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Original Article

Long-Haul Truck Driver Training Does Not Meet Driver Needs in Canada

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ABSTRACT

Introduction: Training standards for long-haul truck drivers (LHTD) are rapidly evolving in Canada, yet the opinions of the drivers themselves have not been adequately considered. The purpose was to survey LHTD on their work training history and to examine LHTD perceptions of driver training and licensing protocols.
Methods: LHTD were recruited across two Western Canadian provinces from seven different truck stops. The sample completed 207 surveys and 67 semi-structured interviews.
Results: The average age of the participants was 52.5 ± 11.5 years (range 24–79); 96% were men. Approximately 33% of the LHTD had at least one crash. Those who did not receive formal driver training were significantly more likely to crash than those who had received training. Participants stated that current training standards are inadequate for the industry, particularly for new drivers. According to participants, entry-level curriculums should consist of both classroom and practical training, as well as on-road observation with a senior mentor. LHTD reported that many new drivers are not equipped to drive in various contexts and settings (e.g., mountains, slippery roads).
Conclusions: LHTD are not confident in the current training guidelines for novice truck drivers. Revisions to the training curriculum and standardization across Canada should be considered.
Practical Application: A federal mandatory entry-level training program is needed in Canada to ensure that all new LHTD ascertain the necessary skills to drive safely. Such a program requires government involvement and input from LHTD to facilitate appropriate licensure and consistent training for all drivers.

1. Introduction

The commercial motor vehicle sector is the second most common occupation among men [1] with more than 300,000 long-haul truck drivers (LHTD) employed in Canada [2]. LHTD operate motor vehicles (not including buses) with a registered weight of more than 4,500 kg [3] and drive further than 160 km from their home terminal, with trips often lasting for a week or longer [4]. Although commercial vehicles only represent 2.3% of registered motor vehicles [5], they account for 6% of vehicle collisions and 21.5% of fatal crashes [3]. Of these fatal crashes, more than 50% involve LHTD [3].

Driver error is the strongest predictor for at-fault crashes in LHTD, most commonly caused by recognition (e.g., perception, distraction, and fatigue) and decision errors (e.g., risk perception, risk-taking, aggressive driving, and judgment problems) [6–10]. Additionally, studies show that crashes are often caused by speeding, aggressive driving behavior [9], following other vehicles too closely [6,9], and misjudging the speed of other vehicles [6]. Heavy truck drivers killed or injured in crashes, including LHTD, were more likely to be between the ages of 26–45 years old [9]. Given the strong association between truck driver error and crash risk, particularly in young drivers, truck driver training should be

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adequate to prepare new LHTD for facing typical road and work-related conditions that may be related to crashes.

In Canada, commercial truck driving is under provincial and territorial jurisdiction except for rules and regulations under the Motor Vehicle Transport Act (MVTA), which is administered by Transport Canada [11]. The MVTA includes regulations on Hours of Service, as well as the motor carrier safety fitness certificate regulations [11]. The federal government has also collaborated with provincial/territorial governments to establish and maintain the National Safety Code; a set of 16 standards, including the standardization of knowledge and performance tests for obtaining commercial licenses [12,13]. However, no federal regulations exist on the content and/or duration of LHTD training (under provincial jurisdiction).

Only the province of Ontario has mandatory entry-level training [14]. This program involves 103.5 hours of classroom (36.5 hours), in-yard (17 hours), and behind-the-wheel (50 hours: 32 on-road, 18 off-road) components, which translates to 2.5 weeks of full-time training [15]. Other provinces have the option of providing LHTD training; however, it is not mandatory. For example, drivers in Quebec can have either 36 months of experience as a Class 5 driver (two-axle automobile weighing less than 4,500 kg) or 24 months of experience with either a Diploma of Vocational Studies in truck transportation or 300 hours of in-classroom training and 40 hours of driving through a truck driving school [16]. In Newfoundland and Labrador, truck drivers can be licensed if they pass the on-road exam without participating in any formal training or school [17].

In 2017, commercial licensing standards in Alberta were evaluated by independent consultants to identify opportunities for improvement [13]. At that time, a truck driver license was granted if an individual was 18 years of age or older, passed a vision test and a medical exam, and passed a knowledge and practical test; however, training was not mandatory [18]. Alberta was the only province in Canada to have a privatized driving examination model for truck driver licensing where the road test was executed by non-government companies [18]. A survey was conducted with 247 individuals from the Alberta Motor Transportation Association, 37 of which were commercial drivers, with the rest of the participants being managers, supervisors, training personnel, and other industry affiliates [13]. Only 5% of the 37 commercial drivers thought that the driver training program was sufficient to foster a safe environment for commercial driving [13]. These findings were corroborated by surveyed managers and training staff [13].

