

The Hyland Report – Implications for Science Education in Ireland

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In this article Declan Kennedy discusses the implications of the Hyland Report for science education in Ireland and argues that this report is the most important report for science education ever published in Ireland. Declan is the author of the book “Writing and Using Learning Outcomes – A Practical Guide” which, to date, has been translated into 12 languages.

Introduction

When the history of science education in Ireland is written, the commissioning of the Hyland Report will stand out as one of the most important milestones. It was the first time that the ISTA commissioned a report by an internationally recognised expert in Education. The report is a perfect example of how to carry out an educational research project, analyse the data, draw clear conclusions and make comprehensive recommendations. It is refreshing to read a report that is written with such clarity and I encourage every ISTA member to read the entire report since it had direct relevance for the teaching of Leaving Certificate biology, chemistry and physics in our schools.

What is the background to the commissioning of the Hyland Report by the ISTA?

The background to the Hyland Report lies in extensive correspondence and communication between the ISTA and NCCA regarding the proposed new Leaving Certificate biology, chemistry and physics syllabi. This correspondence took the form of written correspondence between the ISTA and NCCA as well as communication between the ISTA representatives on NCCA syllabus committees (development groups) and NCCA representatives on these committees.

One of the major problems identified by the ISTA was the lack of depth of treatment included in the proposed new syllabi. The situation was summarised in a letter sent by ISTA to NCCA on 6 October 2013:

“In terms of structure and clarity of depth of treatment, the Leaving Certificate syllabi in Biology, Chemistry and Physics currently being taught in schools are far superior to the proposed draft syllabi recently circulated. The essential problem with the proposed draft syllabi is that they simply contain a list of learning outcomes with no indication regarding depth of treatment or range of subject knowledge associated with these learning outcomes. **We request that this depth of treatment and range of subject knowledge be integrated into the draft syllabi (as is the case with the syllabi currently being taught) before they are finalised by NCCA Council.** It is vital that this important material is embedded into each of the syllabi and not made available as separate documentation at a later stage. Even highly experienced science teachers at our ISTA Council meeting found problems with interpreting many of the learning outcomes. It is clear that there is still a considerable amount of work to be done in order to

reduce the “fuzziness” of these draft syllabi and thus bring them up to the standard of the current Leaving Certificate Biology, Chemistry and Physics syllabi.”

However, the request for the inclusion of depth of treatment in the proposed new syllabi fell on deaf ears as Dr Anne Looney stated in a letter to ISTA on 25 October 2013 that “We don’t intend to include ‘depth of treatment’ and/or ‘range of subject knowledge’ in the new specifications for the sciences or for other subjects in senior cycle. However, as was discussed at a recent round of development group meetings, we will be including some examples of teaching, learning and assessment approaches that will support teachers in classroom planning”.

This letter was discussed by ISTA Council and a detailed response was sent to the NCCA by ISTA (p. 70 – 71 Hyland Report). This response was also circulated at NCCA syllabus committee meeting by ISTA representatives but no progress was made in convincing the NCCA to include depth of treatment within the Leaving Certificate syllabi. As no progress was made with the NCCA, it was decided by ISTA Council to ask for independent advice from an expert in the area of curriculum design and assessment.

Why was Professor Áine Hyland chosen by ISTA to conduct this research?

Professor Hyland is Emeritus Professor of Education at UCC, former Vice-President of UCC and is a former secondary school teacher. She chaired the Commission on the Points system, was a member of the Interim Curriculum and Examinations Board and has already written a huge number of reports, articles and papers, including some landmark reports in recent times e.g. *Entry to Higher Education in Ireland in the 21st Century* (2011) and *A Review of the Structure of Initial Teacher Education Provision in Ireland* (2012). In view of the fact that she is recognised as a national and international expert in the area of education and had no previous involvement with ISTA, it was felt that she would be the ideal, independent expert to carry out this research project.

What was Professor Hyland asked to do?

