its comparative quality is of critical national strategic importance. This note suggests some issues to be addressed.

Two subjects, the “universal” subjects English and Mathematics, are critical to that quality. An Index of English and Mathematical Achievement would enable a direct comparison of students and schools and encourage higher achievement in both.

The Leaving Certificate is a broad programme and this note illustrates the wide subject choice, the subject variations in uptake, in Higher Ordinary ratios and in result patterns. It shows the major male and female differences in these factors. Greater emphasis should be given to the identification of the range of generic skills being developed by particular subject choices.

With the introduction in 2017 of a points incentive for achieving 30-39% at Higher level –the new H7 grade - a discussion, subject by subject, of the purpose and choice of Higher or Ordinary Levels needs to take place.

National future skills planning, including the planning of future STEM qualification needs, should review the male and female pattern of Leaving Certificate Science subject choices.

The applied science and generic skills conferred by Technology/Engineering Leaving Certificate subjects are vital to the success of the Leaving Certificate for many males. They should get special emphasis.

A national Language Policy should promote excellence in English and multilingualism. Languages of strategic importance should be identified and promoted. Community languages, the languages of Ireland’s immigrant communities, should be facilitated as part of that policy. In STEM courses in Higher Education, those with high Leaving Certificate language achievement should be enabled and encouraged to transform that to professional fluency and competence in the language.

Male comparative school underachievement is an international phenomenon and a major issue. A small country, however, should be able to devise successful strategies to address this underachievement in key subjects as part of a wider programme of addressing underachievement.

A pattern of subject choices has evolved, not for strategic reasons, of “dominant” subjects in broad discipline areas. These “dominant” subjects include Biology, Geography, French and Business. The causes and effects of this should be analysed.

Music and Applied Mathematics, totally diverse subjects, have this in common. They are outliers in that they are both largely Higher Level subjects with very high proportions getting high A/B grades at that level. A case can be made for both for a new Advanced Level subject classification.