Provincial jurisdictions have consulted stakeholders in the revisions of truck driver training regulations. For example, in 2018, the government of Alberta received feedback from over 3,300 stakeholders and the general public; the stakeholders consulted included representatives of truck driver training programs, commercial truck/bus companies, and other industry affiliates such as driver examiners and registry agents [19]. However, of the 3,300 individuals that participated, only 220 were consulted during the stakeholder sessions, and it is unclear how many of those were LHTD [19]. The structure and content of the training programs are largely determined by policymakers; however, the input of the primary target group (the drivers themselves) has often not been solicited. Thus, the purpose of this study was to (1) survey LHTD on their job training history and (2) examine LHTD perceptions of driver training and licensing protocols.

2. Materials and methods

2.1. Protocol

The study was approved by the Research Ethics Board at the University of Saskatchewan.

Data were collected from August to November 2018 from five truck stops in Alberta (Lloydminster, two truck stops in Edmonton, Red Deer, and Calgary) and two in Saskatoon, Saskatchewan. Managers from truck stops provided permission for the research team to advertise and conduct data collection at each site. Truck drivers were approached by the researchers when entering the truck stop inquiring whether they were a LHTD working in Canada and if they wanted to participate in the research study. Participants were invited to complete a self-administered survey or participate in a semi-structured interview, or both. Data collection was performed in a common space at the truck stops, often a restaurant or lounge area. Each participant signed informed consent prior to participation.

The survey was adapted to a Canadian context from a prior US-based study that examined the health and wellness of LHTD [20]. In addition to demographic information, the survey inquired about their years of experience, training, and crash history. On average, the survey took participants 30 minutes to complete with each participant receiving a 20-dollar cash honorarium for completing the survey.

Following the survey, participants were asked to participate in a semi-structured one-on-one interview. Participants were asked open-ended questions on truck driver training, including their personal training history; their perception on currently available training; the issues surrounding truck driver training; and their recommendations for improvements. The researchers utilized probes to gain further information when answers were vague or undetailed. Using a semi-structured guide developed by the research team, the interviews, on average, lasted 30 minutes, ranging from 15 minutes to an hour, and were audio-recorded. Each participant received a 10-dollar cash honorarium for completing the interview.

2.2. Participants

LHTD were recruited to participate if they (1) were Canadian, (2) had a Class 1 driver's license (or equivalent), and (3) had spent at least one night away from home while delivering a load at the time of recruitment. The sample completed 207 surveys and 67 interviews. Of these, 67 completed both the survey and interview while 140 completed just the survey.

2.3. Data analysis

Survey data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 25. Continuous variables were presented using mean and standard deviation (mean $\pm$ SD) and range. Categorical variables were presented using frequencies and percentages. An analysis of variance (ANOVA) and Tukey post-hoc tests were conducted to determine differences between continuous and multicategorical variables.

All interviews were recorded and transcribed verbatim by the Social Sciences Research Laboratories at the University of Saskatchewan. Analyses of all the interviews were performed using Nvivo 11. Interview data were analyzed thematically, which involved identifying and recording patterns within the data, which pertained to the research question of truck driver training. Initial codes were developed deductively based on the research questions. Subsequent categories and eventual themes were developed by identifying commonalities within the data and organizing information into increasingly specific groups. Two coders were utilized during analyses; one identified the initial codes and categories and the other confirmed the accuracy of these codes and categories and identified the final themes. Upon noticing that no supplementary information was being gained from subsequent interviews, it was

determined that saturation was achieved, and data collection was concluded [21–23].

3. Results

3.1. Sample description

The mean age of the participants who completed the survey only was 52.5 ± 11.5 (range 24–89); 96% were men (see Table 1). This was similar to those who completed both the survey and the interview; the mean age was 53.0 ± 12.9 years, range 23–89; 95% were men. The participants worked as LHTD for an average of 22.8 ± 15.7 years (range 0.5 to 56). Almost two-thirds worked for companies (65.7%) while others were owner-operators leased to companies (26.5%) or owner-operators who operated under their own authority (5.9%). Approximately 33% of LHTD reported having a crash during their careers, with an average of 1.95 ± 2.27 (range 0–9) crashes. Drivers experienced their first crash, on average, at age 35.9 ± 11.7 years (range 19–67). There were no significant age differences when LHTD experienced their first crash or in their total number of crashes.