Professor Hyland was asked to address two fundamental research questions:

- What is international best practice in the drafting of syllabi for second-level curricula?
- Is the current reform of Leaving Cert syllabi in Ireland in line with international best practice?

In order to address the above research questions, Professor Hyland examined a wide range of science syllabi for a similar age group as the Leaving Certificate and a centralised (i.e. not school-based) mode of assessment (similar to the Leaving Certificate) at international level. Great thanks are due to Rory Geoghegan who assisted her in gathering a huge amount of data on science syllabi throughout the world. From the data gathered, she identified the characteristics of international best practice in the design of science syllabi and focused on Scotland, Australia and also on the International Baccalaureate system as exemplars of good practice.

What important conclusions are drawn in the Hyland Report?

On reading the Hyland Report it is clear that there are a number of key conclusions which may be summarised as follows:

1. Depth of treatment. It is clear that the lack of depth of treatment in the Leaving Certificate biology, chemistry and physics syllabi is **not** in keeping with best international practice. After carrying out her analysis of syllabi at an international level Prof Hyland states that “in every public examination system identified for this report, the syllabi for the end of senior cycle examinations include considerable detail about depth of treatment, examination specification, practicals and laboratory experiments and other advice for teachers and pupils. While learning outcomes are specified in all the syllabi, they are only one element of the detail provided. (p. 5 Hyland Report).

The problem with lack of depth of treatment is highlighted in Table 1 (p. 21 Hyland Report).

Table 1 Comparison of syllabus lengths

	Current syllabus	Draft syllabus
Biology	38 pages (p.7 – 44)	13 pages (p. 19 – 30)
Chemistry	35 pages (p. 37 – 71)	18 pages (p.20 – 37)
Physics	20 pages (p. 25 - 44)	12 pages (p. 21 – 33)

2. More work required on the draft syllabi. Professor Hyland points out that more work is needed on the draft syllabi in biology, chemistry and physics in order to bring them up to international standard: “While the current NCCA draft specifications may be a valid first step in outlining the syllabi, this researcher agrees with the ISTA it is not sufficient to describe a high-stakes examination programme in terms merely of topics and learning outcomes. More detailed information about the depth of treatment of subjects and the requirements for examination must be provided at national level in Ireland to bring the syllabi into line with international good practice.” (p. 42 Hyland Report)

3. Fundamental flaws in template being used by NCCA for syllabus design. It is clear from the reports of the ISTA representatives working on NCCA syllabus committees that considerable frustration was experienced as a result of all three science syllabi being forced into a template consisting of nothing more than a list of learning outcomes. The fundamental flaw in the template being used by the NCCA is highlighted in the Hyland Report. Professor Hyland points out that the practice of the NCCA in designing syllabi that consist solely of a list of topics and learning outcomes is not good practice in syllabus design and that “this researcher has not come across any centralised or public examination syllabus at this level which provides only a list of topics and learning outcomes. (p.5 Hyland Report). In addition, Professor Hyland points out that “while learning outcomes are a very valuable tool for identifying what learners should know and be able to do at the end of a course or programme, it is not appropriate to use learning outcomes alone to define a syllabus and its assessment.” (p. 5 Hyland Report).

4. Problems identified in NCCA benchmarking exercise. Professor Hyland expresses concern with the benchmarking exercise carried out by the NCCA in designing the Leaving Certificate Science syllabi: “It would appear that for international benchmarking purposes, the NCCA has used the curriculum framework *Curriculum for Excellence* of Education Scotland, and the national curriculum framework for the whole of Australia, set by the Australian Curriculum, Assessment and Reporting Authority (ACARA), rather than the examination syllabi provided by the Scottish Qualifications Authority (SQA) and by the Victorian Curriculum and Assessment

