



# Retooling Teacher Certification

Bridging the Vocational-Technical Teacher Gap in Alberta

David Hunt and Brett Fawcett  
June 2024

A Cardus Research Report

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Hunt, D., and B. Fawcett. “Retooling Teacher Certification: Bridging the Vocational-Technical Teacher Gap in Alberta.” Cardus, 2024. <https://www.cardus.ca/research/education/reports/retooling-teacher-certification/>.



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## Key Points

- Alberta has long struggled with a shortage of skilled tradespeople.
- This a complex issue requiring a multifaceted solution, but one vital element of the solution is to expose more young Albertans to the trades in high school.
- Schools can increase access to these courses only if they have an adequate supply of qualified teachers.
- Alberta has too few teachers with trades expertise.
- This teacher shortage is partly, perhaps primarily, due to the current lack of flexibility in the pathways available for skilled tradespeople to become certified teachers.
- This paper recommends three ways that Alberta can improve the flexibility of these pathways, to increase the number of skilled tradespeople who become teachers.
  - Policy Option 1: Expedite BEd Process for Subject Experts
  - Policy Option 2: Integrate BEd Requirement into Flexible Training
  - Policy Option 3: Open Certification Process After Letter of Authority
- These three options are based on policy already in place in jurisdictions around the globe that rank highly for vocational education.
- Thus, the quality of education in Alberta would not be jeopardized by their implementation.

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## Introduction

Skilled tradespeople are in short supply in Alberta. Surveys by the Alberta Chamber of Commerce find that 75 to 85 percent of employers struggle to hire for technical and trades positions (welding, plumbing, carpentry, etc.).<sup>1</sup> From 2013 to 2020, apprenticeship registrations in Alberta declined 37 percent, and there will be a “significant demographic gap for trades workers [across Canada] in about fifteen years.”<sup>2</sup> (By comparison, apprentice registrations in the US are up 50 percent in the past decade.<sup>3</sup>)

This skilled-trades labour shortage is a complex issue. The Alberta legislature recently passed the *Labour Mobility Act* to make it easier for tradespeople from other provinces to have their credentials recognized in Alberta. The act came into effect in April 2023, so it is too early to assess its impact. However, all of Canada is experiencing a shortage of tradespeople.<sup>4</sup> How many skilled tradespeople would be willing to move to Alberta when there is ample work where they presently live? Attracting immigrants from other countries through the Provincial Nominee Program may provide some relief. But that program has been in effect since 1998, and it has not remedied the current shortage. Removing barriers to migration and immigration will not alone solve the problem.

Alberta has recently engaged additional initiatives: funding employer-based training to hire unemployed or underemployed Albertans,<sup>5</sup> appointing an Advisory Council of Skilled Trades Youth Ambassadors,<sup>6</sup> providing post-secondary funding to create more seats in apprenticeship classes,<sup>7</sup> funding dual credit courses for high school students,<sup>8</sup> and introducing a moving bonus for eligible skilled tradespeople who move to the province.<sup>9</sup> Each of these initiatives has a role to play.

This study suggests that in addition to these valuable efforts the province must incentivize an increased supply of teachers to give high school students greater exposure to the trades,

<sup>1</sup> The Strategic Counsel, “Hiring Intentions: Labour Shortage Survey,” A Report to Alberta Chambers of Commerce, July 2023, 16, [https://www.abchamber.ca/wp-content/uploads/2023/08/ACC-Hiring-Intentions-Labour-Shortage-Survey-07\\_23.pdf](https://www.abchamber.ca/wp-content/uploads/2023/08/ACC-Hiring-Intentions-Labour-Shortage-Survey-07_23.pdf).

<sup>2</sup> A. Usher, “Fun with Apprenticeship Registration Data,” Higher Education Strategy Associates, September 26, 2022, <https://higherstrategy.com/fun-with-apprenticeship-registration-data/>.

<sup>3</sup> D. Belkin, “More Students Are Turning Away from College and Toward Apprenticeships,” *Wall Street Journal*, March 16, 2023, <https://www.wsj.com/articles/more-students-are-turning-away-from-college-and-toward-apprenticeships-15f3a05d>.

<sup>4</sup> *Labour Mobility Act*, SA 2021, c L-0.7, <https://canlii.ca/t/bb93>; Statistics Canada, “Survey of Employers on Workers’ Skills (SEWS),” 2022, cited in E. Fissuh, K.K. Gbenyo, and A. Ogilvie, “Determinants of Skill Gaps in the Workplace and Recruitment Difficulties in Canada,” Statistics Canada, Reports on Special Business Projects, November 2022, <https://www150.statcan.gc.ca/n1/pub/18-001-x/18-001-x2022002-eng.htm>.

<sup>5</sup> Government of Alberta, “Budget 2023: Fiscal Plan 2023–26,” 2023, 68, <https://open.alberta.ca/dataset/fe2a75b5-571b-4b44-8b04-66a6d81aaba4/resource/7f532f18-4416-4b40-b387-e7d03b43d6dd/download/budget-2023-fiscal-plan-2023-26.pdf>.

<sup>6</sup> Government of Alberta, “Amplifying Young Voices in the Skilled Trades,” May 22, 2024, <https://www.alberta.ca/release.cfm?xID=90395460F8689-EB12-C614-96D2CC3A7D1D8939>.

<sup>7</sup> Government of Alberta, “Budget 2023: Fiscal Plan,” 82.

<sup>8</sup> Government of Alberta, “More Career Education for Students,” news release, April 9, 2024, <https://www.alberta.ca/release.cfm?xID=901207A734E72-AA3B-3D7B-95C38021D3FF02D2>.

<sup>9</sup> Government of Alberta, “Alberta Is Calling: Moving Bonus,” <https://www.alberta.ca/alberta-is-calling-moving-bonus>.

through well-taught, high-quality courses. The Alberta at Work Initiative, introduced in 2022, is over a \$700-million multi-year government initiative to expand opportunities in the trades by developing and expanding collegiate and charter programs, is a start, but it does not get to the root issue.<sup>10</sup> More Alberta high school students need exposure to the trades, but Alberta has too few vocational-technical (“vo-tech”) teachers to meet this goal.

## Vo-tech Teacher Shortage

Little research has been conducted on the relationship between high school students taking vo-tech courses and whether this increases their interest in a trades career.<sup>11</sup> One survey, cited by Employment and Social Development Canada, found that “14% of those who had taken a vocational course [in high school] hoped to have a future career in the trades and 77% would consider it, compared with the respective 6% and 39% of students in general.”<sup>12</sup> Whether these courses nurture a pre-existing interest or pique a new curiosity, vo-tech courses seem to help orient high school students toward careers in the trades.

Beyond vo-tech, a robust study on subject-specific coursework’s relationship with career selection found that exposure to advanced science and mathematics in high school was related to students’ interest in STEM careers.<sup>13</sup> Although this correlation should not be overstated (as the study found exposure to basic science courses did not yield a significant effect), it is reasonable to posit that such a relationship likely exists for other technical specialties, as well—such as the skilled trades.

