



## **Irish Science Teachers' Association**

**Eol-Oidí na hÉireann**

### **Submission of Irish Science Teachers' Association on the development of Leaving Certificate Climate Action and Sustainable Development**

The Irish Science Teachers' Association is the professional association for science teachers in Ireland. It was founded in 1961 and has a membership in excess of 1200 members. The ISTA is a member of the International Council of Associations for Science Education (ICASE) and is represented on the executive of this organisation. The ISTA functions as a body dedicated to the professional development of its members and the advancement of science teaching.

ISTA works on a voluntary basis to develop co-operation between teachers of science at all levels. It aims to keep members up to date with changes in their subjects and curriculum development. The ISTA is actively involved in providing continuing professional development programmes at local and national level to its members.

The ISTA maintains links with other bodies involved in science education in Ireland, with associations for science education in other countries and with third level institutions in Ireland. It has very close links with the pharmaceutical and electronics industries in Ireland. The current President of the ISTA is Professor Luke O'Neill.

The ISTA welcomes the opportunity to make this submission on the development of Leaving Certificate Climate Action and Sustainable Development. Our views may be summarised as follows:

- The curriculum at Leaving Certificate level is becoming very crowded with several new subjects being introduced in recent years (Computer Science, Politics and Society, Physical Education). There is a danger that those science subjects being studied by relatively small numbers of students (Physics, Chemistry, Agricultural Science and combined Physics and Chemistry) will be adversely affected by this new subject. As school principals cannot offer subjects with small numbers of students, research needs to be undertaken to ascertain if some of these subjects will become non-viable in some schools as a result of introducing Climate Action and Sustainability as a subject.
- We recommend that there will be a high scientific content in this new subject to ensure that future citizens are guided by scientific facts and principles. We also recommend that laboratory practical work will form an integral part of the specification.
- The ISTA must have a representative on the subject development group for Climate Action and Sustainable Development.

- When drafting the new specification, cognisance needs to be taken of aspects of the topic of Climate Change and Sustainability that are already covered by other Leaving Certificate subjects. For example, it is hoped that the proposed new specifications in Leaving Certificate Biology, Chemistry and Physics will have aspects of Climate Change and Sustainability incorporated in them. Therefore, there needs to be a level of coordination and alignment between the various specifications. We are surprised at the very close deadline indicating that “the specification will be completed for Autumn 2023” (Background paper p. 27). The specification of Climate Change and Sustainability should not be completed until the specifications of Biology, Chemistry and Physics have been completed. Otherwise, the inclusion of aspects of Climate Change and Sustainability across all specifications will become disjointed and haphazard.

A detailed syllabus (curriculum specification) must be provided for this new subject and for all Leaving Certificate science subjects. In recent years, serious concerns have been expressed by practising teachers, university academics, professional bodies, Oireachtas committees, and experts in curriculum design about the poor quality Junior Cycle and Senior Cycle “curriculum specifications”) being published by the National Council for Curriculum and Assessment (NCCA). These concerns may be summarised as follows:

- **The Hyland Report (2014).** In this report Professor Hyland, Emeritus Professor of Education UCC, 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 international 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). The Hyland Report and a summary of the Hyland report may be downloaded at the URL given in the list of References.
- **The Irish Science Teachers’ Association (2019).** In 2019 the ISTA published a report *Listening to the Voice of Science Teachers*. This report summarised the findings of a survey completed by its members (ISTA 2019). A total of 762 science teachers completed the survey. Among its findings were:
  - Lack of depth of treatment in the Junior Cycle science specification was a major problem for teachers in identifying what topics they should be teaching in the classroom.
  - 85% of teachers believed that the template of syllabus design used at Junior Cycle was unsuitable for use at Senior Cycle level.
  - There was concern for student and teacher wellbeing due to the stress caused by trying to successfully implement a vague syllabus in the classroom.

The full report may be downloaded at the URL given in the list of reference. Unfortunately, many of the future problems predicted in the Hyland Report have now come to pass.

- **The Irish Agricultural Science Teachers’ Association (2019, 2021)** have made several submissions to the NCCA, to the Minister and to the Oireachtas Committee on Education about the problems encountered with the new Agricultural Science syllabus introduced into schools in 2019. Some of these documents are:
  - IASTA (2019) *IASTA Members’ Survey Reveals Significant Issues with New Specification & the Individual Investigative Study*.