3.1.1. Training history

As shown in Table 2, almost half of the participants (48.3%) received training from a private trucking school; 18.3% received training from a family member or other; 11.6% were trained by their trucking company; 5.8% attended a public or technical school; and 3.9% were trained by the military. Nearly one-fifth (17.4%) did not receive any formal training. The ANOVA and subsequent Tukey post-hoc tests show that LHTD who did not receive training were involved in significantly more crashes than those who received training (1.4 ± 2.5 vs. 0.52 ± 1.0; $p = 0.016$) and approached significance in those who believed they did not receive adequate training (0.62 ± 0.97; $p = 0.052$), after controlling for age and gender. When asked specifically whether they had received enough training to safely handle and secure their cargo, 93.2% reported having adequate training.

Participants were also asked whether they have received training on a variety of topics in a classroom setting within the past year. Participants reported receiving training on federal trucking safety regulations (60.4%), safe/defensive driving practices (60.2%), proper lifting techniques (55.0%), fall prevention (50.8%), vehicle maintenance and safety checks (68.9%), security procedures and awareness (64.6%), and assault prevention (25.6%).

Table 1
Sample description

Variable	$N = 207$
Age	52.5 ± 11.5 (24–89)
Gender	
Men	195 (96.5%)
Women	7 (3.5%)
Years of experience	22.8 ± 15.7 (0.5–56)
Employment	
Company employee	134 (67%)
Independent owner-operator	12 (6%)
Leased owner-operator	54 (27%)
Crashes	
Yes	64 (33.3%)
No	128 (66.7%)
Number of crashes	1.95 ± 2.27 (0–9)
Age of first crash	35.9 ± 11.7 (19–67)

Note: Continuous variables are shown as mean ± SD (range).
Categorical variables are shown as frequencies (%).

Table 2
Training history

Variable	Frequency (%)
Prior Training*	
Private trucking school	100 (48.3%)
Public or technical school	12 (5.8%)
Company training	24 (11.6%)
Military	8 (3.9%)
Family members	38 (18.3%)
Did not receive training	36 (17.4%)
Enough training to drive under all road/weather conditions	
Yes	106 (56.7)
No	81 (43.3)
Enough training to safely handle and secure cargo	
Yes	178 (93.7)
No	12 (6.3)
Classroom training in the last 12 months	
Federal regulation concerning trucking safety	
Yes	116 (60.4)
No	76 (39.6)
Safe driving practices and/or defensive driving	
Yes	115 (60.2)
No	76 (39.8)
Proper lifting techniques	
Yes	104 (55.0)
No	85 (45.0)
Fall prevention	
Yes	96 (50.8)
No	93 (49.2)
Vehicle maintenance and safety checks	
Yes	131 (68.9)
No	59 (31.1)
Security procedures and awareness	
Yes	122 (64.6)
No	67 (35.4)
Assault prevention	
Yes	46 (25.6)
No	134 (74.4)

* Participants could select all response options; frequencies (%) are for each response option.

3.2. Interview results

3.2.1. Classroom training

In the interviews, when asked about available driver training options, participants expressed that they were skeptical of classroom-exclusive training. They did not believe that classroom training properly prepares trainees for the occupation as training schools often teach drivers how to pass the written and practical tests rather than develop the necessary practical skills, such as reversing and breaking, which is associated with behind-the-wheel training.

> *As far as training our drivers, yeah, we have to train them. They have to have behind-the-wheel training, it cannot be learned in a classroom.*—Participant 9

> *The training programs that they have, the stuff that they teach the guys is just bare minimum to get them, give me money and get out of my school kind of thing, it's just not enough, they need more.*—Participant 26

> *It could be better, there are some driving schools but from what I've seen all they teach them is the rules of the log-book and the basics to get your driver's license.*—Participant 76

While some drivers were skeptical of classroom training, they did recognize that it has a place in truck driver education. Participants mentioned that it should be longer and paired with practical training.

