

AUDIT OF TEACHING ASSIGNMENTS

An Integrated Analysis of Teacher Educational Background and Courses Taught
May 2013

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Executive Summary

The *Audit of Teaching Assignments: An Integrated Analysis of Teacher Educational Background and Courses Taught (May 2013)* is based on teaching assignments from the 2011–12 school year, and provides information about the degree to which selected subjects were taught in Nova Scotia by teachers with knowledge in their subject areas. Comparisons to results from the 2007 Audit of Teaching Assignments are included where available.

The 2012 analysis focused on fourteen subject areas, six subjects at the junior high level—English language arts, French language arts (CSAP), mathematics, physical education, social studies, and science—and eight subjects at the senior high level—biology, chemistry, English language arts, French language arts (CSAP), history, mathematics, physical education, and physics.

Results show an overall improvement in the alignment of teacher educational background to subjects taught when compared with data from the 2007 audit. That said, areas of concern identified in 2007 (English language arts, mathematics, science at the junior high level, and history at the senior high level) remain areas of concern with the exception of mathematics at the senior high level, which has shown significant improvement since 2007.

The 2012 audit shows that senior high courses were more likely to be taught by teachers with a related educational background than courses at the junior high level. Overall, 72 percent of junior high courses and 82 percent of senior high courses were taught by teachers with a related educational background. Since 2006–07, the alignment of teacher educational backgrounds to subjects taught has also increased more significantly in senior high courses than junior high courses.

Other highlights of the 2012 audit include the following:

- The alignment of teacher educational background to subjects taught has improved somewhat for junior high English language arts (4 percent increase) and social studies (1 percent increase).
- The number of junior high mathematics courses being taught by teachers with related educational backgrounds increased by 16 percent since 2007; however this continues to be an area of concern, since almost half of all junior high mathematics courses are still being taught by teachers with unrelated educational backgrounds.
- Of the eight subjects analyzed at the senior high level, all showed an improvement over data from the 2007 audit.
- A significant increase of 13 percent in the number of senior high mathematics courses taught by teachers with a related educational background.
- A 10 percent increase in the percent of history courses taught by teachers with related educational backgrounds, although this subject remains an area of concern.
- Among senior high courses of different credit types (Academic, Advanced, and Graduation) Advanced courses continue to have a greater likelihood of being taught by a teacher with a related background compared to Academic or Graduation level courses.
- When compared to non-immersion courses, French-immersion courses were less likely to be taught by teachers with a related educational background, especially at the senior high level (50 percent of immersion courses compared to 83 percent of non-immersion courses).

Introduction

In 2007, the Department of Education published the *Audit of Teaching Assignments: An Integrated Analysis of Teacher Educational Background and Courses Taught*. The 2007 report provided information about the degree to which selected subjects were being taught by teachers with a related educational background. The purpose of this report is to update the 2007 report and to provide an analysis of the changes that have occurred since 2007, where possible.

This report examines the educational background of teachers in six subject areas at the junior high level—English language arts, French language arts (CSAP), mathematics, physical education, science, social studies; and eight subject areas at the senior high level—biology, chemistry, English language arts, French language arts (CSAP), history, mathematics, physical education, and physics.

Methodology

Audit of Teaching Assignments: An Integrated Analysis of Teacher Educational Background and Courses Taught (May 2013) examines courses taught at junior and senior high levels in the 2011–12 school year, in selected subject areas. The objective of this report is to determine to what extent courses are being taught by teachers with related content knowledge in each subject area.

The 2012 audit focused on courses taught in a number of subject areas (see table below) during the 2011–12 school year. Overall 12,961 courses, taught by 2937 teachers, were included in the analysis in six subject areas at the junior high level and eight subject areas at the senior high level.

| Junior High | Senior High |
|--|---|
| English Language Arts French Language Arts (CSAP) (new) Mathematics Physical Education Science Social Studies | Biology Chemistry English Language Arts French Language Arts (CSAP) (new) History Mathematics Physical Education (new) Physics |

When considering the results presented in this report it is important to keep in mind that the number of courses offered in each subject area varies significantly. Appendix A outlines the number of courses included in the audit for each subject area and indicates how many of those courses are taught by teachers with *directly related* and *somewhat related* majors and minors. Changes in teaching assignments will have a greater impact on those subjects with relatively fewer courses.

Data for the 2012 audit was drawn from three sources. The provincial student information system, iNSchool, provided details on classes taught under each subject area, including the teacher assigned to that course and the number of sections taught for each course. School boards provided information on educational backgrounds for all teachers included in the analysis and confirmed the information provided by iNSchool. The Centralized Education Data, Administration and Reporting (CEDAR) database of the Department of Education was also used to provide information related to teachers' educational backgrounds, where required.

Courses taught by teachers whose majors and minors were unavailable were removed from the analysis. In cases of a discrepancy between school board records and the other data sources, the school board records were used.

Related Educational Background

For the purposes of this report, a teacher was considered to have a related educational background in the course being taught if they had a post-secondary major (30 credit hours) or minor (18 credit hours) in the subject area or a related subject area. Department of Education staff with expertise in each subject area identified majors and minors with significant mandatory coursework in each subject area to determine what could be considered related to the subject area. Majors and minors were identified as either *directly related* (providing a significant amount of training in the subject area) or *somewhat related* (providing some post-secondary training in the subject area). In the analysis, directly related and somewhat related backgrounds are combined to report on related backgrounds.

It is recognized that teachers may have credit hours, or other professional learning in addition to their major or minor, however this additional coursework is not taken into account in this analysis. Teachers who have completed the 30-credit-hour Certificate in the Mathematical Sciences for Education, which is designed to provide teachers with the pedagogy and content for teaching high school mathematics, were considered to have an educational background related to mathematics.

The majors and minors considered directly or somewhat related to each subject area considered in this report are provided in Appendix B.

Changes in Methodology

For the most part, the 2012 audit follows the methodology used in the 2007 audit, however there were changes implemented for the 2012 audit regarding what was included as a related educational background in four subject areas.

- **Mathematics (Junior and Senior High):** Chemistry was included as a somewhat related major or minor.
- **Science (Junior High):** Psychology majors and minors were only included as a somewhat related major or minor if it was earned as part of a bachelor of science degree. Psychology majors and minors earned through other bachelor degrees were considered to be unrelated. Home economics was considered a somewhat related major or minor where it has previously been a directly related major or minor.
- **Social Studies (Junior High):** A major or minor in environmental studies was considered somewhat related. Environmental studies was previously considered to be a directly related major or minor.
- **Biology (Senior High):** Psychology majors and minors were only included as a somewhat related major or minor if it was earned as part of a bachelor of science degree. Psychology majors and minors earned through other bachelor degrees were considered to be unrelated.

Majors and minors changing from directly related to somewhat related do not impact the analysis as these two categories are combined and reported as "related" majors and minors throughout the report.

Courses Co-Taught/Job Shared

The 2012 analysis includes courses taught by more than one teacher (a co-teaching or job share arrangement). In assessing the educational background of teachers for these courses it was assumed that the teaching responsibilities were divided evenly between the teachers.

In most school boards it was possible to identify the courses that were co-taught or job shared. However, in some boards, the information on classes taught was assigned to only one of the teachers in the job share or co-teaching arrangement. The courses in these instances were included in the analysis under one teacher only. School boards that did not identify courses that were co-taught or job shared indicated the incidence of these situations was low at both the junior high and senior high levels.

Context

Teacher Content Knowledge and Pedagogy

For the purposes of this report, teacher content knowledge focuses on post-secondary education and university level courses in the subject area being taught. It is widely supported through research that student learning improves when teachers have related content knowledge in the subject area(s) they teach (Darling-Hammond 2000). In addition, it is an expectation of the general public and a commonly accepted assumption that teachers have a background in the subjects they are teaching. However, teaching goes beyond the knowledge of the subject matter and includes an understanding of how to convey content to students. Pedagogical knowledge refers to the various styles and strategies of instruction that bridge content knowledge with the practice of teaching. Teachers should know what to teach (i.e., content) and how to teach (i.e., pedagogy).

Endorsation and Ongoing Learning

In 2005, an endorsation process was adopted in Nova Scotia. Endorsation recognizes the principle that teachers must be competent in both the subject area and the methodology associated with that subject area. Endorsation is based on credit hours of study in a subject area and prescribed teaching methodology. Upon initial certification, teachers are endorsed at the elementary level, secondary level in a specific subject field, or at the elementary and secondary level in French, physical/health education, or arts education. School boards are required to assign teachers to classes related to their endorsation for their first year of teaching service.