Yet schools can make vo-tech courses available only if they have teachers with the required expertise in these fields. Recruitment and retention of these teachers is a challenge, as their trade skills are in high demand outside the classroom. Vo-tech teachers in Alberta are unique in being required to have credentials not only in education but also in their subject area. These teachers must have a four-year bachelor of education (BEd)

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<sup>10</sup> Government of Alberta, “Alberta Advantage: Alberta at Work,” <https://www.alberta.ca/alberta-at-work>.

<sup>11</sup> This paper uses the term “vo-tech” to refer to trades-related courses, which in Alberta are designated as “career and technology studies (CTS),” also known as various jurisdictions as “shop class,” “vocational education training (VET),” and “career and technical education (CTE).”

<sup>12</sup> Noria Corporation for RIGID, “Poll: Skilled Trades Rank Low in Teens’ Career Options,” *RP News Wires*, 2014, quoted in M.-A. Duessing, “Attitudes and Perceptions of Canadian Youth towards Careers in the Trades: Results from the 2012 Programme for International Student Assessment (PISA),” Employment and Social Development Canada, July 5, 2015, 18, [https://saskapprenticeship.ca/wp-content/uploads/2020/08/Attitudes-and-perceptions-of-Canadian-youth-towards-careers-in-the-trades\\_EN\\_Final-3.pdf](https://saskapprenticeship.ca/wp-content/uploads/2020/08/Attitudes-and-perceptions-of-Canadian-youth-towards-careers-in-the-trades_EN_Final-3.pdf).

<sup>13</sup> P.S. Sadler, G. Sonnert, Z. Hazari, and R. Tai, “The Role of Advanced High School Coursework in Increasing STEM Career Interest,” *Science Educator* 23, no. 1 (2014): 1–13.



degree from an approved Alberta educational institution (see the appendix for details on this process) *and* the appropriate Alberta journeyman certificate or recognized trade certificate, depending on the courses taught.

The most recent Teaching and Learning International Survey (a major OECD international survey of teachers and school leaders) found that nearly 20 percent of the Alberta high schools that offer vo-tech programs reported in 2018 that “[vo-tech] teacher shortages significantly hinder their school’s capacity to provide quality instruction,” compared to 15 percent that cited a shortage of qualified teachers in general.<sup>14</sup> These are schools that offer at least one CTS course, however. There are no data publicly available on the number of high schools that do not offer CTS courses. For those that do not, lack of qualified personnel may be the reason. In the July 2023 mandate letter to the Minister of Education, the Premier directed the Minister to “[make] recommendations on the best way to create an expedited teaching certificate to fast-track instructors of skilled trades and other professions into teaching positions in junior high and high schools.”<sup>15</sup>

The vo-tech teacher shortage is a long-standing issue, going back decades.<sup>16</sup> By 2009, the shortage was so severe that the province introduced a new program, Bridge to Certification, which is discussed below.

## Contextualizing the BEd Requirement

The BEd requirement was introduced because the best evidence found that when delivered well, teacher certification “is the best pathway for developing good teachers since it brings together subject matter expertise and knowledge about teaching and learning together to optimal effect,” leading to much of the differences in student achievement between jurisdictions.<sup>17</sup> As early as 1974 and as late as 1997, Alberta Education offered a host of “Practical Arts” or “Industrial Education” courses<sup>18</sup> to give students the opportunity to transition into full-time work upon high school graduation.<sup>19</sup> By the early 1990s,

<sup>14</sup> Organisation for Economic Cooperation and Development, TALIS 2018 Database, 2019, <http://www.oecd.org/education/talis/talis-2018-data.htm>, cited in Organisation for Economic Cooperation and Development, “Ensuring an Adequate Supply of Well-Prepared Teachers in Vocational Education and Training,” in *Teachers and Leaders in Vocational Education and Training* (Paris, OECD Publishing: 2021), 40, <https://doi.org/10.1787/5f526bb5-en>.

<sup>15</sup> Office of the Premier of Alberta, “Education Mandate Letter,” July 25, 2023, <https://open.alberta.ca/dataset/bf7f9a42-a807-49b3-8ba3-451ae3bc2d2f/resource/0ad63305-f39c-4d9a-a2a4-7c1970d2f720/download/educ-mandate-letter-education-2023.pdf>.

<sup>16</sup> For one example of many, see Alberta Teachers’ Association, “Teacher Supply and Demand Report Seriously Flawed,” *ATA Magazine* 36, no. 7 (2001): <https://legacy.teachers.ab.ca/News%20Room/ata%20news/Volume%2036/Number%207/In%20the%20News/Pages/Teacher%20supply%20and%20demand%20report%20seriously%20flawed.aspx>.

<sup>17</sup> L. Darling-Hammond, “Teacher Quality and Student Achievement: A Review of State Policy Evidence,” *Education Policy Analysis Archives* 8, no. 1 (2000): 1–44, cited in P.A. Kirschner, C. Hendrick, and J. Heal, *How Teaching Happens: Seminal Works in Teaching and Teacher Effectiveness and What They Mean in Practice* (New York: Routledge, 2022), 24–34.

<sup>18</sup> A thorough collection of programs of studies for these courses, as well as other curricular documents from Alberta’s history, can be found in the Internet Archive, University of Alberta Library, “Alberta Education Historical Curriculum Guides,” July 17, 2012, <https://archive.org/details/ualbertaeducationguides>.

<sup>19</sup> Alberta Education, “Industrial Education Manual: For Guidance to Teachers, Counsellors and Administrators,” Government of Alberta, 1983, 2-7.



however, a growing shortage of “technical workers” fuelled the desire for a different approach in Alberta high schools.<sup>20</sup> In keeping with the wider move in North America from “industrial” to “technology” courses, by 1997 the province implemented a new program of Career and Technology Studies (CTS) into the high school curriculum.<sup>21</sup> One of the goals of this curricular change was to provide more opportunity for young Albertans to explore possible career paths: a student could take welding, for example, and then choose to either pursue that track further or try a different skill instead. Either way, the student would receive credit for all courses taken.

The new CTS program, however, introduced a significant barrier to filling teaching positions: it required CTS teachers to have a BEd in addition to officially recognized training in the relevant vocational field.<sup>22</sup> How many tradespeople hold a BEd, or would be willing to pause their career, forgo their comfortable salary, and spend thousands of dollars returning to university—for multiple years? It was understandable, then, that only three years into the CTS program, Alberta Education noted that the “challenges experienced by those implementing CTS strands and courses include an increasing shortage of suitably qualified CTS teachers.”<sup>23</sup>

## Existing Levers to Address the Teacher Shortage

There are some exceptions to the requirement that teachers must have a BEd. Schools currently have three ways they can employ a teacher who does not hold a BEd degree from a recognized educational institution in Alberta.