Nowadays (training) has got to be a combination of classroom and driving.—Participant 37

What they should do is a minimum term of schooling, not just a one-week, two-week course. It should be longer. More in-depth on the knowledge of the paper work involved such as border crossings, legalities between provinces, and states as well as driver training and practicing.—Participant 55

They should have a lot more classroom time and a lot more training time on the highway.—Participant 63

3.2.2. Practical training

The participants noted that certain topics should be more emphasized during the practical training. Some of these key skills included backing-up, air brakes, load securement, learning how to maneuver with full and empty trailers, and training on completing pre-trip inspections.

More behind-the-wheel time. More pre-trip inspections. More backing.—Participant 8

A lot of companies train their drivers in chain schools and give them an empty trailer and they teach them how to drive and then they go. Poof, they're done. Then the company comes in- "well here is 60 0000 lbs., good luck!" And they do not know how to stop it.—Participant 35

You need longer training. You need more road time. I think they only allow 10 or 20 hours for learning how to back-up. You're 70 feet long! You need more time learning how to back-up.—Participant 56

One of the key features mentioned for the practical training was how to handle driving in different contexts. LHTD reported the need to practice driving in a wide variety of contexts such as the plains, mountains, and winding roads. LHTD also mentioned the need for new drivers to practice driving in traffic congestion, particularly in large cities that have multiple lane highways. Additionally, drivers emphasized that training ought to encompass exposure to driving in different weather conditions such as on ice and in fog (when visibility is reduced) and at night.

You have to be able to drive that truck in different conditions. Driving a truck around the city here is not the same as driving a truck over the Coquihalla highway in the middle of the winter.—Participant 9

Give you lots of scenarios … take a trip to the mountains. Winter driving, okay. Umm, hills, hills, and ice roads and city, urban driving and all kinds of- night driving is another one.—Participant 15

Our participants suggested options to prepare for these circumstances such as required training during the winter months and training using a driving simulator. Additionally, participants suggested extended mentorship programs or that training modules be offered by employers. Any of these options would provide truck drivers the opportunity to learn how to act in unideal conditions and receive feedback.

They should have training for minimum two months, which includes some sort of professional schools who can do artificial road driving and do driving in rain, snow, and night.—Participant 43

I think, even once they've got their license they should at least be with another driver, whether it be following them or being trained in the same truck for a minimum of a year. That way you get through all four seasons.—Participant 59

I wish companies would provide more on the job training because I took a two-week course … in the summer; you didn't get to do any winter driving.—Participant 68

3.2.3. Length of the training program

For the questions probing the drivers' opinion on the length of training programs currently being offered, approximately a quarter of the respondents (23%) stated that the number of hours is insufficient for the industry.

When I see these guys coming out of schools today, it's a friggin joke. They're handed a key after 2 weeks of training to a Super B, the heaviest equipment you can drive on the road without extra permits and these guys are going down the road after 2 weeks of training.—Participant 22

There are too many people that get given their license, 2 weeks and go. They don't have a clue, they're dangerous.—Participant 52

They should never be sent on a highway with 2 weeks of school. They should do it in a long gradual way.—Participant 66

Overall, the participants felt that a training program requires both in-classroom and practical components to prepare new industry drivers. While the drivers did not mention the number of hours for in-classroom versus practical training, they suggested the length of the training program should be between 8 and 12 weeks (Fig. 1).

A minimum program of maybe 10 weeks, and then they would go with an experienced driver.—Participant 8

I did 7 weeks of training. I don't think it's long enough. I think it should be a minimum of 12 weeks.—Participant 56

They should at least take a full course, a full course which is 8 weeks, and then find a company that hires new drivers but put it as a trainee for a couple of weeks to make sure he's good.—Participant 77

I had eight weeks of training and it was good. I'm glad I went through it. I think it made me a better driver for it; just having the on-road experience.—Participant 87

3.2.4. Mentorship

At the conclusion of this 8–12-week blended learning period, almost a third of participants (31%) said that new drivers should accompany a more senior driver to learn and gain experience on the road. They viewed this as an essential process for trainees to better build their skills in a safe environment that is conducive for asking questions.