Teachers have a professional obligation to remain current in their subject field. Teachers stay abreast of current content knowledge and pedagogy through upgrading courses, conferences, professional learning communities, professional development sessions, and by reading articles and journals. Ongoing teacher professional development and school board supports are critical in supporting teachers in their subject content. School boards provide in-service training, networking opportunities, resources, and mentoring to help teachers remain current in their subject field or to help teachers become more effective through experience.

Hiring and Assignment Process

The hiring and placement practices of school boards vary across the province with some making initial hiring decisions at the school board level and others at the school level. School boards must adhere to local agreements between each regional school board and the Nova Scotia Teachers Union, as well as school board policies when hiring and allocating staffing assignments. Boards indicated that in most cases, staffing assignments within each school are determined by the school's administrative team. School boards reported that the process for staffing assignments generally coincides with the budget process each year. Staff are allocated to schools based on projected enrolments collected in the spring during the registration process.

Many boards indicated that they provide professional development to school administrators annually to review criteria and procedures for teacher assignment, although resource limitations and budget restrictions are impacting their ability to do this. While guidelines and procedures vary, school boards are stringent on qualifications for specialist subject areas, such as guidance, music, physical education, and resource. In addition, a concerted effort is made in many boards to ensure

assignments in English language arts, mathematics, and science are matched to the teacher's academic background. In mixed assignments (i.e., assignments in multiple subject areas), an effort is made to match the teacher's academic background to the subject area that accounts for the highest percentage of the assignment.

Challenges

School principals work to create assignments that best match the teacher's academic background; however, the teaching assignment process can be complex. Declining enrollments create challenges for staffing assignments. Lower enrolments may mean fewer teachers in the school, resulting in some teachers being assigned to multiple subjects—sometimes outside their academic background. This can be a particular challenge in rural areas of the province where school boards already experience difficulties in attracting teachers qualified to teach in particular subject areas. School size and configuration, the range of courses offered in the school, and requirements related to specialist subject areas add to the complexity of the teacher assignment process.

Schools that offer French immersion programming, and the Conseil scolaire acadien provincial (CSAP), experience challenges in recruiting teachers with necessary fluency in reading, writing, and spoken French as well as the required content background. This is especially problematic at higher grade levels where the subjects are more specific in content and for schools with relatively smaller enrolments.

Partners Working Group

In fall 2012, the Minister of Education announced the formation of the Partners Working Group in response to a commitment made in *Kids and Learning First: A Plan to Help Every Student Succeed* (Province of Nova Scotia 2012) to improve the match between what teachers are asked to teach and their training, background, or experience. The mandate of the Partners Working Group was to make recommendations to the Minister on ways to improve the alignment of teacher academic background with courses taught and ensure that teacher preparation and professional learning are designed to meet the needs of students in Nova Scotia.

The Partners Working Group examined the processes and procedures school boards employ when assigning teachers and identified the strengths and challenges within the current system. The report and recommendations of this group are presented in the report, *Aligning Teacher Qualifications with the Learning Needs of Nova Scotian Students* (Nova Scotia Department of Education and Early Childhood Development 2013).

Results

Teaching assignments from the 2011–12 school year were examined to assess the proportion of courses taught by teachers with a related educational background. The analysis in this report refers to related educational background, which groups together directly related and somewhat related majors and minors. The majors and minors considered directly or somewhat related to each subject area are provided in Appendix B.

Overall Results

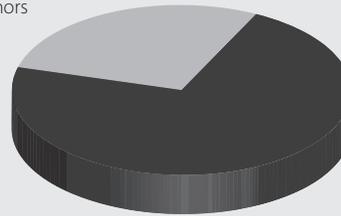
Overall, 72 percent of junior high courses and 81 percent of senior high courses were taught by teachers with a related educational background in 2011–12.

Chart 1: Courses Taught by Teachers with Related Background

Junior High School Courses

Taught by Teachers with
Unrelated Major/Minors

28%



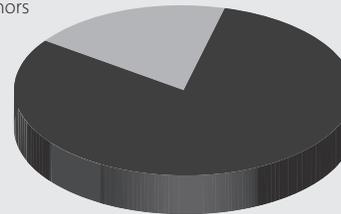
Taught by Teachers with
Related Major/Minors

72%

Senior High School Courses

Taught by Teachers with
Unrelated Major/Minors

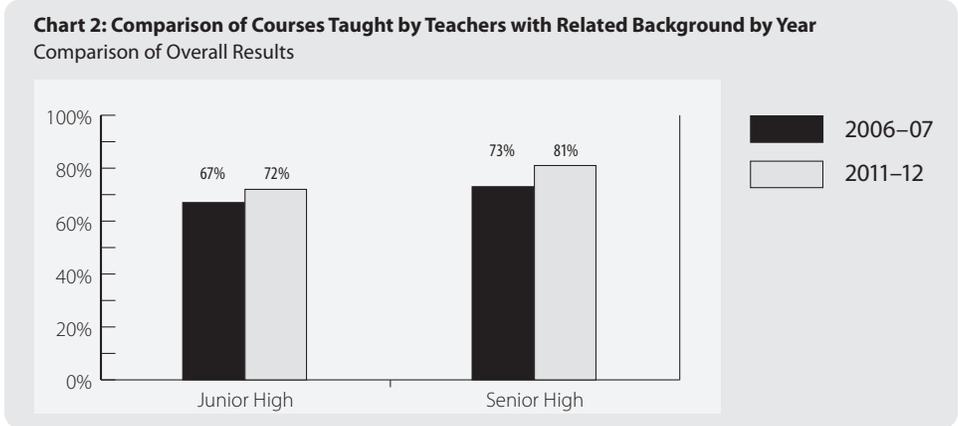
19%



Taught by Teachers with
Related Major/Minors

81%

Compared to results from 2006–07, the percentage of courses taught by teachers with a related educational background has increased at both junior and senior high levels overall. The improvement was slightly higher at the senior high level with an increase of 8 percent compared to 5 percent at junior high.



Impact of Changes to the Methodology

As discussed in the Methodology section of this report, changes were made in the 2012 audit to what was considered a related background in two subject areas, which had an impact on the overall results of the audit. Mathematics (junior high and senior high) now includes chemistry as a related background and science (junior high) no longer includes psychology as a related major or minor, unless it was earned as part of a bachelor of science degree.

An analysis was undertaken to determine the impact of this change on the results. The percentage of courses taught by teachers with related backgrounds in mathematics at junior and senior high levels were slightly higher than they would have been without a change in methodology. For junior high science the methodology change means that the results are lower than they would have been without a change in the methodology, resulting in no change compared to the 2007 audit.

Overall the changes in methodology did not have a significant impact on the changes in results between 2007 and 2012.

Table 1: Impact of Changes to Methodology

| | 2006-07 Teaching Assignments | 2011-12 Teaching Assignments | |
|--------------------------------|---|--|--|
| | % of Courses Taught by Teachers with a Related Background | % of Courses Taught by Teachers with a Related Background (2007 Methodology) | % of Courses Taught by Teachers with a Related Background (2012 Methodology) |
| Junior High Mathematics | 37% | 49% | 53% |
| Senior High Mathematics | 67% | 75% | 80% |
| Junior High Science | 65% | 70% | 64% |

Subject-Level Results

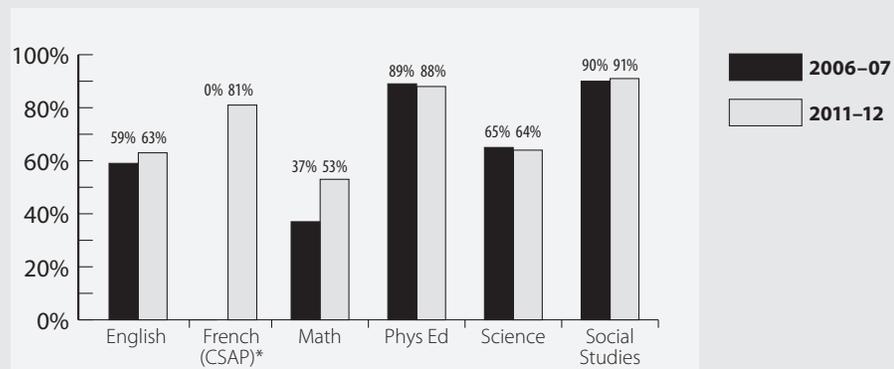
At both the junior and senior high levels, the degree to which courses were taught by teachers with a related background varied, although the variance appears to be more prevalent at the junior high level. Overall, senior high level courses were generally more likely to be taught by teachers with a related background.

When considering results by subject, it is important to remember that the number of courses for each subject and level vary significantly. For example, 2062 courses were taught in senior high mathematics while only 48 courses were taught in junior high French language arts. Changes in teaching assignments will have a greater impact on those subjects with relatively fewer courses taught. See Appendix A for detail on the number of courses taught in each subject area.

