The International Baccalaureate Diploma Programme: Alignment with Norwegian upper secondary education

Research summary

Summary developed by IB Research based on a report prepared by:
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Background

This study identifies and evaluates similarities and differences between the International Baccalaureate (IB) Diploma Programme (DP) and the Norwegian upper secondary qualification (Vitnemål for Videregående Opplæring). The study explores alignment between the DP and Norwegian objectives for education, pedagogical and learning approaches, and intended outcomes. Additionally, researchers compared the content and structure, approaches to assessment, and cognitive demand of selected DP subjects (mathematics standard level (SL) and higher level (HL); mathematical studies SL; and biology, chemistry and physics, all at SL) and their Norwegian upper secondary counterparts. Table 1 identifies the syllabuses used as the basis for this comparison.

Vitnemål for Videregående Opplæring

The Norwegian upper secondary programme (Vitnemål for Videregående Opplæring) is a three-year qualification designed to prepare students, typically aged 16–19, for higher education. There are currently five general study programmes, each preparing students for a different area of university study. During the three-year programme, students must complete eleven subjects common to all streams, in addition to subjects specific to a student's chosen stream.

Subject	Vitnemål for Videregående Opplæring	DP
Mathematics	Matematikk R1 og R2	Mathematics HL and SL
	Matematikk S1 og S2 and Matematikk R1 og R2	Mathematical studies SL
Biology	Biologi 1	Biology SL
Chemistry	Kjemi 1	Chemistry SL
Physics	Fysikk 1	Physics SL

Table 1: Syllabuses reviewed

Research methods

To conduct a reliable comparison of the DP and the Norwegian education system, the study included three key phases: desk-based research and a document review for both systems; comparative analysis; and evaluation and synthesis. The methodological approach is outlined in figure 1.