Sticking with a 14 hour day to show technique, to show practice and safe procedure. And go over a few things for a few hours, then switch seats and put the new person in the chair and let them drive and try out the techniques so that they have more, better-developed skills.—Participant 14

Have them go out with a guy like myself or somebody who's got experience and have that person show that person what to do, don't let them just sit at the wheel and the other guy's sitting there yacking at you, telling you what to do, show them how to do it. And that'll be the biggest difference.—Participant 22

You need a lot of hours driving on the road with an instructor, on the side, backing up, hooking, un-hooking, doing everything right in the middle of a city. Not just drive around the countryside and you pass, here's your license.—Participant 65

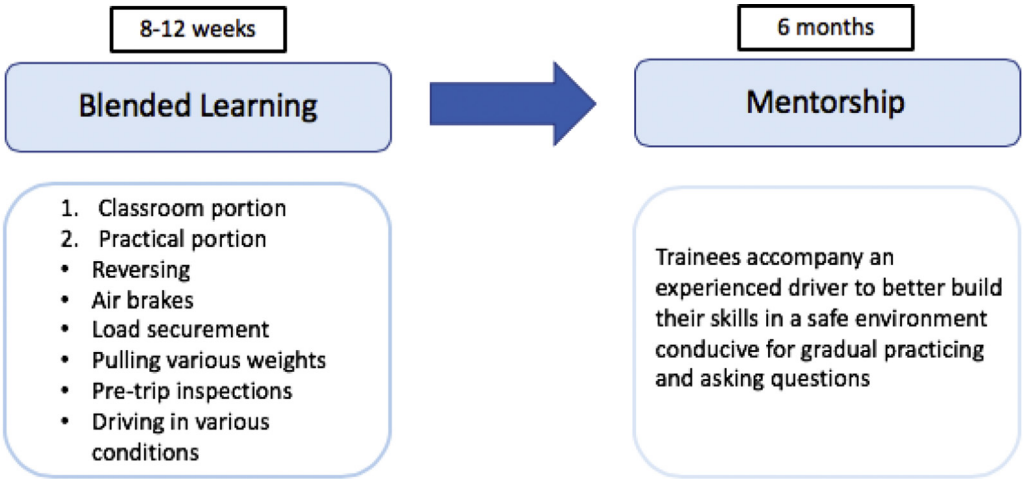

Fig. 1. Ideal LHTD training program | LHTD expressed that novice drivers should undergo an 8–12 week blended learning program consisting of both classroom and practical training. This should be followed by a 6-month mentorship period with the trainee accompanying an experienced driver to better build their skills.

The duration for which new drivers should accompany a mentor on the road varied among LHTD, ranging from one month to a year; however, six months was the most commonly mentioned time period.

> *Honestly, somebody should hold their hand for at least six months.*—Participant 49

> *As far as new drivers go, minimum 6 months to a year. Not six weeks. And by the way, for your information, I am a licensed Class 1 instructor as well as a licensed heavy equipment instructor.*—Participant 57

> *I will take a kid out of a classroom that has their 18-week course. I will take that, I will put them in my truck with me and he stays with me for six months. And I'll teach him everything he needs to know in that six months.*—Participant 89

However, participants noted that experienced driver trainers who can provide training are rare as they are often not compensated sufficiently, or they are not interested in mentoring.

> *Companies don't' wanna pay experienced drivers what they otta be paid to truly put in the effort to wanna train rookie drivers.*—Participant 7

> *This company I worked for … they'd take new drivers and say well here you'll get an extra two cents for training this guy, but the guy that's doing the training, he drives for 12 hours, hops in bed and says here you go … They need actual trainers.*—Participant 26

> *I finally found a transport company that would take me as an intern because for some reason it's very difficult to do now. There are not many people who want to be coaches, there are not many people who qualify to be coaches.*—Participant 39

> *New truckers, the way the industry is going, they should be riding with somebody for a while. Somebody that's professional. Somebody that can handle people being with them to drive with. Cause there are some people out there that they prefer not to. I've done it a few times in my life and I've thrown the guy out the window and said, "walk home." I can't. You gotta have somebody that can be patient.*—Participant 67

3.2.5. Standardization

The participants were adamant that truck driver training and licensing procedures should be standardized across the country. Participants mentioned that in jurisdictions without standardization in training and licensing, certain facilities are prioritizing increasing revenues rather than ensuring safe roads.

> *They gotta start watchin' the schools because too many of 'em they're not training them, they're selling the license.*—Participant 67

> *I'm gonna charge you $5,000 to give you a Class 1 license, the faster I can train you up, the more money I make.*—Participant 81

Participants suggested that truck driver programs should be offered through accredited or certified schools or those managed by the government, thereby eliminating the opportunity for training institutions to take advantage of a lenient system.