Junior High

At the junior high level, changes compared to 2006–07 were relatively minor with the exception of mathematics and, to a lesser degree, English. In both 2006–07 and 2011–12 alignment of teachers' educational backgrounds with courses taught were relatively strong for junior high physical education and social studies. There was a marked improvement in mathematics courses taught by teachers with a related educational background (37 percent to 53 percent) however only about half of all junior high mathematics courses were taught by teachers with a related background, which continues to be a significant area of concern. Other areas of concern at the junior high level are English language arts and science. This is consistent with the results found in 2007.

Chart 3: Junior High Courses Taught by Teachers with Related Background
% of Courses Taught by Teachers with a Related Background



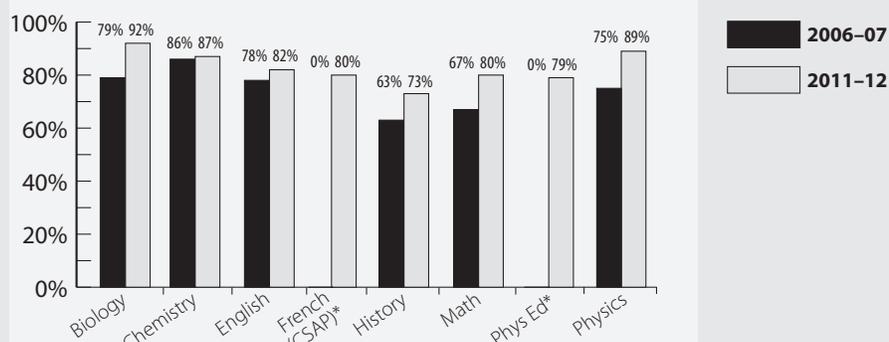
* French (CSAP) was not included in the 2007 Audit of Teaching Assignments analysis.

Senior High

Senior high science courses had strong results in 2011–12: 92 percent of biology courses, 89 percent of physics courses, and 87 percent of chemistry courses were taught by teachers with related educational backgrounds. Compared to the results from 2007, an improvement was seen in each subject area analyzed at the senior high level (French language arts at CSAP and physical education were not included in the 2007 audit). History continues to be a concern with only 73 percent of history courses being taught by teachers with a related background, although there was an improvement over the 2006–07 data from 63 percent in 2006–07, to 73 percent in 2011–12.

Physics, biology, and mathematics showed the largest improvement in results between 2006–07 and 2011–12. Physics results improved from 75 percent of courses in 2006–07, to 89 percent of courses in 2011–2012 taught by teachers with a related educational background. Biology results improved from 79 percent of courses in 2006–07, to 92 percent of courses in 2011–12 taught by teachers with related educational backgrounds. Mathematics results improved from 67 percent of courses in 2006–07, to 80 percent of courses in 2011–12 taught by teachers with related educational backgrounds.

Chart 4: Senior High Courses Taught by Teachers with Related Background
% of Courses Taught by Teachers with a Related Background



* French (CSAP) and Physical Education were not included in the 2007 Audit of Teaching Assignments analysis.

In 2011–12, the following subjects had relatively low percentages of courses taught by teachers with related educational backgrounds:

| Junior High | Senior High |
|---|-------------|
| Mathematics English Language Arts Science | History |

Subject Level Results by School Board

The subject level results of the 2012 Audit of Teaching Assignments are presented below by school board.

Junior High

Compared to results from the 2007 audit, the majority of school boards experienced decreases in the percentage of courses taught by teachers with a related educational background in two or more subject areas. This is most evident in science and English language arts with five out of eight boards showing decreases in these subject areas. The percentage of physical education courses taught by a teacher with a related education background also decreased in five boards, although the overall percentage has remained relatively high.

Despite a decrease in five school boards in the percentage of English language arts courses taught by teachers with a related educational background, an overall increase of four percent was experienced when compared to 2007. This is mainly due to relatively large increases in three school boards (Cape Breton–Victoria Regional School Board, Conseil scolaire acadien provincial, and Halifax Regional School Board).

Mathematics and social studies courses also experienced increases in the overall percentage of courses taught by teachers with a related educational background compared to results from 2007. Increases in the percentage of mathematics courses taught by teachers with a related educational background were experienced in every school board. In particular, Cape Breton–Victoria Regional School Board and Conseil scolaire acadien provincial experienced large increases (29 percent and 26 percent, respectively). Annapolis Valley Regional School Board continues to experience challenges with respect to mathematics teaching assignments, with only 28 percent of courses taught by teachers with a related educational background, despite an increase of 9 percent since 2007.