- **Flawed Leaving Certificate Agricultural Science syllabus examined for the first time** (IASTA, 2021). In this document the IASTA stated that “It is time to call a halt to the practice of the Department of Education publishing these vague and dumbed-down syllabi. Teachers of Agricultural Science are the key to excellence in curriculum implementation in the classroom and deserve better than being provided with a sub-standard syllabus that does not measure up to international best practice”. (IASTA 2021). This document also quoted a teacher who stated at their annual conference: “I am teaching a topic on the Ag. Science specification at the moment and I don’t know if I should be spending two months on the topic, two weeks, two days or two hours on it ”
- In the **IASTA submission to the Oireachtas Committee on Education** (IASTA, 2021) it pointed out that “of 278 teachers that completed a survey circulated by the IASTA in January 2021, only one of the 278 teachers rated their level of confidence in delivering the new specification as ‘very confident’”.
- **Third level academics (2020)**. In a letter to the Irish Times (Childs 2020) Dr. Peter Childs, Emeritus Senior Lecturer in Science Education, University of Limerick, described the situation regarding the use of template of syllabus design based only on learning outcomes as follows:

*It is like trying to build a house based only on its desired features, but without an architectural drawing and detailed plans. Teachers need a detailed syllabus, like the ones currently used, in order to teach effectively. He went on to say It is a recipe for disaster when teachers do not know what they are supposed to teach and to what depth, where each teacher becomes the arbiter of the curriculum.*

The full text of the letter may be viewed at the URL in the list of references.

- **Association of Teachers of Irish (2021)**. In April 2021 the Association of Teachers of Irish (Gréasán) carried out a survey of their members on the draft specifications for Leaving Certificate Irish. The survey was completed by 420 teachers. The report stated that “teachers have expressed great dissatisfaction regarding the Junior Cycle Gaeilge course”.
  - The following recommendation was made in the report: “It is essential that the implementation of the Junior Cycle Gaeilge course is fully analysed, that the problems with this course are resolved, and that it is examined how the results of this review may affect the proposed Leaving Certificate specifications” (Association of Teachers of Irish 2021).
  - It is also stated that “97% of teachers believe that more details should be provided in the draft specifications on the potential themes and topics that would evolve from the learning outcomes to give clear direction to teachers and students.” (p. 6)
  - The report also states “Only very basic detail is given, and there is a danger therefore that different interpretations of the learning outcomes may be taken and developed by different groups (e.g. the SEC, the textbook publishers etc.) and that these may not be aligned with each other. This approach is not satisfactory for an exam as important as the Leaving Certificate.” (p. 6)

The full report may be downloaded from the URL given in the list of references.

- **Irish language organisations (2021).** A total of fourteen organisations with responsibility for the promotion of Irish in the education system commissioned the report *Discussion Document responding to the Senior Cycle Draft Irish Specifications L1 an L2 published for consultation by the NCCA on 23 February 2021* (Hyland and Ui Uiginn 2021). This report provides a detailed analysis of international good practices in syllabus reform and made a number of important points. As these points are applicable to syllabi in every subject, they are reproduced in some detail as follows:
  - “In terms of content, the draft specifications, based on themes and learning outcomes, are sparse and lacking in depth. Detailed information is not given about what the teacher is to teach or what the student is to learn. No explanation is given of the depth of learning that should be covered within the themes or topics and teachers are not provided with guidelines or details on assessment.” (p. 19)
  - “The learning outcomes should be clear **and** the depth and breadth of knowledge required should also be provided. Teacher guidelines should be provided as well as comprehensive information on the assessment of the subject. It is not sufficient to state that these will be made available at a later date. The consultation is currently underway and feedback is being sought from stakeholders. Worthwhile feedback cannot be given in the absence of this information.” (p. 19)
  - “While learning outcomes, if clearly set out, are a useful tool in curriculum design, learning outcomes **alone** are not enough to design a specification for a high-stakes examination such as the Leaving Certificate. Learning outcomes are statements of essential learning, and as such they are written at minimum / threshold (i.e. pass/fail) standard. They do not provide the **range of skills and information** to be provided in any subject.” (p.19)
  - “No senior cycle specification should be as bare and lacking in depth as these draft specifications. They merely provide a skeleton with no flesh on the bones and no detailed content.” (p. 19)
  - “The NCCA has indicated that the SEC will follow its normal practice and that sample examination papers and marking schemes will not be made available until November 2024, a few months before the first exams based on these specifications in June 2025. This is a flawed approach. Accurate and comprehensive information on the assessment system, oral and written, **should be aligned** from the outset with the content of the specification and provided with the draft specification in advance of the consultation. There must be alignment between learning outcomes, specification content, teacher guidelines and assessment. Information in the draft specifications on assessment comprises two pages and is mainly an account of the weighting of marks. This is a huge shortcoming, and we believe that these draft specifications should not have been published without comprehensive information on the assessment components.” (p. 23)