Authority (VCAA), which in the view of this researcher are the more relevant benchmarks.” (p. 41 Hyland Report). Having expressed concern at the benchmarking exercise, Prof. Hyland provides very good evidence to support her concern at the quality of the benchmarking exercise carried out by the NCCA. She compares three chemistry syllabi (Scotland, Australia and International Baccalaureate) with the NCCA draft Leaving Certificate Chemistry syllabus: “Comparing these three chemistry syllabi with the NCCA draft specification for Leaving Cert chemistry, one notes a significant difference in approach between the three systems chosen and the approach of the NCCA. While the NCCA document resembles, to some extent, the national curriculum and assessment guidelines of Education Scotland, or the curriculum and assessment guidelines of the Australian Curriculum and Assessment Authority it does not resemble the detailed examination syllabi provided by the examining and awarding bodies in Scotland (the Scottish Qualifications Authority), in Victoria, Australia (the Victorian Curriculum and Assessment Authority) and the International Baccalaureate Organisation (IBO).” (p. 41 Hyland Report).

5. Fall in standards of science syllabi. Professor Hyland warns of the dangers of writing syllabi solely in terms of a list of topics and learning outcomes as this could lead to a fall in standards: “Learning outcomes are statements of essential learning, and as such they are written at minimum acceptable or threshold (pass / fail) standard. If teachers focus only on learning outcomes, there is a real risk that the teaching and learning targets will be at a minimum rather than a maximum level, that the bar will not be set high enough for student learning, and that as a result, standards will fall” (p. 5 Hyland Report). Prof. Hyland also points out that the design of the Leaving Certificate biology, chemistry and physics syllabi currently being taught in schools are of a high standard with a format that is “consistent and clear across subjects” (p. 12 Hyland Report). The report also states that “the current Leaving Certificate physics, chemistry and biology syllabi, which have been implemented since the early 2000s, are highly regarded by teachers and have contributed to a reversal of the decline in the numbers of pupils taking science subjects at senior cycle” (p. 40 Hyland Report).

6. No justification for keeping syllabi vague. One of the reasons put forward by NCCA representatives at NCCA syllabus committee meetings for not including depth of treatment was that over-specification of syllabus design contributes to rote learning. In Chapter 4 of the Hyland Report, it is made very clear that there is no link between giving detailed depth of treatment and rote learning: “The international comparisons in Section 2 of this report show that it is possible to provide syllabi or examination programmes which include detailed guidelines; teachers’ notes; assessment specifications etc. while at the same time devising an approach to assessment which does not reward rote-learning and ensures that higher order skills are recognised and rewarded. To my knowledge, it has never been suggested that the detail provided by the IBO Diploma syllabi or the Scottish Highers or the Victorian Certificate of Education has led to or leads to rote-learning.” (p.39 Hyland Report).

What are the main recommendations of the Hyland report?

1. Syllabi need to be brought up to international standard. Prof Hyland points out very clearly that “more detailed information about the depth of treatment of subjects and the requirements for examination must be provided at national level in Ireland to bring the syllabi into line with international good practice.” (p. 5 Hyland Report). Professor Hyland also recommends that the depth of treatment of the draft Leaving

Certificate Biology, Chemistry and Physics syllabi should at least be brought up to the standard of the current syllabi being taught in schools at present: "It is the considered view of this researcher that the final versions of the proposed new syllabi for physics, chemistry and biology, should contain at least the same depth of treatment as is available in the current syllabus documents, as well as detailed examination specifications and Teachers' Notes. When approved by the Minister, the full range of documentation in relation to each syllabus should be published online and in hard copy under the logo of the Department of Education and Skills, prior to the implementation of the syllabi." (p. 44 Hyland Report).

2. Full range of documentation available before implementation of the syllabi. Prof. Hyland recommends that "the full range of syllabus documentation (including teachers' notes, examination specifications etc.) should be officially published at the same time as the syllabus itself, under the logo of the DES as has been the case in the past. This elaborated documentation should be available well before the syllabus is due to be implemented, to enable teachers to become familiar with the new material and to undergo appropriate professional development and up-skilling" (p. 5 Hyland Report). Details of examples of syllabi documentation in Scotland (200 pages approx), Australia (200 pages approx.) and the International Baccalaureate (150 pages approx) are included in the report (see p. 26 -36 and p. 40-41).