Chart 5: Junior High English Courses

Courses Taught by Teachers with Related Background

■ 2006-07
■ 2011-12

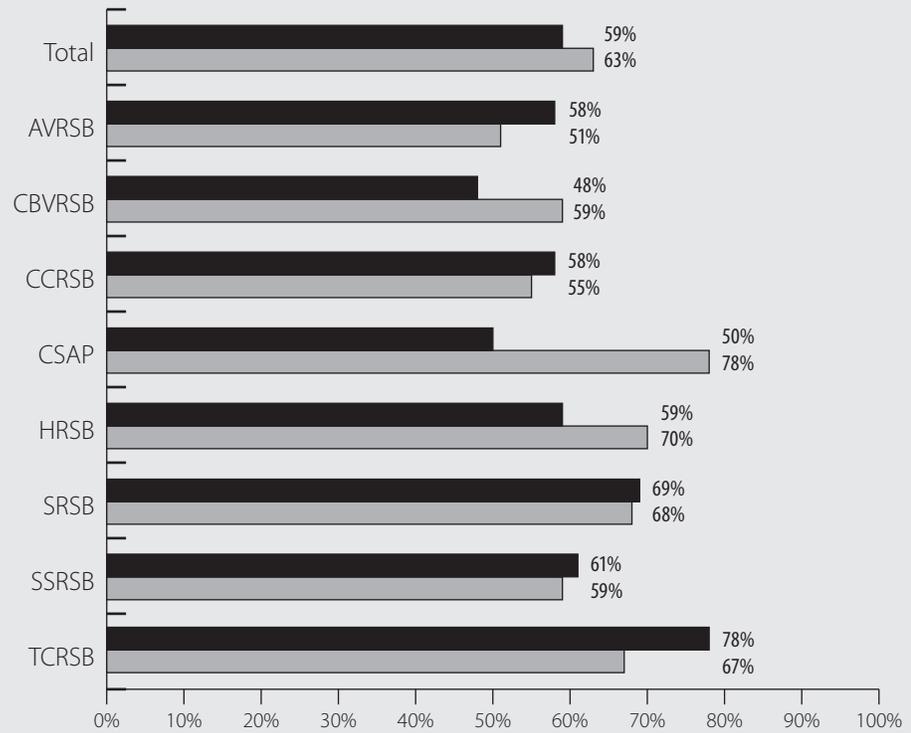
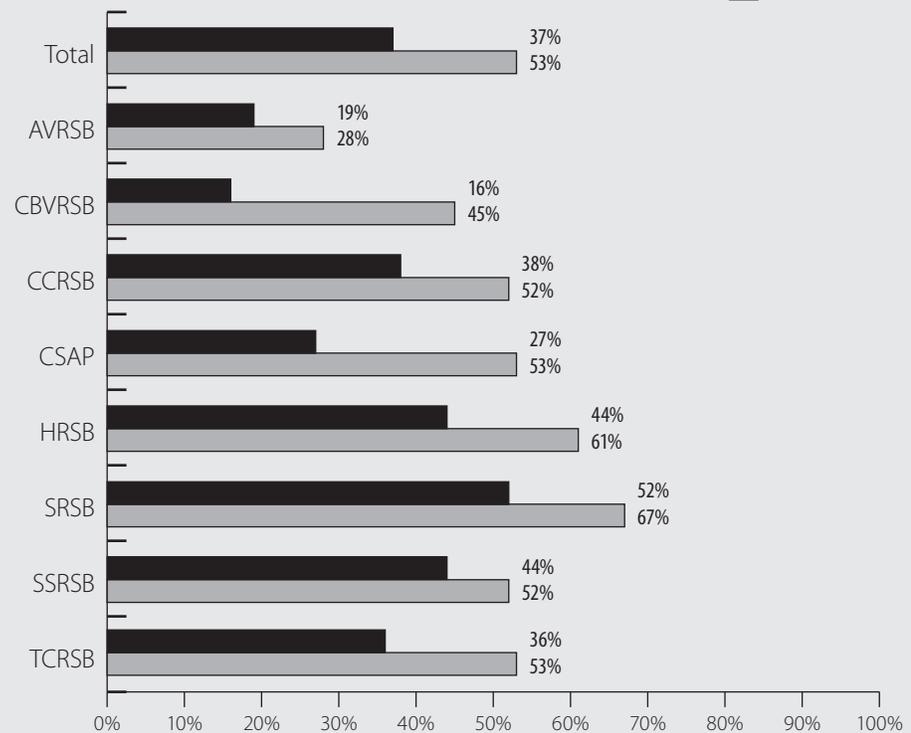
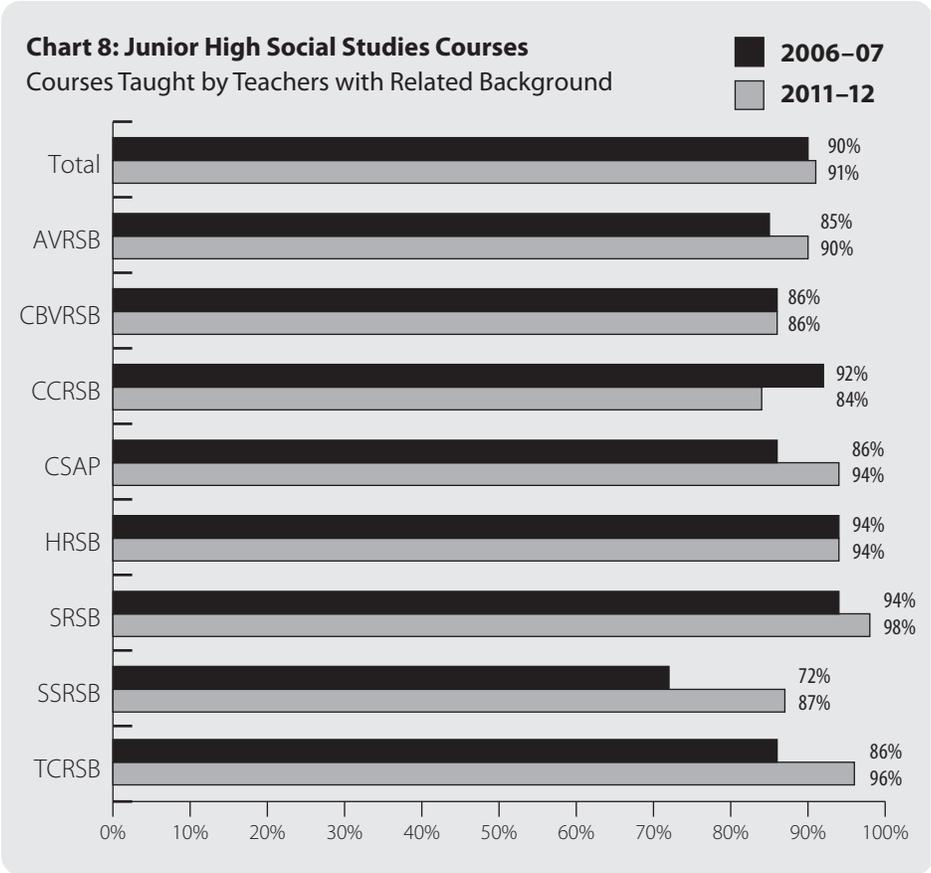
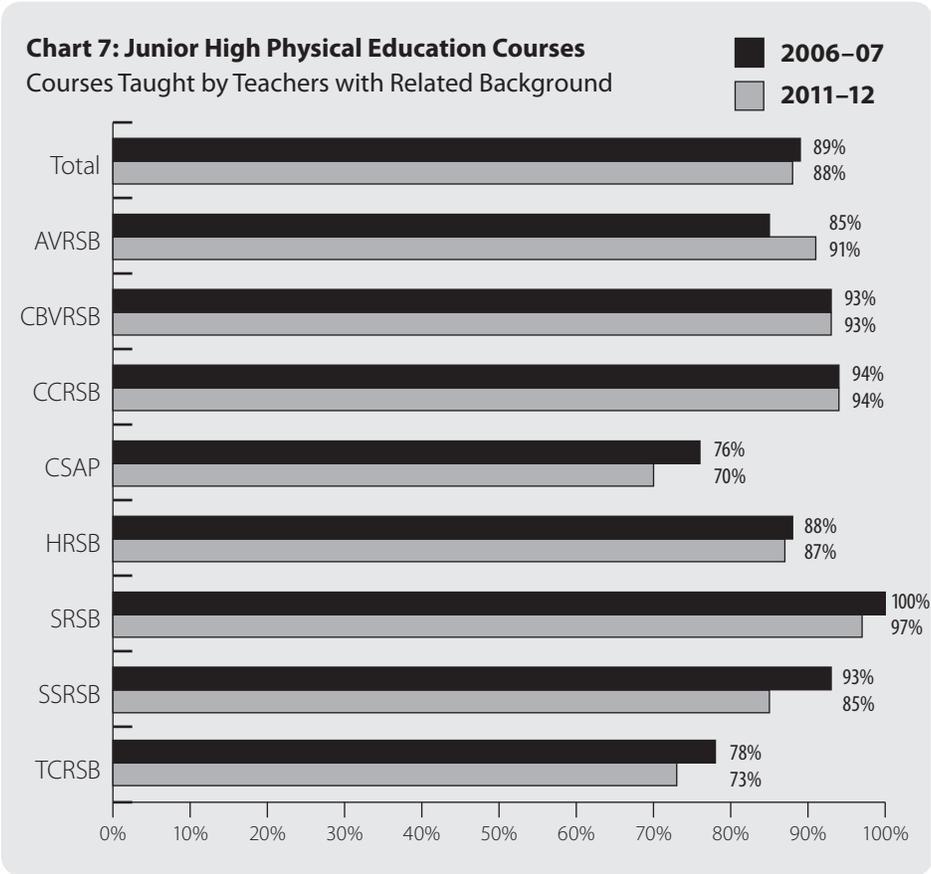


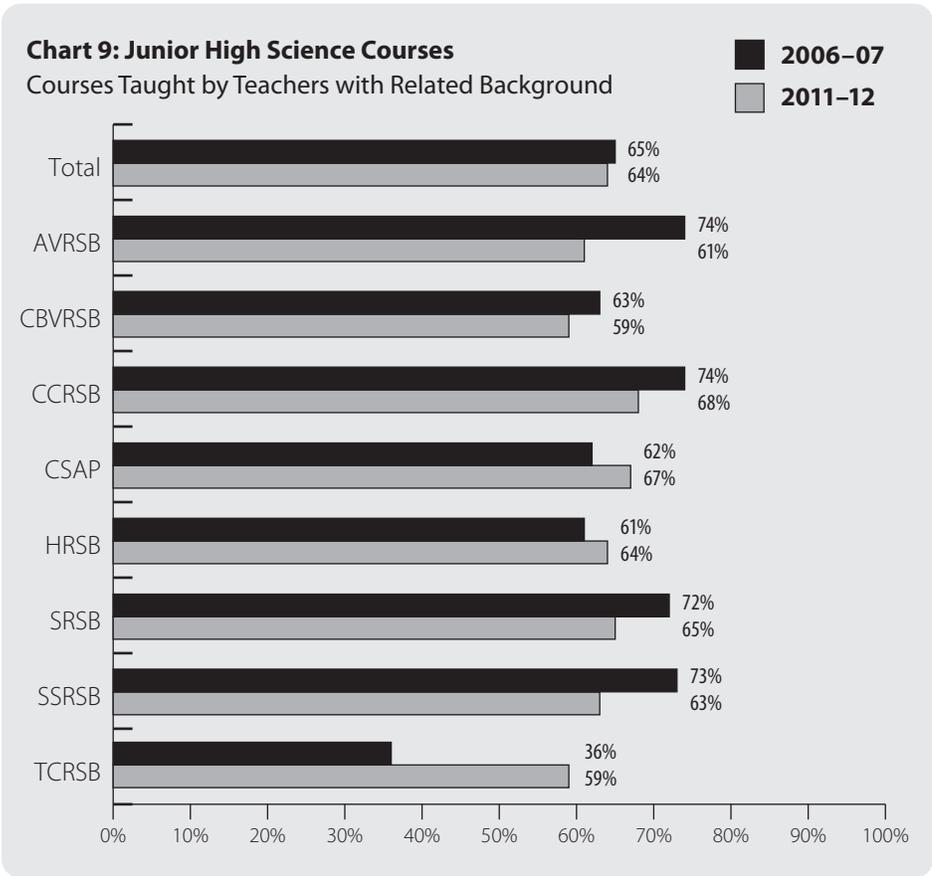
Chart 6: Junior High Mathematics Courses

Courses Taught by Teachers with Related Background

■ 2006-07
■ 2011-12







Note: The change in methodology related to psychology majors/minors being considered a related background only in relation to the bachelor of science degree had an effect on increases/decreases in three school boards. Without the change in methodology, CBVRSB would have shown an increase to 70% (versus 59%), SRSB would have shown a slight increase to 75% (versus 65%), and CCRSB would have shown no change (versus a decrease to 68%).