### 1. Supervised Teaching

Schools can employ a non-certified teacher to teach a CTS course if “the requirements for supervision of non-certified instructors are met.”<sup>24</sup> The supervision is nebulously defined. In some cases, the term seems to refer broadly to general oversight (for example, superintendents “supervise” their schools per section 221(5) of the *Education Act*), while, in other cases, it refers to physical, in-person oversight (for example, this seems to be the implication when section 196(1) of the *Education Act* refers to teacher supervision of students).<sup>25</sup> The researchers’ discussions with administrators, teachers, and education leaders in Alberta have revealed conflicting interpretations of what supervision means. Some schools allow a more general oversight of a non-certificated CTS teacher by a

<sup>20</sup> *Alberta Report*, “Alberta Education Tackles the Technician Gap,” September 8, 1997, 19.

<sup>21</sup> Alberta Learning, “Promising Practices in Career and Technology Studies (CTS),” Government of Alberta, 2000, 1, <https://files.eric.ed.gov/fulltext/ED453370.pdf>.

<sup>22</sup> Alberta Education, “Guide to Career and Technology Studies (CTS),” Government of Alberta, 2013, 21, <https://open.alberta.ca/dataset/d58665e3-9622-4b63-a73e-02122f52a12d/resource/773442e8-06ef-4209-a288-92e9a1bc3c33/download/guide-to-cts.pdf>.

<sup>23</sup> Alberta Learning, “Promising Practices,” 3.

<sup>24</sup> Alberta Education, “Guide to CTS,” 9.

<sup>25</sup> *Education Act*, SA 2012, c E-0.3.

certificated teacher; others require the supervisory teacher to be physically present. Either way, the school must allocate part of another teacher's time to provide this supervision.

## 2. Letter of Authority

A second alternative is that a school board can apply to the minister of education for a Letter of Authority to allow a subject-matter expert to teach without a BEd.<sup>26</sup> While the regulations do not put any time limit on how long a Letter of Authority can be valid before expiring, in practice the letter is often viewed as a temporary solution, to be used until either a certified teacher can be found or the letter holder receives Alberta-recognized teacher training and becomes eligible for certification themselves. The government's manual for school superintendents states that Letters of Authority exist for situations in which "a school authority has been unable to recruit a certificated teacher" and that a letter "is valid for one or three years and permits individuals to teach while upgrading their credentials."<sup>27</sup> Importantly, while a letter allows the person to teach, it provides no direct pathway to certification. If the person wants to become a certified teacher, they need to acquire a BEd while they are working under the letter, and then they need two additional years of full-time work with an Interim Professional Certification. Only the post-degree hours of work count toward permanent certification.<sup>28</sup>

## 3. Bridge to Teacher Certification

The third approach is the CTS Bridge to Teacher Certification, a program created in 2009 in response to "a pressing need to recruit individuals who have appropriate technical qualifications to work in CTS classrooms."<sup>29</sup> It works as follows:<sup>30</sup>

1. A School Authority applies to Alberta Education for funding for a candidate seeking to become a CTS teacher.
2. If Alberta Education deems the candidate suitable, a conditional grant is provided to support the candidate's studies.
3. The candidate can then apply to the University of Alberta's BEd program. (A journey certificate is now valid for advanced standing of up to thirty credits.<sup>31</sup>)

<sup>26</sup> *Certification of Teachers and Teacher Leaders Regulation*, Alta Reg 123/2022, s 12, <https://canlii.ca/t/55v9q>.

<sup>27</sup> Alberta Education, "Professional Standards: Superintendent Quick Reference," Government of Alberta, October 24, 2011, 8:2, 7:4, <https://open.alberta.ca/dataset/3c27ff16-6ea9-4c7d-852a-bf8990b33acf/resource/72a9132d-b580-47ac-8d37-2289bc285846/download/5409175-2011-superintendent-quick-reference-guide-2011-10-24.pdf>.

<sup>28</sup> Association of Independent Schools and Colleges in Alberta, "Teacher Certification Handbook 2020–2021," 2020, 10, <https://www.aisca.ab.ca/wp-content/uploads/2020/08/Final-Teacher-Certification-Handbook.pdf>.

<sup>29</sup> Government of Alberta, "New Program to Increase Specialty Teachers in Alberta Classrooms," news release, September 1, 2010, <https://www.alberta.ca/release.cfm?xID=29046CDB94529-D67D-67D8-F6972BEB60E6596A>.

<sup>30</sup> Alberta Education, "Career and Technology Studies: 2024 Bridge to Teacher Certification Program," Government of Alberta, 2023, <https://www.alberta.ca/system/files/edc-2024-cts-bridging-information-guide.pdf>.

<sup>31</sup> University of Alberta, "Journey Certification," <https://www.ualberta.ca/education/programs/undergraduate-admissions/journey-certification.html>.

4. If the candidate is accepted into the program, they must take twenty-four credits for specified coursework and an additional twelve credits (fourteen weeks) of practicum. These are the Bridge to Teacher Certification’s “pre-service courses.”
5. Upon completion of the pre-service courses and dependent on having a recommendation from the School Authority that has sought their services, the candidate can receive a three-year Letter of Authority, entitling them “to be employed as a teacher whose teaching is restricted to the CTS cluster that includes their area of expertise/journey certification.”<sup>32</sup>
6. The Letter of Authority is conditional on the candidate’s agreeing to successfully complete a minimum of eighteen credits of required courses toward a complete BEd during their employment at the school.
7. Upon completion of the BEd, the candidate is granted Interim Professional Certification and is eventually, after an equivalent of two school years,<sup>33</sup> granted a Permanent Professional Certificate.

The financial support that the program provides is significant and certainly helps to mitigate the concerns that many candidates may have about suspending their income and incurring debt to become a certified teacher.

Yet there are several limitations to the Bridge to Teacher Certification. First, letter holders need to spend time studying and, in practice, working before they are entitled to any type of professional certificate. As with the Letter of Authority, the time spent teaching prior to Interim Professional Certification does not count toward permanent certification. In this case, candidates need to have practicum experience before they can even be issued a Letter, and thus there is a significant amount of distance between applying to this program and beginning to teach in a classroom—let alone making an income.

A second limitation is that candidates who have already taken preliminary courses in pedagogy and have been deemed ready to start teaching by the minister of education still need the rest of their BEd to receive certification. The difference seems to be that a Letter of Authority entitles instructors to teach a particular subject, whereas certification entitles that same instructor to teach any subject. However, is the entire BEd program necessary when competence has already been demonstrated in both subject-matter knowledge and pedagogical knowledge?

A third limitation of the program is the cap on the number of applicants who are able to go through the program. The 2024 CTS Bridging program supports up to sixteen successful applicants—previously twenty-two applicants in 2023.<sup>34</sup> While this decrease

<sup>32</sup> The official explanation of the program explicitly states that “a Letter of Authority is a short-term solution that requires the teacher to continue to complete educational courses toward qualifying for an Alberta Interim Professional Certificate” (Alberta Education, “2024 Bridge to Teacher Certification Program,” 6, 12).