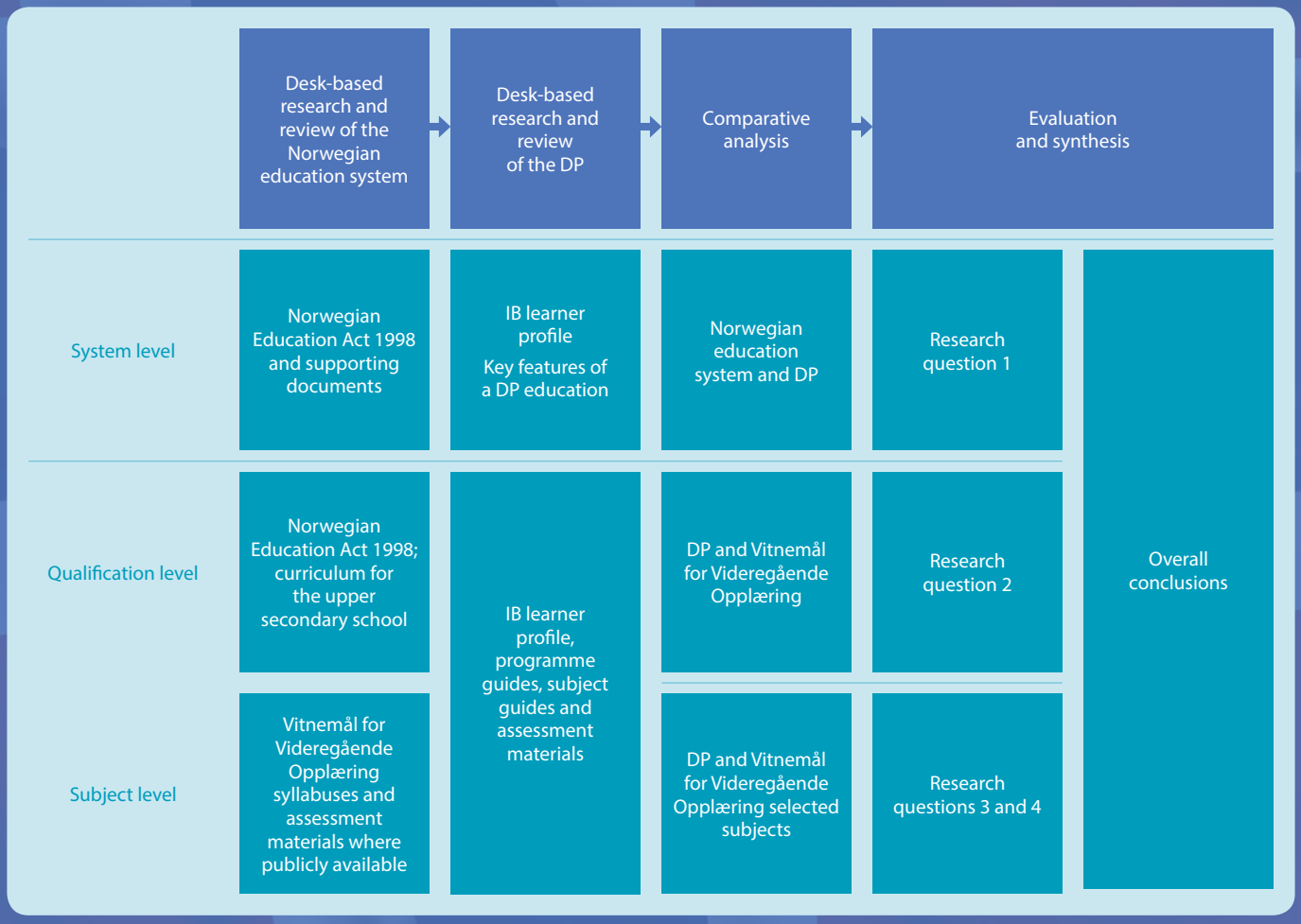

Figure 1: Methodological processes

Findings

Having conducted a policy, system and subject-level comparative analysis of the two upper secondary qualifications, this study has identified many areas where the DP aligns closely with the learning outcomes, content and underpinning philosophy of the Norwegian Vitnemål for Videregående Opplæring.

Overarching findings

Overall, the two educational programmes set similar objectives and have similar principles, with both seeking to provide a holistic education focused on students' academic and personal development. In particular, both systems seek to develop students who are:

- internationally and open-minded
- prepared for further study or work, including the skills and values needed for work and life
- critical thinkers and lifelong learners who are inquisitive, creative and able to think scientifically
- principled, ethical and caring.

Qualification-level findings

At the qualification level, many similarities were found in the intended learning outcomes and standards for learning and teaching in both systems. Specifically, schools are encouraged to:

- provide holistic teaching using a range of methods to assist students in becoming self-motivated and self-regulated learners
- provide differentiated teaching that meets all students' needs within a student-centred and constructivist classroom environment
- support teachers in curriculum development and delivery while ensuring that curricular content is accurate, relevant and makes connections to other subject areas

- record and report on students' progression through assessment, and ensure students are aware of their own progress
- help students to develop subject knowledge, communication and presentation skills, critical- and ethical-thinking skills, and the ability to apply mathematical skills in real-world scenarios.

Subject-level findings (sciences)

Similarities and differences

- The two educational systems have similar aims for students to develop key practical, investigative and deductive skills, allowing students to conduct research, extract information from sources, and evaluate and present results.
- Students in both systems are expected to be able to apply mathematical knowledge within science contexts, and to use various digital tools in conducting investigations.
- Differences in skills, where noted, were minor. For example, although both programmes emphasize the ability to conduct independent research, Norwegian students are expected to be familiar with, and use, specific resources, such as science magazines and newspapers.

Content coverage

- DP science courses broadly cover the main topics and content included in the Norwegian courses. Overall, the findings suggest that DP courses offer wider coverage of science topics.
- While the courses have a similar number of teaching hours, considered in conjunction with the content, the volume of study is greater in the DP than in the Norwegian science courses.