Senior High

Overall, compared to 2007, increases were noted in the percentage of courses taught by teachers with a related educational background in all subject areas at the senior high level.

Most boards experienced an increase in the percentage of biology courses taught by teachers with a related educational background. Significant increases were experienced in Halifax Regional School Board (an increase of 23 percent), Annapolis Valley Regional School Board (an increase of 20 percent), Cape Breton–Victoria Regional School Board (an increase of 17 percent), Conseil scolaire acadien provincial (an increase of 13 percent), and Tri-County Regional School Board (an increase of 12 percent). Overall the percentage increased by 13 percent.

Most school boards experienced increases in the percentage of courses taught by teachers with a related educational background for history, mathematics, and physics. Mathematics continued to have varied results between boards with a range of 29 percent (92 percent in HRSB compared to 63 percent in AVRSB). Overall, the percentage of mathematics courses taught by teachers with a related educational background has increased by 13 percent.

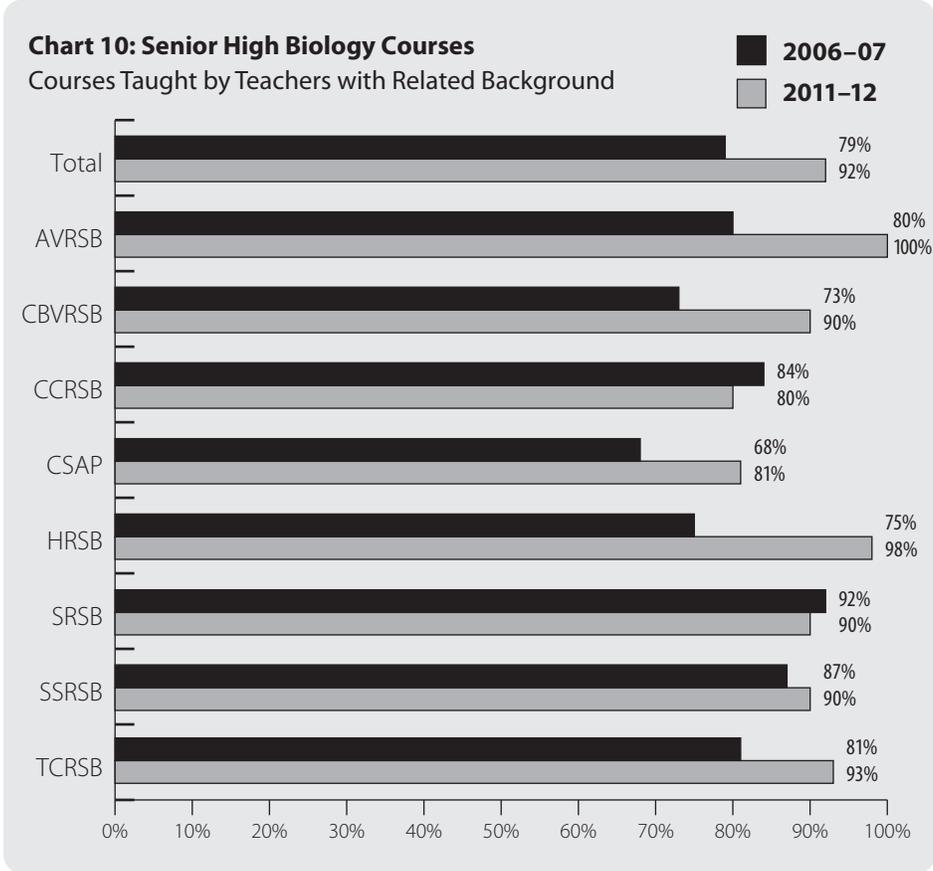


Chart 11: Senior High Chemistry Courses
Courses Taught by Teachers with Related Background

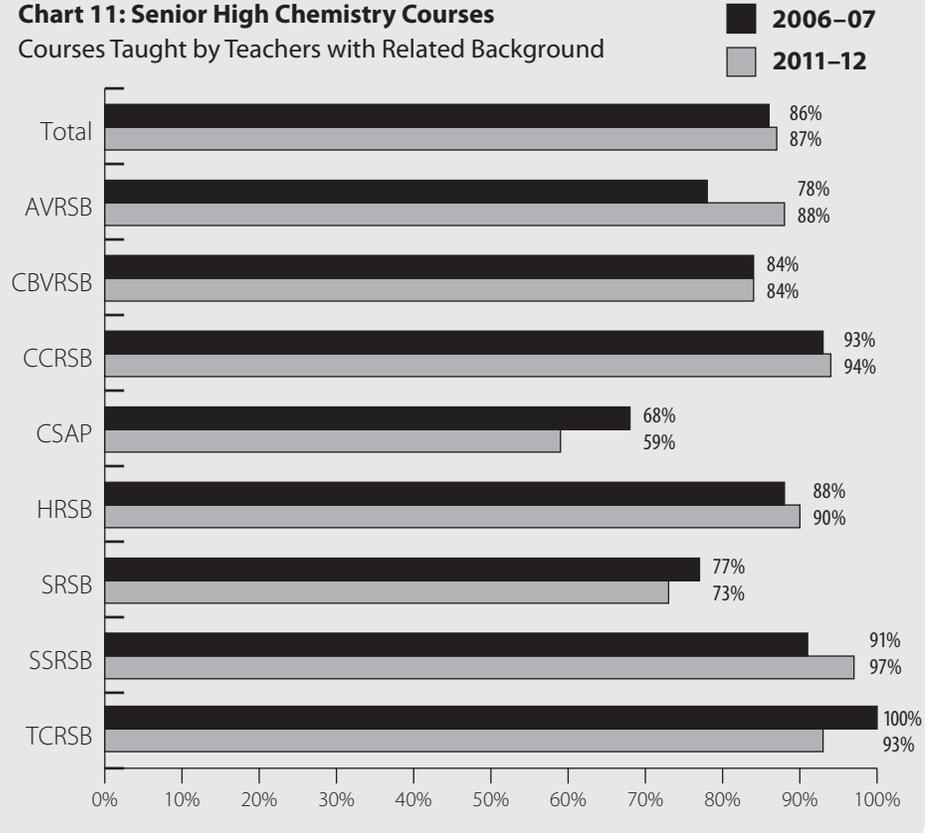


Chart 12: Senior High English Courses
Courses Taught by Teachers with Related Background

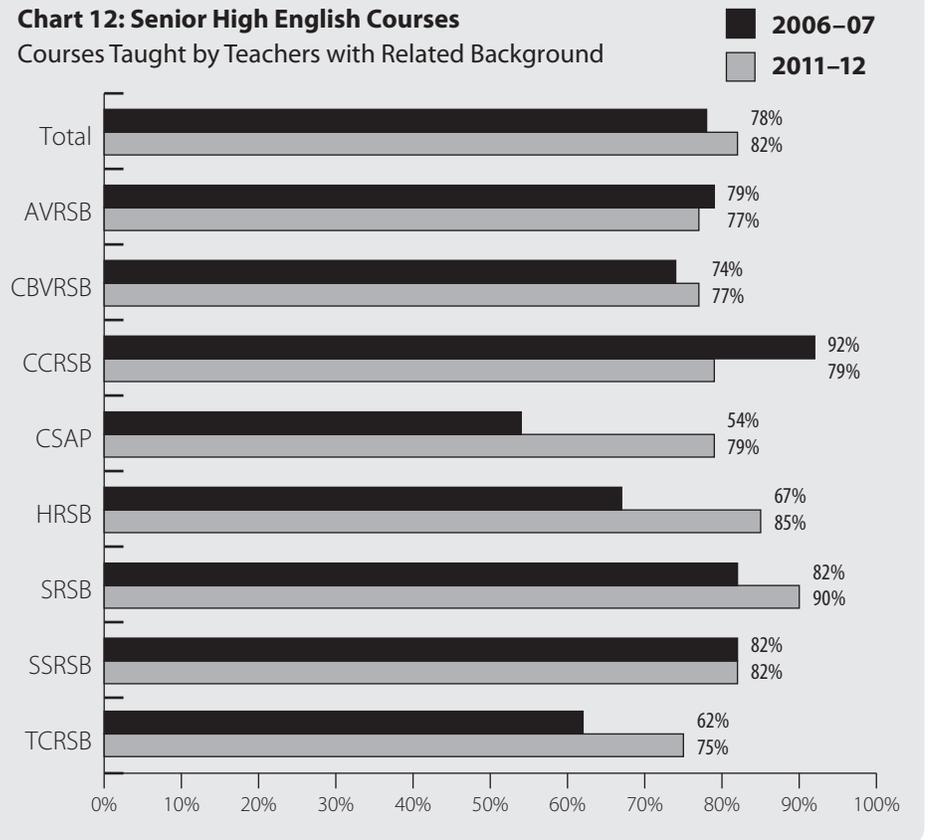


Chart 13: Senior High History Courses
Courses Taught by Teachers with Related Background