<sup>33</sup> Those in the Bridge program are permitted “unrestricted teaching” in the form of a Permanent Professional Certificate “in accordance with the *Certification of Teachers and Teacher Leaders Regulation*” (Alberta Education, “2024 Bridge to Teacher Certification Program,” 6). Section 10(a) of this regulation states that only an applicant who “has completed the equivalent of 2 school years” is eligible for a permanent certificate.

<sup>34</sup> Alberta Education, “2024 Bridge to Teacher Certification Program,” 5.

may be due to a lack of interest in this program, the cap may further hinder the ability for more applicants to complete the program.

Sixteen candidates is an insufficient number, particularly when these teachers are divided into five CTS subject clusters. For example, in the 2016–17 school year (the most recent year for which relevant data are publicly available), there were 109 total enrolments in the program.<sup>35</sup> Consistent with an earlier report that fifty-six tradespeople had enrolled

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in the program's first four years, this would mean that an average of fifteen people enrol annually.<sup>36</sup> Twenty-six of those 109 participants received their Interim Professional Certification in 2017. Of that twenty-six, one was an auto mechanic, three were carpenters, and four were welders; the others were in foods or cosmetology. Of the remaining eighty-three candidates, twelve were welders, two were in construction, and one was in heavy equipment.<sup>37</sup>

Thus, it is unsurprising that after nearly a decade of the Bridge program, Alberta Education was still acknowledging the problem of “increasing demand for qualified CTS teachers” yet “limited numbers of qualified CTS teachers available to teach.”<sup>38</sup>

In summary, none of the existing levers can resolve the vo-tech teacher shortage in Alberta, as the existing pathways for vo-tech teacher certification present significant barriers to addressing this issue.

## Objectives and Criteria for Policy Options

The OECD offers three recommendations for how to address vo-tech teacher shortages.<sup>39</sup> These have been adopted as policy objectives in this paper:

1. Increase the attractiveness of teaching careers in vo-tech;

<sup>35</sup> The only other recent government data available is that seventeen applicants joined the Bridge program in 2019–20 (Alberta Education, “Education Annual Report 2019–2020,” Government of Alberta, 2020, 17, <https://open.alberta.ca/dataset/8b226e68-1227-4aec-87a5-b573f3bfb062/resource/f4747a89-c14f-4ea6-a154-d4a5bf817733/download/edc-annual-report-2019-2020.pdf>).

<sup>36</sup> C. Klingbeil, “Trades Alberta: Where Journeypersons Become Teachers,” *Edmonton Journal*, January 29, 2013, <https://edmontonjournal.com/business/trades%20alberta/trades-alberta-where-journeypersons-become-teachers>.

<sup>37</sup> Alberta Education, “Education Annual Report 2016–2017,” Government of Alberta, 2017, 122, <https://open.alberta.ca/dataset/8b226e68-1227-4aec-87a5-b573f3bfb062/resource/b71a5715-1441-4824-995f-a407e2687025/download/Alberta-Education-Annual-Report-2016-17.pdf>.

<sup>38</sup> Alberta Education, “CTS Bridge to Teacher Certification Guide: Program Information 2017–2018,” Government of Alberta, 2017, 3, <https://open.alberta.ca/dataset/855fe03b-7747-4dcf-b9e6-6f9f21948732/resource/6b3fa0d0-d829-4cda-a510-293245625821/download/cts-bridging-information-package.pdf>.

<sup>39</sup> OECD, “Ensuring an Adequate Supply.”

2. Provide flexible pathways into vo-tech teaching;
3. Attract more industry professionals to teach in vo-tech.

Each of these objectives can help increase the supply of vo-tech teachers. But in meeting these objectives, additional criteria may be helpful to evaluate policy options:

1. Quality: Does the policy option assure teacher quality (in both pedagogical knowledge and subject-matter knowledge)?
2. Cost: Is the policy option cost-neutral for taxpayers?
3. Acceptability: Is the policy option politically feasible?

## Learning from Other Jurisdictions

### Canadian Models

There are five Canadian policies that can inform our policy search. In Alberta, there is one additional exception to the levers described above, which could be expanded to other school types: registered (that is, non-funded, non-accredited) independent schools are not required to use certified teachers.<sup>40</sup> Similarly, in Ontario, independent (non-funded) schools are not required to hire certified teachers.<sup>41</sup> In British Columbia, independent schools (including those that are partially taxpayer-funded) can offer subject-restricted or school-and-subject-restricted<sup>42</sup> teaching certificates under a separate professional accreditation body.<sup>43</sup> However, all of these Canadian examples are limited to independent schools and do not require the teacher to have formal pedagogical training. Manitoba and Saskatchewan are the exceptions. Manitoba allows for two-year diplomas.<sup>44</sup> And in Saskatchewan, a certificated journeyman—with a high school diploma (or equivalent)

<sup>40</sup> D. Hunt, A. Momoh, and D. Van Pelt, “Funding All Students: A Comparative Economic Analysis of the Fiscal Cost to Support Students in Ontario Independent Schools,” Cardus, 2021, <https://www.cardus.ca/research/education/reports/the-cost-to-fund-students-in-ontario-independent-schools/>. However, teachers must be certified at accredited independent schools in Alberta.

<sup>41</sup> Hunt, Momoh, and Van Pelt, “Funding All Students.”

<sup>42</sup> A subject-restricted teaching certificate allows people who hold a post-secondary degree to teach subjects in which they have specialized post-secondary training, albeit only in independent schools. It initially authorizes a teacher to work for up to sixty months and can be converted into a non-expiring certificate after the teacher has successfully taught for the equivalent of 1.5 full-time years. As the name implies, it entitles the holder to teach only a particular subject. School- and subject-restricted certificates operate similarly but do not require the holder to possess a degree; the applicant’s life skills and practical experience can qualify them instead. The teacher is limited to teaching a particular subject and in a particular school.

<sup>43</sup> Government of British Columbia, “Independent School Teaching Certificate Requirements to Apply,” June 18, 2021, <https://www2.gov.bc.ca/gov/content/education-training/k-12/teach/become-a-teacher/types/independent-teaching-certificate/istc-requirements>.

<sup>44</sup> Manitoba Education and Early Childhood Learning, “Technology Education Program: Required and Recommended Teacher Certification Qualifications,” Government of Manitoba, <https://www.edu.gov.mb.ca/k12/cur/teched/docs/teacher-cert.pdf>; Manitoba Education and Early Childhood Learning, “Professional Certification,” Government of Manitoba, <https://www.edu.gov.mb.ca/k12/profcert/becoming-a-teacher.html>.

and sufficient technical training—can complete a four-year degree in only one year of formal teacher-training at the university level (plus a practicum), and then receive a “vocational certificate” to teach a specified subject (and related subjects).<sup>45</sup>

## European Models

The World Economic Forum’s Global Human Capital Index of 2017 ranks 130 countries on vocational education, among other indicators.<sup>46</sup> Nordic countries rank high in the list, and they generally require vo-tech teachers to have a vocational degree, bachelor degree, or master’s degree, and a six- to twelve-month course in pedagogy.<sup>47</sup> Norway, ranked number 1, allows holders of a trade certificate and relevant work experience to complete pedagogical training in one year of full-time study. The brevity of this program is intentional; it was designed to attract applicants in an effort to address a teacher shortage in these fields.<sup>48</sup> Likewise, Finland, ranked number 2, allows for easy facilitation of tradespeople-turned-teachers,<sup>49</sup> as does Sweden (ranked eighth). Specifically to address their vocational teacher shortage,<sup>50</sup> Sweden requires half the minimum credits for vocational-educator qualifications compared to other teacher qualifications,<sup>51</sup> and there is an intentional flexibility in how long it takes to complete these credits. Vocational teachers can work and teach while completing these credits; indeed, in Swedish upper secondary schools, only 56.5 percent of vocational teachers have completed all these qualification requirements—and yet they are allowed to work in this role.<sup>52</sup>

Switzerland (which ranks third in the world), Germany (sixth), and Austria (tenth) can also be examined.<sup>53</sup> Like Canada, all three are federal states, so regulations vary from one jurisdiction to another within their national borders, but these models outlined here give a general picture.