> *Our government, federal and provincial, needs to step in and regulate this more. And it's not just the students who need to understand, it's the instructors that have to be penalized if they're not doing it right.*—Participant 2

> *They need to put the government back in there, I don't know what the other provinces do now but Alberta needs to get their buildings back and start testing, especially the class 1.*—Participant 22

> *Definitely certification from a school, a recognized and accredited school.* – Participant 33

4. Discussion and conclusions

Our respondents were adamant that standardized training curriculums are needed across Canada for all individuals entering the industry. Presently, only standardized processes related to LHTD knowledge and performance testing are available [13,24]; however, this does not apply to training curriculums. Our participants noted that truck driver training should consist of both classroom and behind-the-wheel training. Following Ontario's lead, mandatory entry-level training programs, consisting of classroom, in-yard, and behind-the-wheel components, have been introduced in Alberta, Saskatchewan, and recently in Manitoba [14,18,25,26]. In all other provinces, truck driver training is recommended but not yet mandatory, allowing truck drivers to obtain a license without adequate experience. In the USA, the Federal Motor Carrier Safety Administration established new mandatory entry-level training for all new drivers applying for a commercial driver's license [27]. This new program, which commences in

February 2022 [28], requires trainees to complete a standardized curriculum consisting of classroom, in-yard, and behind-the-wheel components provided by an institution listed on the Training Provider Registry [27]. Given that 33% of the sample were involved in crashes at an average age of 36 years, federal regulations are needed across all provinces/territories to ensure all drivers are provided with the same level of education and training. In our study, those who did not receive formal training were more likely to crash, underscoring the necessity for mandatory training.

Our participants emphasized specific aspects that should be incorporated into standardized training. For example, after completing a blended-learning period, all new drivers should be required to have a mentor that they drive with for six months. This would ensure that new drivers gain the necessary skill set for the occupation by observing an experienced driver, asking questions, and gradually practicing the skills themselves. Only Quebec requires new drivers to join a mentor on the road; however, this period varies between one and three months, depending on their credentials [16]. Employees surveyed by the BC Trucking Association also recommended including job-shadowing with an experienced driver for new drivers [29]. Specific skills should be taught by the mentor, practiced by the novice, and approved by the mentor upon successful completion [29]. Our participants mentioned that specific skills should be taught by mentors including backing-up, using air brakes, load securement, learning how to maneuver trailers of different weights, and completing pre-trip inspections. Additionally, new drivers should be provided an opportunity to drive in different settings under the supervision of a mentor such as geographical terrains (e.g., plains, mountains), on rural and urban roads, as well as different weather conditions and times of day (e.g., night driving). Our participants noted barriers to mentorship programs including the unavailability of qualified mentors, insufficient compensation, and a lack of interest by experienced drivers. As provinces/territories implement mandatory entry-level training programs, the salaries of LHTD mentors could be subsidized by the government to incentivize senior drivers to get involved in the training process.

Participants also mentioned the potential use of driving simulators as a training mechanism. Several studies show that truck driver skills such as gear shifting and backing up can be practiced and successfully translated into real-world driving [30]. Of potential benefit is that the time required to learn these skills on the driving simulator was either equal or less than the time required to learn the same skills in the real world [30]. While not directly mentioned by our participants, simulator training may reduce accident risk by addressing recognition and decision errors in truck drivers. Meta-analyses have found simulators to be effective techniques in both aviation [31] and medical training [32]; thus, may be a potential avenue for training in the trucking sector.

Our participants felt strongly that training and licensing should be offered by accredited/certified schools or those managed by the government. According to the participants, such facilities should be providing standardized training and licensing, as private companies profit from new truck drivers by offering shortened and less intensive driver training curriculums without considering the safety of the roads. Driving schools, especially those in North America, tend to provide minimal training toward practicing on-road maneuvers. Instead, they should focus their efforts on teaching drivers how to pass the licensing road test [33]. Until March 2019, Alberta was the only Canadian province with a fully privatized driver examination model [19]. Under this model, Alberta's road testing fees were the highest in Canada [34]. Up to 35 complaints per week were reported about driver examiners including issues of professionalism, sexual harassment, issuing fake documents, bribery, and fraud [34,35]. Alberta has since employed a government-run driver examination program with standardized fees [19].