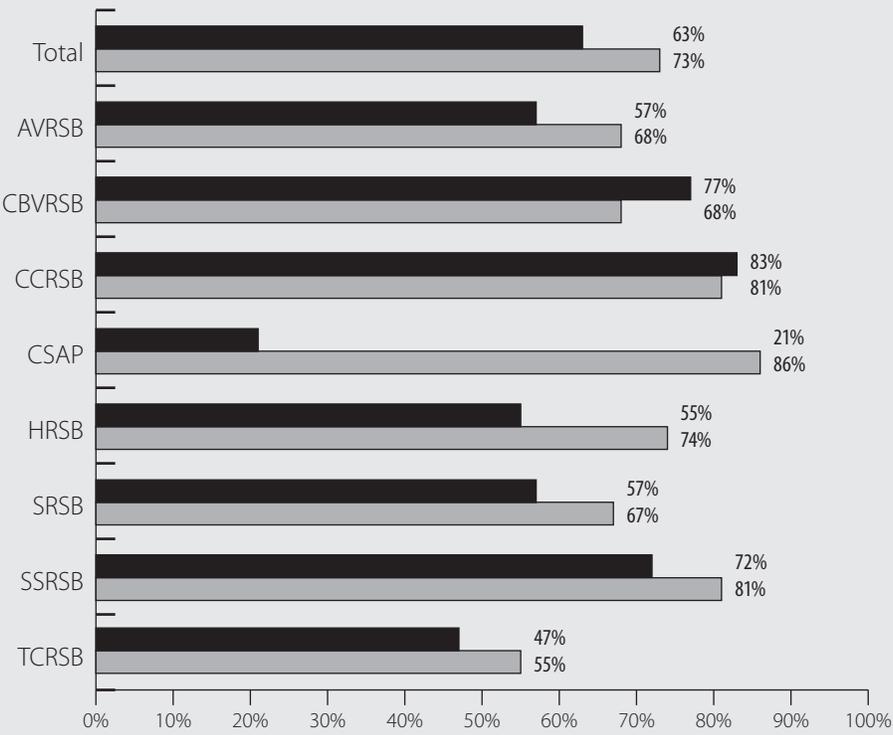


Chart 14: Senior High Mathematics Courses
Courses Taught by Teachers with Related Background

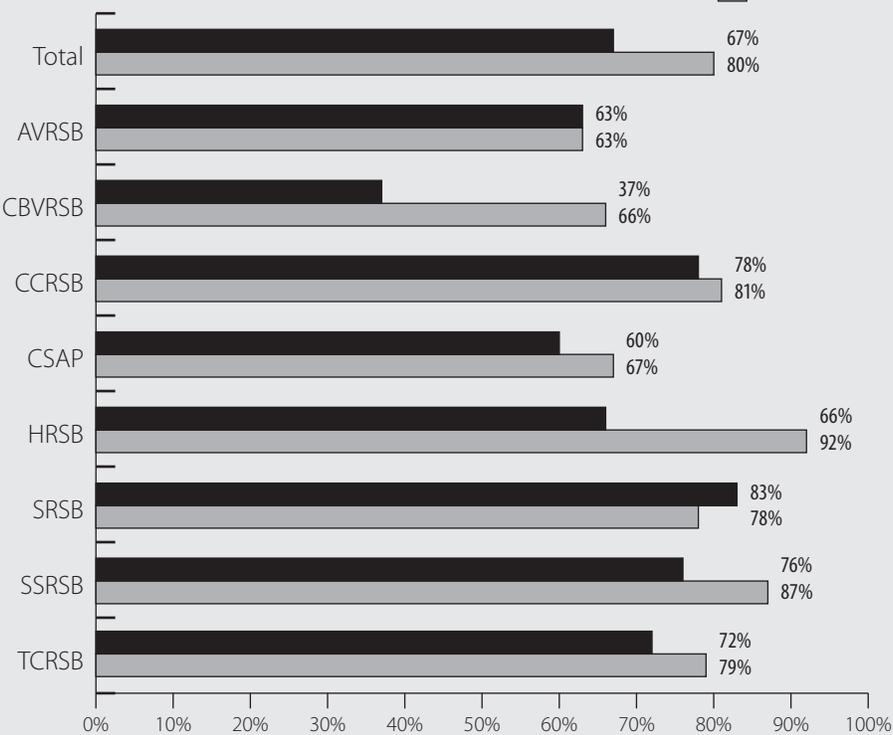
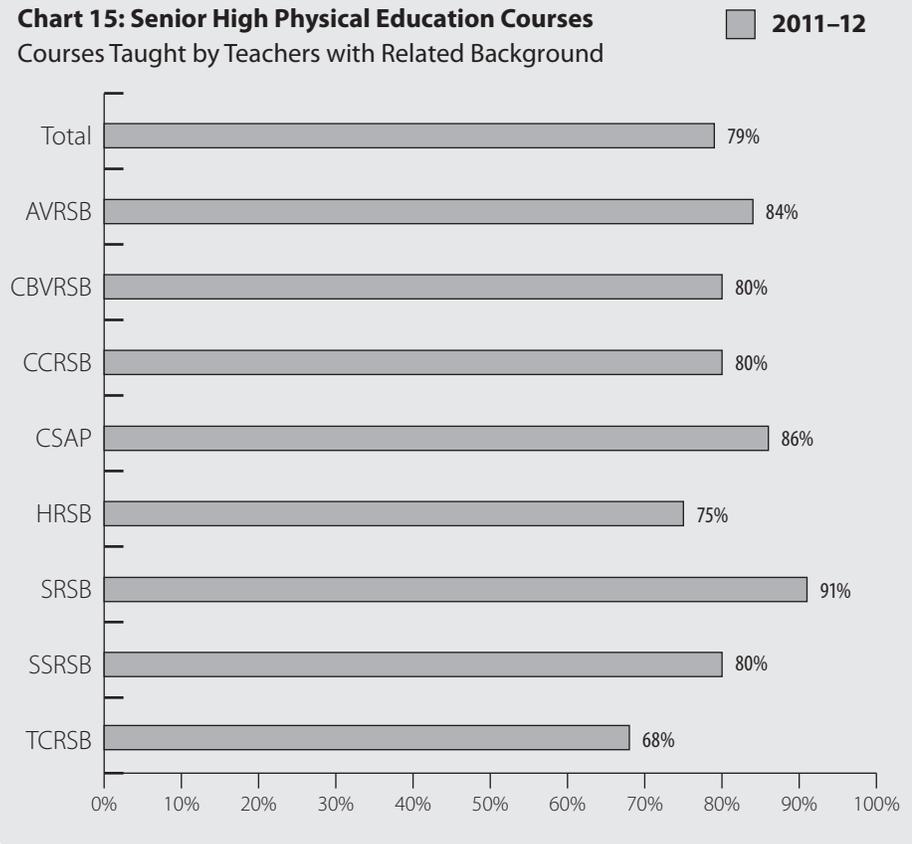
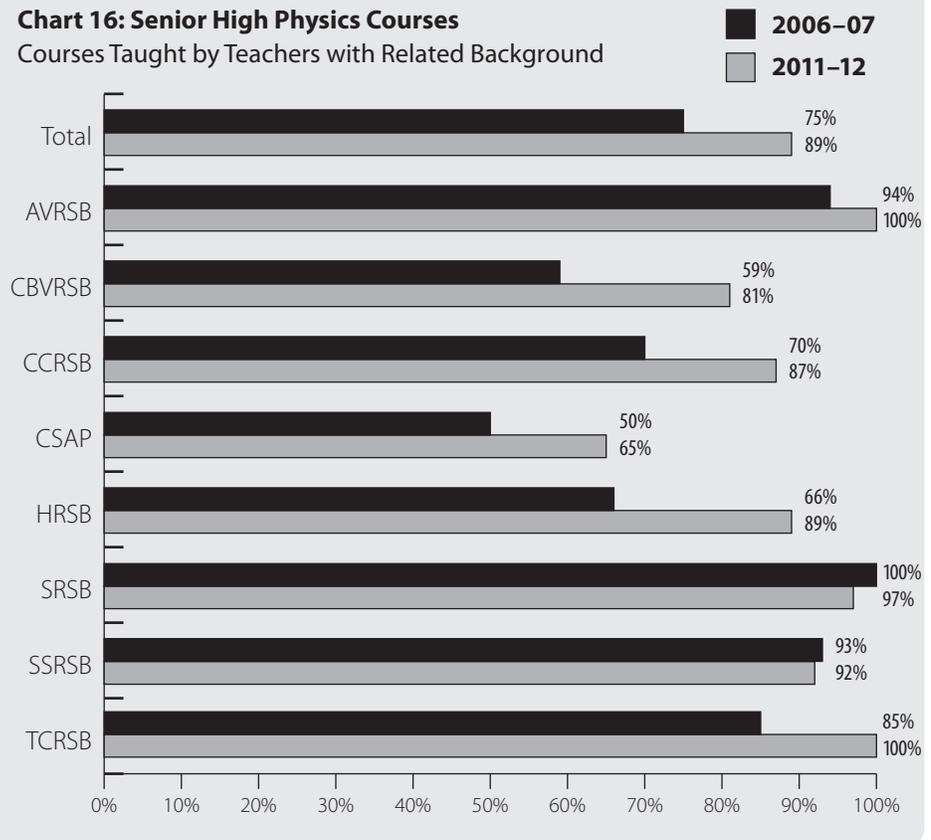