<sup>45</sup> Saskatchewan Professional Teachers Regulatory Board, “Types of Certificates,” [https://sptrb.ca/SPTRB/Certification/Types\\_of\\_Certificates/SPTRB/Certification/Types\\_of\\_Certificates.aspx?hkey=b51383a9-810d-44e0-8568-53dd4a730051](https://sptrb.ca/SPTRB/Certification/Types_of_Certificates/SPTRB/Certification/Types_of_Certificates.aspx?hkey=b51383a9-810d-44e0-8568-53dd4a730051); Saskatchewan Ministry of Education, “Teacher Classification in Saskatchewan: A Guide for School Divisions and the Conseil des écoles fransaskoises,” Government of Saskatchewan, 2022.

<sup>46</sup> World Economic Forum, “The Global Human Capital Report,” September 13, 2017, <https://www.weforum.org/reports/the-global-human-capital-report-2017/>.

<sup>47</sup> Nordic Council of Ministers, “Comparative Study of Nordic Teacher-Training Programmes,” 2009, 21, <https://doi.org/10.6027/TN2009-520>.

<sup>48</sup> R.H. Lyckander, “Exploring Vocational Teacher Preparation in Norway: A Study of Dimensions and Differences in Vocational Teacher Learning,” *Journal of Vocational Education & Training* 12, no. 2 (2022): 24–49, <https://doi.org/10.1080/13636820.2021.2007985>.

<sup>49</sup> OECD, “Ensuring an Adequate Supply.”

<sup>50</sup> I. Henning Loeb and L. Lassnigg, “Quality in Swedish and Austrian VET and VET Teacher Education: A Comparative Study,” in *Trends in Vocational Education and Training Research: Proceedings of the European Conference on Educational Research (ECER), Vocational Education and Training Network (VETNET)*, ed. C. Nägele and B.E. Stalder (Bern, Switzerland: VETNET, 2018), 180.

<sup>51</sup> Ninety credits, as opposed to at least 180 for other teacher qualifications.

<sup>52</sup> S. Antera, “Being a Vocational Teacher in Sweden: Navigating the Regime of Competence for Vocational Teachers,” *International Journal for Research in Vocational Education and Training* 9, no. 2 (2022): 271, <https://doi.org/10.13152/IJRJET.9.2.6>.

<sup>53</sup> World Economic Forum, “The Global Human Capital Report.”



In Switzerland, a tradesperson with relevant work experience does not need even the equivalent of a high school diploma, and the pedagogical training that they receive can be taken while the teacher is already employed.<sup>54</sup> One day a week is reserved for in-person pedagogy courses, and the teachers are expected to complete their coursework within their first four years in the classroom.<sup>55</sup>

In Germany, those with vocational experience can go directly into on-the-job training (i.e., already teaching in classrooms) combined with courses in pedagogy, receiving a (reduced) salary during this time and certification at the end of this one-and-a-half- to two-year process.<sup>56</sup>

In Austria, vo-tech teaching requires only the requisite work experience; pedagogical training is required only for permanent teaching positions.<sup>57</sup> This can be accomplished after already starting to work as a vo-tech teacher.<sup>58</sup>

### American Models

The United States ranks fourth on the Human Capital Index for vocational education. Like Canada and the aforementioned federal states, standards and regulations vary by jurisdiction. For instance, California, Idaho, and Utah do not require vo-tech teachers to have any education other than a high school diploma, provided that they have the necessary industrial experience.<sup>59</sup> These states grant these teachers an immediate preliminary certification, and permanent certification can be obtained after a few years of teaching and, in some cases, after taking some courses in pedagogy. Importantly, though, the time spent teaching with the preliminary certification counts toward permanent certification, and the education courses that may be required (which are not equivalent to a BEd) can be taken as soon as the person begins teaching.

<sup>54</sup> A. Wagner et al., “Attracting, Developing and Retaining Effective Teachers: Country Note: Switzerland,” Organization for Economic Co-operation and Development Directorate for Education, Education and Training Policy Division, 2004, 13–14, <https://www.oecd.org/switzerland/33684152.pdf>.

<sup>55</sup> Zurich University of Teacher Education, “Teacher Training for Secondary Level II/Vocational Education,” <https://phzh.ch/en/studies/degree-programmes/secondary-level-ii-vocational-education/>; Eidgenössische Hochschule für Berufsbildung, “Lehrperson Berufskunde (BKU) im Hauptberuf,” <https://www.ehb.swiss/bku-lehrperson-im-hauptberuf>.

<sup>56</sup> G. Halász et al., “Attracting, Developing and Retaining Effective Teachers: Country Note: Germany,” Organisation for Economic Co-operation and Development Directorate for Education, 2004, 14, <https://www.oecd.org/germany/33732207.pdf>.

<sup>57</sup> L. Lassnigg and E. Stöger, “Professionals for Vocational Education and Training in Austria: Report for the EUROPROF-Project,” Institute for Advanced Studies, 2000, 30, <https://irihs.ihs.ac.at/id/eprint/1238/1/endeuroprof.pdf>.

<sup>58</sup> E. Wagner, “Supporting Teachers and Trainers for Successful Reforms and Quality of Vocational Education and Training: Mapping Their Professional Development in the EU—Austria,” Cedefop ReferNet, 2016, [http://libserver.cedefop.europa.eu/vetelib/2016/ReferNet\\_AT\\_TT.pdf](http://libserver.cedefop.europa.eu/vetelib/2016/ReferNet_AT_TT.pdf).

<sup>59</sup> Commission on Teacher Credentialing, “Designated Subjects: Career Technical Education Teaching Credential Based on SB 1104s—Issued on or After January 1, 2009,” State of California, December 7, 2021, <https://www.ctc.ca.gov/credentials/leaflets/designated-subjects-cl-888>; Idaho Division of Career Technical Education, “Become a CTE Educator,” State of Idaho, <https://cte.idaho.gov/educators-5/become-a-cte-educator>; Utah State Board of Education, “Career and Technical Education (CTE): Educator Endorsements,” State of Utah, <https://www.schools.utah.gov/cte/educatorendorsements>.