While this study provides new findings on what LHTD desire in future training curriculums, this study relied on convenience sampling. Consequently, the participants may not be representative of all LHTD and findings cannot be generalized. However, by providing a small monetary incentive to participants, it is likely that the non-response rates were likely reduced. Additionally, given the number of people who participated, it is likely that a wide range of perspectives was captured to sufficiently understand the gaps and opportunities for improvement in the trucking sector.

5. Practical implications

In January 2019, Canada's federal transportation ministers committed to adopting national mandatory entry-level training standards for LHTD by January 2020 [36]. These standards will constitute a revised National Safety Code. Furthermore, provinces have committed to adopting these national training standards by 2021 [36]. This study shows that input and feedback solicited from LHTD is critical for the industry as a whole, as well as for improving the safety of LHTD and road users in general. LHTD as stakeholders and active participants should be involved in the decision-making process to ensure new policies meet the demands of the industry.

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Conflicts of interest

No authors have any conflicts of interest to report.

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References

[1] Statistics Canada. The 20 most common occupations among men aged 15 years and over and the proportion of men in the total workforce, May 2011; 2011.. https://www12.statcan.gc.ca/nhs-enm/2011/as-sa/99-012-x/2011002/tbl/tbl03-eng.cfm. [Accessed 18 April 2019].
[2] Gill V, Macdonald A. Understanding the truck driver supply and demand gap and its implications for the Canadian economy; 2013.
[3] Transport Canada. Commercial vehicle safety in Canada: 2011 annual report to parliament; 2016.
[4] Bigelow PL, Myers AM, Crizzle AM, Gooderham S, Shubair MTP. Health and wellness of commercial motor vehicle drivers in Canada: literature review, discussion, and direction for further research; 2014. Ottawa, Ont.
[5] Statistics Canada. Canadian motor vehicle traffic collision statistics; 2018. 2018.
[6] Federal Motor Carrier Safety Administration. The large truck crash causation study; 2007. https://www.fmcsa.dot.gov/safety/research-and-analysis/large-truck-crash-causation-study-analysis-brief. [Accessed 18 April 2019].
[7] Federal Motor Carrier Safety Administration. CMV driving tips - driver distraction; 2015. https://www.fmcsa.dot.gov/safety/driver-safety/cmv-driving-tips-driver-distraction. [Accessed 1 August 2019].
[8] Hanowski RJ, Hickman JS, Wierwille WW, Keisler A. A descriptive analysis of light vehicle-heavy vehicle interactions using in situ driving data. Accid Anal Prev 2007;39:169–79. https://doi.org/10.1016/j.aap.2006.06.016.
[9] Mayhew DR, Simpson HM, Beirness DJ. Heavy trucks and road crashes; 2004.. http://tirf.ca/wp-content/uploads/2017/02/Heavy_Trucks_Report.pdf. [Accessed 18 April 2019].