One of the main recommendations made in the report is that the draft syllabi should be set aside:

- “Our advice at this stage would be that any decision on a new specification for Irish in the senior cycle should be set aside until the review of the junior cycle has been completed and the results of the review have been made available. We then ask that the Department of Education, the NCCA and the State Examinations Commission give consideration to the recommendations we have made in this discussion document for the design of a new structure for Irish at senior cycle level, a structure that, for the first

time, would cater adequately for the learning needs of all students in the country”. (p. 47)

- **Association of Secondary Teachers in Ireland (2022)**. The ASTI issued a questionnaire to their members asking them to document their experience of the implementation of the Framework for Junior Cycle. A total of 2981 teachers responded to the survey and the following extracts from the report give a good flavour of the type of comments received:
  - “Indeed, it would be an under-statement to say that there is profound and universal concern among teachers about the capacity of the junior cycle subject specifications to prepare students for the senior cycle curriculum. Lack of depth of content knowledge was not the only source of this conviction.” (p. 13)
  - “However, it must be emphasised that even those teachers who expressed positive views, most invariably qualified their comment by expressing concern about students’ progression to senior cycle.” (p. 13)
  - “Lack of depth of knowledge content over the three-year cycle was repeatedly identified by teachers as problematic. Many teachers stated that, several years into the new Framework curriculum, they were unsure if they were teaching the course properly. This is creating confusion and frustration for teachers and is also impacting on their workload.” (p. 14)
  - “Learning outcomes remain problematic. They are too broad, too vague and are lacking in guidance to the teacher on what students are expected to be able to do in order to show that they have achieved each learning outcome. This causes confusion and frustration for both teachers and students adding to workload of teachers.” (p. 14)

Among the recommendations of the ASTI report were:

- A comprehensive independent evaluation of the implementation of the Framework for Junior Cycle needs to be conducted.
  - The NCCA and the Department of Education must address teachers’ concerns in relation to the lack of depth of content in the subject specifications.
  - The Department of Education must address teacher wellbeing.
- **Oireachtas Committee on Education (2022)**. The Joint Committee on Education, Further and Higher Education, Research, Innovation and Science invited written submissions on Senior Cycle Reform from a wide range of stakeholders in education. In addition, it met with many of these stakeholders. The report of the committee *Learning for Life* was published in May 2022 and contained ten key report recommendations. The following was the second recommendation listed in the report:
    - “As part of Senior Cycle reform, a key priority for the Department of Education must be that the revised syllabus for each subject is far more detailed with comprehensive instructions for teachers. The Committee recommends that the National Council for Curriculum and Assessment (NCCA) reviews the proposed design of the new specifications to ensure teachers are properly supported and students are taught to the highest professional standards.”  
(Oireachtas Committee 2022 p. 11)

In addition to the above, individual teachers have voiced their concerns about the quality of syllabi at conference presentations. For example, Stephen Murphy (Murphy 2020) spoke at the 2020 ISTA Annual Conference and outlined his difficulties trying to teach the vague Leaving Certificate Computer Science syllabus. A video recording of his address may be viewed at the URL in the list of references below.

Similarly, John Lucey, former NCCA Education Officer, spoke about how NCCA used to develop syllabi containing detailed depth of treatment (Lucey 2020). This is in complete contrast to the current template being used by NCCA. A video recording of his address may be viewed at the URL in the list of references below.

In addition, Mr Humphrey Jones, in a keynote address at the 2022 ISTA Annual Conference (Jones 2022), detailed the major problems encountered by him in trying to implement the vague Agricultural Science syllabus in the classroom. He also pointed out that his school had now ceased offering Agricultural Science as a subject. His experience is reflected in the reports of the Irish Agricultural Science Teachers' Association (IASTA 2019, 2021).

In view of the concerns expressed above, there is clearly a need to utilise a more detailed template that is in keeping with international best practice. International best practice is summarised in a keynote address given by Bethan Foulkes of the Oxford, Cambridge and RSA Examination Board (Awarding Body) to the 2022 ISTA Annual Conference (Foulkes 2022). A copy of this address is available for viewing at the URL given in the list of references.

The ISTA is not prepared to accept a vague Climate Action and Sustainable Development specification that is not in keeping with international best practice in syllabus design.

This submission was made by the Council of the Irish Science Teachers' Association on behalf of all its members.

October 26<sup>th</sup> 2022

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