American states also typically provide for applicants to receive pedagogical training as a condition of being allowed to teach, though each state has a different way of providing this training. For example, New Jersey allows candidates with relevant work experience but no degree to teach if they complete twenty-four hours' worth of pedagogical training "through a state-approved provider or through approved coursework at a NJ State-approved college."<sup>60</sup> Texas and Arkansas also grant certification or permits to teachers without degrees who complete specified workshops on pedagogy.<sup>61</sup> Similarly, the Southern Regional Education Board offers a "Teaching to Lead" teacher-preparation program for those entering from business and industry.<sup>62</sup>

## Recommendations

All three of the following policy options are worth implementing. They are not mutually exclusive, they each meet the objectives and evaluative criteria, and each can be readily enacted with minimal modification of the existing framework of teacher training and certification.

### Policy Option 1: Expedite BEd Process for Subject Experts

This option would allow holders of trade certificates who have relevant work experience to complete their pedagogical training (BEd equivalent) in the equivalent of one year of full-time study at any accredited Canadian school of education (or equivalent). It provides flexibility on the length of time for completion, to accommodate working professionals studying part-time. This option is similar to policy already in place in Saskatchewan and Norway.

This option meets all the objectives outlined by the OECD. In particular, it provides flexible pathways into teaching. Given that Norway is the top-ranked jurisdiction globally for vocational education, it is reasonable to conclude that quality would not be jeopardized with this option. Training costs would be borne by the teacher-in-training, and quality of pedagogy should not be jeopardized either, given the rigour of the standards.

<sup>60</sup> New Jersey Department of Education, "Certification and Induction," State of New Jersey, <https://web.archive.org/web/20211110024555/https://www.nj.gov/education/license/cte/infofaq.htm>. See also New Jersey Department of Education, "Pathways for CTE Teachers: Alternate Route Program," State of New Jersey, <https://www.nj.gov/education/certification/cte/alternate.shtml>.

<sup>61</sup> See, for example, Education Service Center Region 19, "Career and Technical Education Certification Program," <https://www.esc19.net/domain/46>; Arkansas Department of Workforce Education, "Program Policies and Procedures for Career and Technical Education," State of Arkansas, 2004, [https://www.sos.arkansas.gov/uploads/rulesRegs/Arkansas%20Register/2004/oct\\_2004/172.00.04-003.pdf](https://www.sos.arkansas.gov/uploads/rulesRegs/Arkansas%20Register/2004/oct_2004/172.00.04-003.pdf).

<sup>62</sup> Southern Regional Education Board, "Credentials for All: An Imperative for SREB States," 2015, [https://www.sreb.org/sites/main/files/file-attachments/cct\\_report.pdf?1494459159](https://www.sreb.org/sites/main/files/file-attachments/cct_report.pdf?1494459159).

## **Policy Option 2: Integrate BEd Requirement into Flexible Training**

This option would allow holders of trade certificates who have relevant work experience to begin teaching vo-tech courses part-time, with the expectation that full-time teaching positions require the completion of the Policy Option 1 pedagogical coursework. The coursework would be completed after beginning teaching and within the first four years of teaching. This option combines the approaches of Switzerland, Germany, Austria, and a number of American states.

This option, too, meets the objectives and should be particularly attractive to industry professionals. Like the first option, the jurisdictions already practicing this approach are known for the outstanding quality of vocational education, and there would be no additional taxpayer burden.

## **Policy Option 3: Open Certification Process After Letter of Authority**

This option is for vo-tech teachers who are completing the three years of teaching on a limited-scope Letter of Authority. This option would allow a supportive letter from their current principal to grant access to an Interim Professional Certification—thereby enabling them to enter the regular process toward permanent certification.

Once again, this option meets all three OECD objectives, especially the objective of increasing the attractiveness of this career, and also meets all three evaluative criteria.

## **Conclusion**

High-quality instruction requires more than good pedagogy. Subject-matter knowledge and skill are also critical—especially in the teaching of the trades. Presently, Alberta does not offer an attractive pathway for skilled tradespeople to serve with excellence in high school classrooms. An attractive pathway is critical for increasing the number of people who move from working in the skilled trades to teaching the skilled trades to high school students, thereby equipping these students with valuable skills and encouraging them to consider the skilled trades as their career.

The province should reduce the barriers noted in this report—most especially the BEd requirement in its present form—and offer the alternate pathways recommended in this paper. These pathways would help to reverse Alberta's skilled-trades labour shortage, so that not only Alberta's economy flourishes but also its people—affording more young Albertans the opportunity to explore and pursue meaningful, well-paying work in the trades and technical careers.

## Appendix

### Alberta's BEd Requirement for Teacher Certification

Teachers in Alberta need to meet the Teaching Quality Standard (TQS), which holds teachers to rules of professional practice and conduct. To try to ensure they meet this standard, Alberta Education requires that certain preconditions be met before granting certification.

Teacher certification is separated into two phases: Interim Professional Certification and Permanent Professional Certification. A teacher can receive permanent certification only if they have worked as a teacher for the equivalent of two years full-time with interim certification and have received positive evaluations from administrators who have observed them teach during that time.

In turn, interim certification, which lasts up to three years, can be granted only to graduates of “a 4 year university degree with a pre-service teacher preparation program from an approved institution.” This preparation needs to include forty-eight semester hours of coursework and ten weeks of practicum (supervised student teaching).<sup>63</sup>

For convenience, certification can be divided into three stages:

**Stage One:** *The acquisition of a BEd.* This can be either a four-year BEd for elementary generalists or secondary specialists, or a two-year after-degree for those who already have an undergraduate degree. This includes pedagogical training and supervised practicum experience. Nothing at this stage counts toward certification but is a necessary prerequisite to certification.

**Stage Two:** *Interim Professional Certification.* This entitles a person to be employed as a teacher at an Alberta-accredited school, and hours spent teaching during this time count toward permanent certification. Certificate holders must be observed and assessed multiple times a year by their administrators to ensure that their teaching and planning matches TQS standards. Interim certification lasts up to three years, but teachers can progress to permanent certification after only two years.

**Stage Three:** *Permanent Professional Certification.* After a minimum of two years of interim certification, Alberta Education grants permanent certification if the requisite number of teaching hours have been completed and the teacher's administrators recommend them. Teachers holding permanent certification are entitled to teach in Alberta for life, unless the minister of education withdraws the certification for gross TQS violations.

<sup>63</sup> Alberta Education, “Teacher Certification,” Government of Alberta, 2023, <https://www.alberta.ca/teacher-certification.aspx>.