Chart 15: Senior High Physical Education Courses
Courses Taught by Teachers with Related Background



Note: Senior high physical education was not included in the 2007 Audit of Teaching Assignments and therefore 2006-07 data is not available for comparison.

Chart 16: Senior High Physics Courses
Courses Taught by Teachers with Related Background



Analysis of Courses by Credit Type

The Nova Scotia public school program offers some senior high school courses at different credit types, including Academic, Advanced, and Graduation courses. Additional analysis was conducted to determine if there was a relationship between course level and the educational background of the teachers teaching courses for each credit type.

When examining courses by credit type, the results indicate that Advanced courses have a greater likelihood of being taught by a teacher with a related background compared to Academic or Graduation level courses. In 2011–12, 89 percent of Advanced courses were taught by a teacher with a related educational background compared to Academic and Graduation level courses at 83 percent and 70 percent, respectively. The table below shows the results by credit type for applicable courses.

| Table 2: Courses Taught by Teachers with a Related Background by Course Level | | | | |
|--|---|----------------------------|------------------------------|---|
| | # of Courses Taught by Teachers with | | | % of Courses Taught by Teachers with a Related Major/Minor |
| | Total | Related Major/Minor | Unrelated Major/Minor | |
| Advanced Courses | | | | |
| English | 156 | 135 | 21 | 87% |
| French (CSAP) | 18 | 15 | 3 | 83% |
| Mathematics | 519 | 467 | 52 | 90% |
| History* | 53 | 39.5 | 13.5 | 75% |
| Biology** | 104 | 98 | 6 | 94% |
| Chemistry | 121 | 105 | 16 | 87% |
| Physics*** | 78 | 73 | 5 | 94% |
| Academic Courses | | | | |
| English | 1208 | 992.5 | 215.5 | 82% |
| French (CSAP) | 50 | 39 | 11 | 78% |
| Mathematics | 807 | 686 | 121 | 85% |
| History | 546 | 399.5 | 146.5 | 73% |
| Biology | 458 | 418 | 40 | 91% |
| Chemistry | 335 | 290 | 45 | 87% |
| Physics**** | 222 | 193 | 29 | 87% |
| Graduation Courses | | | | |
| English | 311 | 238 | 73 | 77% |
| French (CSAP) | 15 | 12 | 3 | 80% |
| Mathematics | 736 | 490.5 | 245.5 | 67% |

* Advanced history was offered by CBVRSB, CCRSB, HRSB, and SSRSB only.

**Advanced biology was not offered by TCRSB.

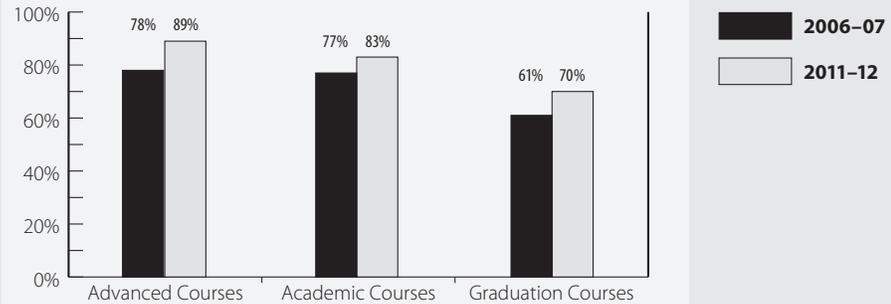
***Advanced physics was not offered by AVRSB, CSAP, and TCRSB.

****Academic physics was not offered by SSRSB.

Comparison to 2007

The results for Advanced, Academic, and Graduation courses improved between 2006–07 and 2011–12. The largest increase was in Advanced courses, which increased from 78 percent of courses in 2006–07 to 89 percent of courses in 2011–12 taught by teachers with related backgrounds.¹

Chart 17: Courses Taught by Teachers with Related Backgrounds by Course Level by Year
Comparison of Courses by Credit Type



¹ Courses by type from 2011–12 were examined to determine the impact the methodology changes had on the results (mathematics courses taught by teachers with majors/minors in chemistry were not counted as related background and French language arts (CSAP) was removed from analysis). Small differences in the percentages occurred but did not change the trend of improvement for each course type (87 percent of Advanced courses, 82 percent of Academic courses, and 67 percent of Graduation courses).

Courses Offered in French Immersion

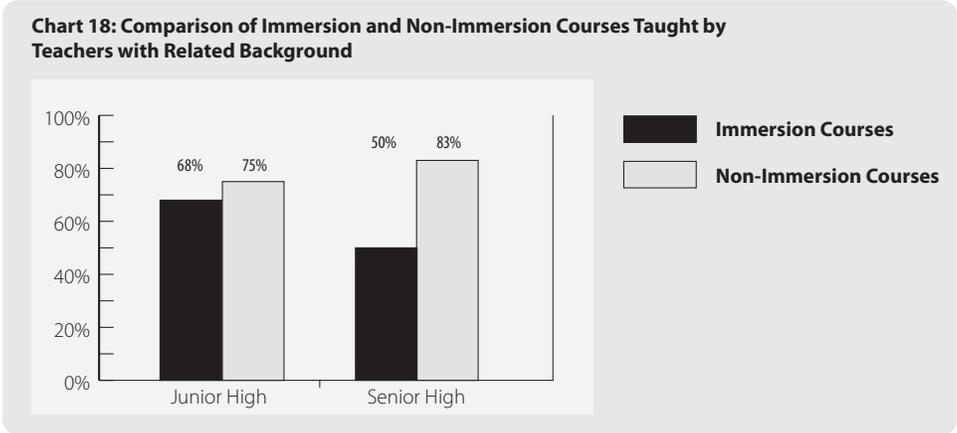
Overall, 68 percent of junior high French immersion courses and 50 percent of senior high French immersion courses were taught by teachers with a related educational background in 2011–12. Social studies and biology courses have the highest percentage of teachers with a related educational background. Mathematics (junior high), science, physical education (senior high), and history are all areas of concern with half or less of all courses being taught by teachers with an unrelated background.

Table 3: French Immersion Courses Taught by Teachers with Related Background

| | # of Courses Taught by Teachers with | | | % of Courses Taught by Teachers with a Related Major/Minor |
|--------------------|--------------------------------------|---------------------|-----------------------|--|
| | Total | Related Major/Minor | Unrelated Major/Minor | |
| Junior High | | | | |
| Mathematics | 250 | 123 | 127 | 49% |
| Social Studies | 313.5 | 307.5 | 6 | 98% |
| Science | 260 | 132 | 128 | 51% |
| Senior High | | | | |
| Physical Education | 38 | 7 | 31 | 18% |
| History | 74 | 30 | 44 | 41% |
| Biology | 40 | 38 | 2 | 95% |

Note: Junior high physical education, senior high mathematics, and senior high chemistry were only offered in one or two school boards, which offered less than ten courses in total. Due to the small number of courses offered, these subjects are not included in this analysis.

When compared to non-immersion courses, fewer immersion courses were taught by teachers with educational backgrounds related to the subject area: 68 percent compared to 75 percent at the junior high level and 50 percent compared to 83 percent at the senior high level.