3. Depth of treatment embedded within the syllabi. Professor Hyland points out the importance of having depth of treatment embedded within syllabi developed by NCCA: "From 1989 to date, the advice provided by the NCCA to the Minister has included the level of detail that teachers expect and need to enable them to prepare their students for the Leaving Certificate public examinations. That level of detail has also been used and will continue to be required by the SEC to enable them to set and mark the Leaving Certificate examination papers. It is the considered opinion of this researcher, that the issue of depth of treatment and clarity of examination specifications will become an issue for all Leaving Certificate subjects as the revision of Leaving Certificate syllabi proceeds. It is almost inevitable that the concerns raised by ISTA will be echoed by other subject teachers and associations as well as by third level representatives if the matter is not addressed now." (p. 43 Hyland Report).

4. Continuation of syllabus committee structures. The Hyland report recommends that the present structure of syllabus committees (recently re-named by the NCCA as "development groups") should continue: "The syllabus committees /development groups should continue to be involved in the identification and where relevant, the development of resources to support the new subject syllabi. Members of development groups contribute invaluable expertise and experience, on a pro bono basis, to Irish education. They help to bridge the gap between theory and practice, between the ideal and the possible. Teachers, in particular, have an important role to play as they are at the chalk-face on a daily basis and bring knowledge of the on-the-ground constraints to the discussion. Third level representatives and employers help to ensure that the revised syllabi prepare future pupils appropriately for further learning and for work. The partnership model has served Irish education well in the past and will hopefully continue to do so in the future" (p. 44 Hyland Report).

5. Sharing of syllabus documentation from other countries. Professor Hyland makes a very interesting suggestion that consideration be given to national and international collaboration in the sharing of syllabus documentation:

"In coming to a decision about the detail to be provided for the Leaving Cert examination syllabi, consideration might be given by the Minister to collaborating with other bodies, either nationally or internationally to provide appropriate state-of-the-art materials thereby avoiding unnecessary and expensive duplication or "re-inventing the wheel". As science subjects are less culturally bound than some other subjects, resources developed for science teaching in one country are likely to be relevant and suitable for teachers and learners in another country. All the documentation accessed for this report is in the public domain, and is accessible for anyone (teacher or pupil or member of the public) who wishes to use it." (p. 44 Hyland Report).

Charting the way forward

We are at a cross roads in science education in Ireland. One road is signposted with flawed syllabi that do not measure up to international best practice. There is a real danger that the "dumbing down" of standards by writing syllabi simply as a list of learning outcomes could lead to lack of recognition of the Leaving Certificate science subjects for entry to universities in Ireland and abroad. In addition, it is possible that schools could move away from the Leaving Certificate examination and enter their students for the International Baccalaureate examinations or examinations set by the UK examination boards. The concerns of science teachers were clearly stated in a letter sent by the ISTA to the NCCA in November 2013:

"We do not wish to see the situation repeated as occurred in the draft Junior Cert. Science syllabus where a syllabus document of only 19 pages of Learning Outcomes was sent to schools and teachers were expected to teach the entire Junior Certificate programme based on this very unsatisfactory document. As outlined in our submission to the NCCA on 6th October 2013, it took the ISTA three years (2003–2006) to obtain clarification on the depth of treatment of the learning outcomes. It subsequently transpired that this clarification had little relevance or official standing as the clarification documentation was not embedded in the syllabus. It is not acceptable to the ISTA that depth of treatment should be covered in Teachers' Guidelines – it must be an integral part of the syllabus."

The Hyland Report dispels the "fuzziness" about the design of the Leaving Certificate science syllabi and provides clear guidelines on the correct path to take. The Hyland Report is the most important report ever published in the area of science education in Ireland. Science teachers and Leaving Certificate students of biology, chemistry and physics have every right to expect that the syllabi being taught in our schools are of international standard. Therefore, the recommendations of the Hyland Report must be implemented in full.

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