## References

- Alberta Education. "Career and Technology Studies: 2024 Bridge to Teacher Certification Program." 2023. <https://www.alberta.ca/system/files/edc-2024-cts-bridging-information-guide.pdf>.
- . "CTS Bridge to Teacher Certification: Program Information 2017–2018." Government of Alberta, 2017. <https://open.alberta.ca/dataset/855fe03b-7747-4dcf-b9e6-6f9f21948732/resource/6b3fa0d0-d829-4cda-a510-293245625821/download/cts-bridging-information-package.pdf>.
- . "Education Annual Report 2016–2017." Government of Alberta, 2017. <https://open.alberta.ca/dataset/8b226e68-1227-4aec-87a5-b573f3bfb062/resource/b71a5715-1441-4824-995f-a407e2687025/download/Alberta-Education-Annual-Report-2016-17.pdf>.
- . "Education Annual Report 2019–2020." Government of Alberta, 2020. <https://open.alberta.ca/dataset/8b226e68-1227-4aec-87a5-b573f3bfb062/resource/f4747a89-c14f-4ea6-a154-d4a5bf817733/download/edc-annual-report-2019-2020.pdf>.
- . "Guide to Career and Technology Studies (CTS)." 2013. <https://open.alberta.ca/dataset/d58665e3-9622-4b63-a73e-02122f52a12d/resource/773442e8-06ef-4209-a288-92e9a1bc3c33/download/guide-to-cts.pdf>.
- . "Industrial Education Manual: For Guidance to Teachers, Counsellors and Administrators." Government of Alberta, 1983.
- . "Professional Standards: Superintendent Quick Reference." October 24, 2011. <https://open.alberta.ca/dataset/3c27ff16-6ea9-4c7d-852a-bf8990b33acf/resource/72a9132d-b580-47ac-8d37-2289bc285846/download/5409175-2011-superintendent-quick-reference-guide-2011-10-24.pdf>.
- . "Teacher Certification." Government of Alberta, 2023. <https://www.alberta.ca/teacher-certification.aspx>.
- Alberta Learning. "Promising Practices in Career and Technology Studies (CTS)." Government of Alberta, 2000. <https://files.eric.ed.gov/fulltext/ED453370.pdf>.
- Alberta Report*. "Alberta Education Tackles the Technician Gap." September 8, 1997.
- Alberta Teachers' Association. "Teacher Supply and Demand Report Seriously Flawed." *ATA Magazine* 36, no. 7 (2001): <https://legacy.teachers.ab.ca/News%20Room/ata%20news/Volume%2036/Number%207/In%20the%20News/Pages/Teacher%20supply%20and%20demand%20report%20seriously%20flawed.aspx>.
- Antera, S. "Being a Vocational Teacher in Sweden: Navigating the Regime of Competence for Vocational Teachers." *International Journal for Research in Vocational Education and Training* 9, no. 2 (2022): 269–93. <https://doi.org/10.13152/IJRVET.9.2.6>.
- Arkansas Department of Workforce Education. "Program Policies and Procedures for Career and Technical Education." State of Arkansas, 2004. [https://www.sos.arkansas.gov/uploads/rulesRegs/Arkansas%20Register/2004/oct\\_2004/172.00.04-003.pdf](https://www.sos.arkansas.gov/uploads/rulesRegs/Arkansas%20Register/2004/oct_2004/172.00.04-003.pdf).

- Association of Independent Schools and Colleges in Alberta. “Teacher Certification Handbook 2020–2021.” 2020. <https://www.aisca.ab.ca/wp-content/uploads/2020/08/Final-Teacher-Certification-Handbook.pdf>.
- Belkin, D. “More Students Are Turning Away from College and Toward Apprenticeships.” *Wall Street Journal*, March 16, 2023. <https://www.wsj.com/articles/more-students-are-turning-away-from-college-and-toward-apprenticeships-15f3a05d>.
- Commission on Teacher Credentialing. “Designated Subjects: Career Technical Education Teaching Credential Based on SB 1104—Issued on or After January 1, 2009.” State of California, December 7, 2021. [https://www.ctc.ca.gov/credentials/leaflets/designated-subjects-\(cl-888\)](https://www.ctc.ca.gov/credentials/leaflets/designated-subjects-(cl-888)).
- Darling-Hammond, L. “Teacher Quality and Student Achievement: A Review of State Policy Evidence.” *Education Policy Analysis Archives* 8, no. 1 (2000): 1–44.
- Duessing, M.-A. “Attitudes and Perceptions of Canadian Youth Towards Careers in the Trades: Results from the 2012 Programme for International Student Assessment (PISA).” Employment and Social Development Canada, July 5, 2015. [https://saskapprenticeship.ca/wp-content/uploads/2020/08/Attitudes-and-perceptions-of-Canadian-youth-towards-careers-in-the-trades\\_EN\\_Final-3.pdf](https://saskapprenticeship.ca/wp-content/uploads/2020/08/Attitudes-and-perceptions-of-Canadian-youth-towards-careers-in-the-trades_EN_Final-3.pdf).
- Education Service Center Region 19. “Career and Technical Education Certification Program.” <https://www.esc19.net/domain/46>.
- Eidgenössische Hochschule für Berufsbildung. “Lehrperson Berufskunde (BKU) im Hauptberuf.” <https://www.ehb.swiss/bku-lehrperson-im-hauptberuf>.
- Fissuh, E., K.K. Gbenyo, and A. Ogilvie. “Determinants of Skill Gaps in the Workplace and Recruitment Difficulties in Canada.” Statistics Canada, Reports on Special Business Projects, November 2022. <https://www150.statcan.gc.ca/n1/pub/18-001-x/18-001-x2022002-eng.htm>.
- Government of Alberta. “Alberta Advantage: Alberta at Work.” <https://www.alberta.ca/alberta-at-work>.
- . “Alberta Advantage: Alberta at Work.” <https://www.alberta.ca/alberta-at-work>.
- . “Amplifying Young Voices in the Skilled Trades.” May 22, 2024. <https://www.alberta.ca/release.cfm?xID=90395460F8689-EB12-C614-96D2CC3A7D1D8939>.
- . “Budget 2023: Fiscal Plan 2023–26.” 2023. <https://open.alberta.ca/dataset/fe2a75b5-571b-4b44-8b04-66a6d81aaba4/resource/7f532f18-4416-4b40-b387-e7d03b43d6dd/download/budget-2023-fiscal-plan-2023-26.pdf>.
- . “New Program to Increase Specialty Teachers in Alberta Classrooms.” News release, September 1, 2010. <https://www.alberta.ca/release.cfm?xID=29046CDB94529-D67D-67D8-F6972BEB60E6596A>.
- . “More Career Education for Students.” News release, April 9, 2024. <https://www.alberta.ca/release.cfm?xID=901207A734E72-AA3B-3D7B-95C38021D3FF02D2>.
- Government of British Columbia. “Independent School Teaching Certificate Requirements to Apply.” June 18, 2021. <https://www2.gov.bc.ca/gov/content/education-training/k-12/teach/become-a-teacher/types/independent-teaching-certificate/istc-requirements>.