[10] Thiffault P. Addressing human factors in the motor carrier industry in Canada; 2011. National safety code; 2011 [updated 2013 Dec 10; cited 2019 Apr 18]. Available from: https://www.tc.gc.ca/eng/motorvehiclesafety/safevehicles-motorcarriers-safetycode-index-290.htm.
[11] Transport Canada. Motor carriers, commercial vehicles and drivers; 2018.. https://www.tc.gc.ca/eng/motorvehiclesafety/roadsafety-motor-carriers-commercial-vehicles-drivers-1312.htm. [Accessed 18 April 2019].
[12] Canadian Council of Motor Transport Administrators. National safety code n.d. https://ccmta.ca/images/publications/pdf//NSC.Fact.Sheet.ENG.MAR2020.pdf [Accessed 18 April 2019].
[13] Gargoum SA, Kim AM, Zhang H, Qiu TZ. Towards establishing effective commercial driver training standards: analysis of industry opinions from Alberta. Can J Civ Eng 2017;44:899–910. https://doi.org/10.1139/cjce-2017-0115.
[14] Government of Ontario. New mandatory training for class A driver's licence applicants; 2019.. https://www.ontario.ca/page/new-mandatory-training-class-drivers-licence-applicants?_ga=2.127483343.335561993.1555613276-2100453385.1549064032. [Accessed 18 April 2019].
[15] Ministry of Transportation. Commercial truck driver training standard (class A); 2016.. http://www.mto.gov.on.ca/english/driver/pdfs/commercial-truck-driver-training-standard.pdf. [Accessed 14 June 2019].
[16] Government of Quebec. Obtaining a driver's license n.d. https://saaq.gouv.qc.ca/en/drivers-licences/obtaining-licence/heavy-vehicles-class-1-2-3/truck-class-3/ [Accessed 26 May 2019].
[17] Government of Newfoundland Labrador. Application process; 2019.. https://www.servicenl.gov.nl.ca/drivers/DriversandVehicles/driverlicensing/application.html. [Accessed 26 May 2019].
[18] Government of Alberta. Mandatory entry-level training for class 1 and 2 driver's licences n.d. https://www.alberta.ca/mandatory-entry-level-training-for-class-1-and-2-drivers-licences.aspx [Accessed 18 April 2019].
[19] Government of Alberta. Commercial driver and road test engagement n.d. https://www.alberta.ca/commercial-driver-engagement.aspx [Accessed 18 April 2019].
[20] Sieber WK, Robinson CF, Birdsey J, Chen GX, Hitchcock EM, Lincoln JE, Nakata A, Sweeney MH. Obesity and other risk factors: the national survey of U.S. long-haul truck driver health and injury. Am J Ind Med 2014;57:615–26. https://doi.org/10.1002/ajim.22293.
[21] Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psychol 2006;3:77–101. https://doi.org/10.1191/1478088706qp063oa.
[22] Denzin N, Lincoln Y. Introduction: entering the field of qualitative research. Strateg Qual Inq 1998:1–34. Thousand Oaks: Sage.
[23] Sandelowski M. Whatever happened to qualitative description? Res Nurs Health 2000;23:334–40. https://doi.org/10.1002/1098-240X(200008)23:4<334::AID-NUR9>3.0.CO;2-G.
[24] SGI. Class 1 MELT training resources n.d. https://www.sgi.sk.ca/class-1-melt [Accessed 15 July 2019].
[25] Manitoba Public Insurance. Mandatory entry level training- Class 1 license n.d. https://www.mpi.mb.ca/en/DL/DL/Pages/MandatoryEntryLevel.aspx [Accessed 18 April 2019].
[26] Government of Saskatchewan. Saskatchewan introducing mandatory minimum training requirements for commercial semi drivers; 2018.. https://www.saskatchewan.ca/government/news-and-media/2018/december/03/semi-truck-driver-training. [Accessed 18 April 2019].
[27] Federal Motor Carrier Safety Administration. Entry-level driver training (ELDT); 2019.. https://www.fmcsa.dot.gov/registration/commercial-drivers-license/eldt. [Accessed 11 April 2020].
[28] Federal Motor Carrier Safety Administration. Extension of compliance date for entry-level driver training; 2020.. https://www.fmcsa.dot.gov/newsroom/extension-compliance-date-entry-level-driver-training-0.
[29] BC Trucking Association. Successful ways to find and keep your workforce; 2013.. http://www.bctrucking.com/sites/default/files/BCTA-Workforce-Brochure.pdf. [Accessed 19 June 2019].
[30] Hirsch P, Choukou M-A, Bellavance F. Transfer of training in basic controls from truck simulator to real truck. Transp Res Rec J Transp Res Board 2017;2637:66–73. https://doi.org/10.3141/2637-08.
[31] Hays R, Jacobs J, Prince C, Salas E. Flight simulator training effectiveness: a meta-analysis. Mil Psychol 1992;4:63–74.
[32] McGaghie W, Issenberg B, Cohen E, Barsuk J, Wayne D. Does simulation-based medical education with deliberate practice yield better results than traditional clinical education? A meta-analytic comparative review of the evidence. Acad Med J Assoc Am Med Coll 2011;86:706–11.
[33] Simons-Morton B, Ehsani J. Learning to drive safely: reasonable expectations and future directions for the learner period. Saf 2016;2.
[34] Tantus Solutions Group Inc. Alberta transportation provincial driver examination model review; 2016.. https://www.alberta.ca/assets/documents/transportation-driver-exam-model-review-2016.pdf. [Accessed 20 June 2019].
[35] Bellefontaine M. Alberta to end "wild west" privatized driving exam system; 2018.. https://www.cbc.ca/news/canada/edmonton/alberta-government-to-take-over-driver-exams-1.4847270. [Accessed 20 June 2019].
[36] Billington J. Premiers committed to enhancing skills development and immigration; 2019.. http://www.canadaspremiers.ca/premiers-committed-to-enhancing-skills-development-and-immigration/. [Accessed 10 September 2019].