At the individual subject level, researchers identified the following findings.

- In chemistry, many topic areas are shared, including acid-base calculations and experiments; organic compounds; atomic models; the periodic table; nomenclature rules; writing chemical equations; and performing chemical equilibrium calculations.
- In physics, both programmes expect students to be able to use conservation laws to describe fission and fusion processes, apply Stefan–Boltzmann's and Wien's displacement law, and describe a Hertzsprung–Russell diagram, the life cycle of a star and the standard model. Only minor differences were noted; for example, certain Norwegian topics, such as transistors and doping of semi-conductors, were not found in the DP.
- In biology, both courses aim for students to learn practical skills and be able to think scientifically. While both systems cover cell biology, organs, diversity, and reproduction, the DP does not include certain Norwegian topics, such as healthcare, reproduction of bacteria, and human diseases.

Assessment

While the two qualifications both use externally assessed written examinations across the sciences to test subject knowledge, the assessment methods broadly differ. The DP includes mandatory internal and external assessment, while the Norwegian courses include school-based internal assessment, with external assessments for selected students.

Subject-level findings (mathematics)

Similarities and differences

- The study found that the DP mathematics courses (mathematics HL and SL, and mathematical studies SL) employ similar aims to those of the Norwegian mathematics courses: both focus on developing students' numeracy, technological and mathematical inquiry skills, and ability to communicate mathematically and formulate logical arguments.
- Minimal differences were observed in the Norwegian mathematics courses with regard to formulating specific proofs and the ability to evaluate the suitability and limitations of digital tools—skills that are only partially covered in the DP mathematics courses.

Content coverage

The two educational programmes include largely comparable mathematics content and associated aims. At the individual subject level, researchers identified the following findings.

- DP mathematics HL and SL and Norwegian mathematics R1 and R2 cover a similar range of mathematics topics relating to geometry, algebra and functions.
- Mathematics R1 and DP mathematics HL and SL cover combinatorics and probability in similar ways.
- Mathematics R2 and DP mathematics HL and SL similarly cover differential equations.
- Overall, DP mathematics HL was found to cover a wider range of topics than its Norwegian counterpart.
- DP mathematical studies SL and Norwegian mathematics R1 include similar topics, but fewer than those covered by DP mathematics HL and SL. Significantly fewer sub-topics are shared between the DP mathematical studies SL and Norwegian mathematics R2 courses.
- The content of the DP mathematical studies SL and Norwegian mathematics S1 and S2 are closely aligned, albeit with a few differences. The Norwegian mathematics S1 course includes content on linear optimization whereas the DP mathematical studies SL course offers additional mathematics content on descriptive statistics, geometry and trigonometry.

Assessment

- DP and Norwegian mathematics courses use similar assessment methods—both employ internal assessment, although external assessment is not mandatory for all students in the Norwegian system.
- With regard to external written examinations, both programmes use comparable question types to assess content and skills, including knowledge and understanding of concepts and content; problem-solving skills; use of technology; mathematical reasoning skills; and communication skills in mathematics.
- On average, DP examinations were found to be more demanding. In some courses, this was because of the number of questions students needed to complete within the available timeframe; in other courses, this related to the complexity of procedures the students were required to perform, and the amount of guidance provided to students.

Summary

The study found notable and substantial alignment between the DP and the Vitnemål for Videregående Opplæring in terms of their overarching objectives, principles and aims for holistic student development. Similarities were also found between the mathematics and science courses reviewed—in general, while the DP provides a wider breadth of knowledge, both educational programmes develop similar skills and content knowledge. This alignment indicates that IB World Schools in Norway are well equipped to deliver the DP in a way that is compatible with the aims, goals, curriculum and assessment expectations of the Norwegian system.

This summary was developed by the IB Research department. A copy of the full report is available at: ibo.org/en/research/. For more information on this study or other IB research, please email research@ibo.org.

To cite the full report, please use the following.
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