- Halász, G., P. Santiago, M. Ekholm, P. Matthews, and P. McKenzie. “Attracting, Developing and Retaining Effective Teachers: Country Note: Germany.” Organisation for Economic Co-operation and Development Directorate for Education, 2004. <https://www.oecd.org/germany/33732207.pdf>.
- Henning Loeb, I., and L. Lassnigg. “Quality in Swedish and Austrian VET and VET Teacher Education: A Comparative Study.” In *Trends in Vocational Education and Training Research: Proceedings of the European Conference on Educational Research (ECER), Vocational Education and Training Network (VETNET)*, edited by C. Nägele and B.E. Stadler, 173–82. Bern, Switzerland: VETNET, 2018.
- Hunt, D., A. Momoh, and D. Van Pelt. “Funding All Students: A Comparative Economic Analysis of the Fiscal Cost to Support Students in Ontario Independent Schools.” Cardus, 2021. <https://www.cardus.ca/research/education/reports/the-cost-to-fund-students-in-ontario-independent-schools/>.
- Idaho Division of Career Technical Education. “Become a CTE Educator.” State of Idaho. <https://cte.idaho.gov/educators-5/become-a-cte-educator>.
- Kirschner, P.A., C. Hendrick, and J. Heal. *How Teaching Happens: Seminal Works in Teaching and Teacher Effectiveness and What They Mean in Practice*. New York: Routledge, 2022.
- Klingbeil, C. “Trades Alberta: Where Journeypersons Become Teachers.” *Edmonton Journal*, January 29, 2013. <https://edmontonjournal.com/business/trades%20alberta/trades-alberta-where-journeypersons-become-teachers>.
- Lassnigg, L., and E. Stöger. “Professionals for Vocational Education and Training in Austria: Report for the EUROPROF–Project.” Institute for Advanced Studies, 2000. <https://irihs.ihs.ac.at/id/eprint/1238/1/endeuroprof.pdf>.
- Lyckander, R.H. “Exploring Vocational Teacher Preparation in Norway: A Study of Dimensions and Differences in Vocational Teacher Learning.” *Journal of Vocational Education & Training* 12, no. 2 (2022): 24–49. <https://doi.org/10.1080/13636820.2021.2007985>.
- Manitoba Education and Early Childhood Learning. “Professional Certification.” Government of Manitoba. <https://www.edu.gov.mb.ca/k12/profcert/becoming-a-teacher.html>.
- . “Technology Education Program: Required and Recommended Teacher Certification Qualifications.” Government of Manitoba. <https://www.edu.gov.mb.ca/k12/cur/teched/docs/teacher-cert.pdf>.
- New Jersey Department of Education. “Certification and Induction.” State of New Jersey. <https://web.archive.org/web/20211110024555/https://www.nj.gov/education/license/cte/infofaq.htm>.
- . “Pathways for CTE Teachers: Alternate Route Program.” State of New Jersey. <https://www.nj.gov/education/certification/cte/alternate.shtml>.
- Noria Corporation for RIGID. “Poll: Skilled Trades Rank Low in Teens’ Career Options.” *RP News Wires*, 2014.
- Nordic Council of Ministers. “Comparative Study of Nordic Teacher-Training Programmes.” 2009. <https://doi.org/10.6027/TN2009-520>.



- Office of the Premier of Alberta. "Education Mandate Letter." July 25, 2023. <https://open.alberta.ca/dataset/bf7f9a42-a807-49b3-8ba3-451ae3bc2d2f/resource/0ad63305-f39c-4d9a-a2a4-7c1970d2f720/download/educ-mandate-letter-education-2023.pdf>.
- Organisation for Economic Co-operation and Development. "Ensuring an Adequate Supply of Well-Prepared Teachers in Vocational Education and Training." In *Teachers and Leaders in Vocational Education and Training*. Paris: OECD Publishing, 2021. <https://doi.org/10.1787/5f526bb5-en>.
- . TALIS 2018 Database, 2019. <http://www.oecd.org/education/talis/talis-2018-data.htm>.
- Sadler, P.S., G. Sonnert, Z. Hazari, and R. Tai. "The Role of Advanced High School Coursework in Increasing STEM Career Interest." *Science Educator* 23, no. 1 (2014): 1–13.
- Saskatchewan Professional Teachers Regulatory Board. "Types of Certificates." [https://sptrb.ca/SPTRB/Certification/Types\\_of\\_Certificates/SPTRB/Certification/Types\\_of\\_Certificates.aspx?hkey=b51383a9-810d-44e0-8568-53dd4a730051](https://sptrb.ca/SPTRB/Certification/Types_of_Certificates/SPTRB/Certification/Types_of_Certificates.aspx?hkey=b51383a9-810d-44e0-8568-53dd4a730051).
- Southern Regional Education Board. "Credentials for All: An Imperative for SREB States." 2015. [https://www.sreb.org/sites/main/files/file-attachments/cct\\_report.pdf?1494459159](https://www.sreb.org/sites/main/files/file-attachments/cct_report.pdf?1494459159).
- Statistics Canada. "Survey of Employers on Workers' Skills (SEWS)." 2022. <https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&Id=1369712>.
- The Strategic Counsel. "Hiring Intentions: Labour Shortage Survey." Report to Alberta Chambers of Commerce, July 2023. [https://www.abchamber.ca/wp-content/uploads/2023/08/ACC-Hiring-Intentions-Labour-Shortage-Survey-07\\_23.pdf](https://www.abchamber.ca/wp-content/uploads/2023/08/ACC-Hiring-Intentions-Labour-Shortage-Survey-07_23.pdf).
- University of Alberta. "Journey Certification." <https://www.ualberta.ca/education/programs/undergraduate-admissions/journey-certification.html>.
- University of Alberta Library, "Alberta Education Historical Curriculum Guides." July 17, 2012. <https://archive.org/details/ualbertaeducationguides>.
- Usher, A. "Fun with Apprenticeship Registration Data." Higher Education Strategy Associates, September 26, 2022. <https://higherstrategy.com/fun-with-apprenticeship-registration-data/>.
- Utah State Board of Education. "Career and Technical Education (CTE): Educator Endorsements." State of Utah. <https://www.schools.utah.gov/cte/educatorendorsements>.
- Wagner, A., P. Santiago, C. Thieme, and D. Zay. "Attracting, Developing and Retaining Effective Teachers: Country Note: Switzerland." Organization for Economic Co-operation and Development Directorate for Education, Education and Training Policy Division, 2004. <https://www.oecd.org/switzerland/33684152.pdf>.
- Wagner, E. "Supporting Teachers and Trainers for Successful Reforms and Quality of Vocational Education and Training: Mapping Their Professional Development in the EU–Austria." Cedefop ReferNet, 2016. [http://libserver.cedefop.europa.eu/vetelib/2016/ReferNet\\_AT\\_TT.pdf](http://libserver.cedefop.europa.eu/vetelib/2016/ReferNet_AT_TT.pdf).
- World Economic Forum. "The Global Human Capital Report." September 13, 2017. <https://www.weforum.org/reports/the-global-human-capital-report-2017/>.
- Zurich University of Teacher Education. "Teacher Training for Secondary Level II/Vocational Education." <https://phzh.ch/en/studies/degree-programmes/secondary-level-ii-vocational-education/>.