Teacher Educational Background

While analysis in this report focuses on the courses taught in each subject area, additional analysis was undertaken to further examine the majors and minors of those teachers without related educational backgrounds in the four areas of concern identified. Three subject areas at the junior high level (mathematics, English language arts, and science) and one subject at the senior high level (history) have been identified as areas of concern based on the relatively low percentages of courses being taught by teachers with a related educational background.

The table below outlines the number and percentage of teachers who taught courses in 2011–12 and did not have a related educational background. The table also identifies the most frequent majors and minors of those teachers. When examining the results presented in the table below it is important to keep in mind that the numbers represent the number of *teachers* who taught in each subject area and not the number of courses. For example, junior high English language arts included 1316 courses that were taught by 500 teachers. The percentage below is related to the total number of teachers teaching in each subject area and not the number of courses as presented in other sections of this report.

| Table 4: Educational Background of Teachers in Identified Areas of Concern | | | | |
|---|---|---------------------------------|---|------------------------|
| | Junior High | | | Senior High |
| | Mathematics | English | Science | History |
| Total # of Teachers Teaching in each Subject Area | 548 | 500 | 529 | 275 |
| • # of Teachers with a Related Educational Background | 278 | 295 | 330 | 190 |
| • # of Teachers with an Unrelated Educational Background | 270 | 205 | 199 | 85 |
| % of Teachers with an Unrelated Educational Background | 49% | 41% | 38% | 31% |
| Most Common Majors of Teachers with Unrelated Educational Backgrounds | Biology Physical Education French | History French Psychology | French History Mathematics English | French English |
| Most Common Minors of Teachers with Unrelated Educational Backgrounds | English Biology French | Sociology Psychology | English French History | English Mathematics |

Conclusion

School boards have made a noticeable effort to respond to the 2007 Audit of Teaching Assignments and overall there has been an increase in the percentage of courses taught by teachers with a related academic background at the junior high and senior high levels. School board level results in teacher assignments in mathematics were especially notable at both levels. In the 2007 audit, it was reported that school boards were making considerable efforts to provide additional education opportunities for teachers who may need to upgrade, and it was anticipated that these efforts would be evident in any future analysis of teacher educational backgrounds. This report confirms that assumption.

Despite increases overall in the percentage of courses taught by teachers with a related educational background, the subject areas identified in 2007 continue to be areas of concern with the exception of mathematics at the senior high level. The courses offered at the junior high level are a particular concern, most notably in mathematics. Almost half of all mathematics courses taught at the junior high level are not taught by a teacher with a related educational background in that subject.

Examining the majors and minors of those teachers who are teaching subjects outside of their educational background indicates that most teachers have backgrounds in the social sciences. This was also true in the previous audit. This raises particular concern with respect to those teaching mathematics and science courses.

The department will continue to work with its partners on ways to improve the alignment of teacher educational backgrounds with courses taught.

References

- Barber, Michale, Chinezi Chijioke, Mona Mourshed. 2010. *How the World's Most Improved School Systems Keep Getting Better*. New York: McKinsey Company.
- Barber, Michael, and Mona Mourshed. 2007. *How the world's best performing school systems come out on top*. New York: McKinsey & Company.
- Darling-Hammond, L. 2000. "How Teacher Education Matters." *Journal of Teacher Education*. 51(3): 166–173.
- Nova Scotia Department of Education and Early Childhood Development. 2013. *Aligning Teacher Qualifications with the Learning Needs of Nova Scotian Students*. Halifax, NS: Province of Nova Scotia.
- Nova Scotia Department of Education. 2007. *Audit of Teaching Assignments: An Integrated Analysis of Teacher Educational Background and Courses Taught*. Halifax, NS: Province of Nova Scotia.
- Nova Scotia Department of Education. 2012. *Kids and Learning First: A Plan to Help Every Student Succeed*. Halifax, NS: Province of Nova Scotia.

Appendix A: Overall Results by Subject

Detailed Tables

| Junior High Subjects | | | | | | |
|----------------------|---------------------|--------------------------------------|------------------------------|-----------------------|--------------------------------------|-----------------------|
| Subject | # of Courses Taught | # of Courses Taught by Teachers with | | | % of Courses Taught by Teachers with | |
| | | Directly Related Major/Minor | Somewhat Related Major/Minor | Unrelated Major/Minor | Related Major/Minor | Unrelated Major/Minor |
| English | 1316 | 809 | 18 | 489 | 63% | 37% |
| French (CSAP) | 48 | 37 | 2 | 9 | 81% | 19% |
| Mathematics | 1310.5 | 575 | 119 | 616.5 | 53% | 47% |
| Physical Education | 1288 | 913.5 | 223 | 151.5 | 88% | 12% |
| Social Studies | 1289.5 | 699.5 | 471 | 119 | 91% | 9% |
| Science | 1281 | 665.5 | 150 | 465.5 | 64% | 36% |

| Senior High Subjects | | | | | | |
|----------------------|---------------------|--------------------------------------|------------------------------|-----------------------|--------------------------------------|-----------------------|
| Subject | # of Courses Taught | # of Courses Taught by Teachers with | | | % of Courses Taught by Teachers with | |
| | | Directly Related Major/Minor | Somewhat Related Major/Minor | Unrelated Major/Minor | Related Major/Minor | Unrelated Major/Minor |
| English | 1675 | 1350.5 | 15 | 309.5 | 82% | 18% |
| French (CSAP) | 83 | 62 | 4 | 17 | 80% | 20% |
| Mathematics | 2062 | 1525 | 118.5 | 418.5 | 80% | 20% |
| Physical Education | 691 | 486 | 61.5 | 143.5 | 79% | 21% |
| History | 599 | 355.5 | 83.5 | 160 | 73% | 27% |
| Biology | 562 | 457 | 59 | 46 | 92% | 8% |
| Chemistry | 456 | 333 | 62 | 61 | 87% | 13% |
| Physics | 300 | 150 | 116 | 34 | 89% | 11% |

Appendix B: List of Related Majors and Minors

Junior and Senior High School Courses

This table includes the majors and minors of teachers who taught courses in the identified subject areas in the 2011–12 school year. It does not represent a comprehensive list of all majors and minors that may be considered related to a subject area, as it focuses only on those teachers included in the analysis.

| Junior High: Directly Related Majors and Minors and Somewhat Related Majors and Minors | | | |
|--|--|---|---|
| Subject | Related Majors and Minors | | |
| | Directly Related Major/Minor | Somewhat Related Major/Minor | |
| English | English English Literature | Classics Humanities Theatre Studies Drama | Journalism Literacy Library |
| French (CSAP) | French | Translation Theatre | |
| Math | Mathematics | Accounting Business Administration Chemistry Commerce | Computer Science Engineering Economics Physics |
| Physical Education | Physical Education | Human Kinetics Kinesiology Recreation Studies | Health Nutrition Sport Science |
| Social Studies | Anthropology Atlantic Canadian Studies Canadian Studies Celtic Studies Community Studies Economics Geography Geology History Political Science Sociology | Business Administration English Environmental Studies French German Linguistics Literacy Marketing Mi'kmaq Studies Music Management | Nutrition Philosophy Psychology Religious Studies/ Religion and Culture Spanish Technology Theatre |
| Science | Agriculture Biology Biochemistry Chemistry Geology Kinesiology Neuroscience Physics Science | Environmental Biology Environmental Science Environmental Studies Engineering Family Studies | Home Economics Human Ecology Human Kinetics Life Sciences Nutrition Physical Education Psychology (BSc) |

| Senior High: Directly Related Majors/Minors and Somewhat Related Majors/Minors | | | |
|---|---|--|--|
| Subject | Related Majors and Minors | | |
| | Directly Related Major/Minor | Somewhat Related Major/Minor | |
| English | English English Literature | Classics Journalism Library Studies Drama | Theatre Humanities |
| French (CSAP) | French | Translation Theatre | French Second Language |
| Math | Mathematics | Computer Science Chemistry Economics | Engineering Physics |
| Physical Education | Physical Education | Human Kinetics Kinesiology Recreation | Health Nutrition |
| History | History | Anthropology Art History Canadian Studies Economics | Geography Mi'kmaq Studies Political Science Sociology |
| Biology | Biology Agriculture Animal Science Biochemistry Immunology Kinesiology Microbiology Neuroscience | Chemistry Environmental Studies Human Ecology Human Kinetics Marine Biology Nutrition Oceanography | Physical Education Psychology (BSc) Science |
| Chemistry | Chemistry Biochemistry Chemical Engineering Petroleum Engineering | Biology Neuroscience Nutrition Science | |
| Physics | Physics Engineering Meteorology | Biochemistry Chemistry Mathematics | |

