Implementation of the Serbian Law on Dual Education

Fourth Report on Drivers and Barriers in the Implementation Phase

Report

Author(s):
Renold, Ursula; Caves, Katherine Marie; Oswald-Egg, Maria Esther

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Chair of Education Systems

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Authors

Ursula Renold[1]

Katherine Caves[1]

Maria Esther Oswald-Egg[1]

Report prepared by the

[1]Chair of Education Systems at ETH Zurich in Zurich, Switzerland (http://www.ces.ethz.ch/)

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Note: When an explanation is consistent from previous reports, we have kept the wording the same.

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List of Abbreviations

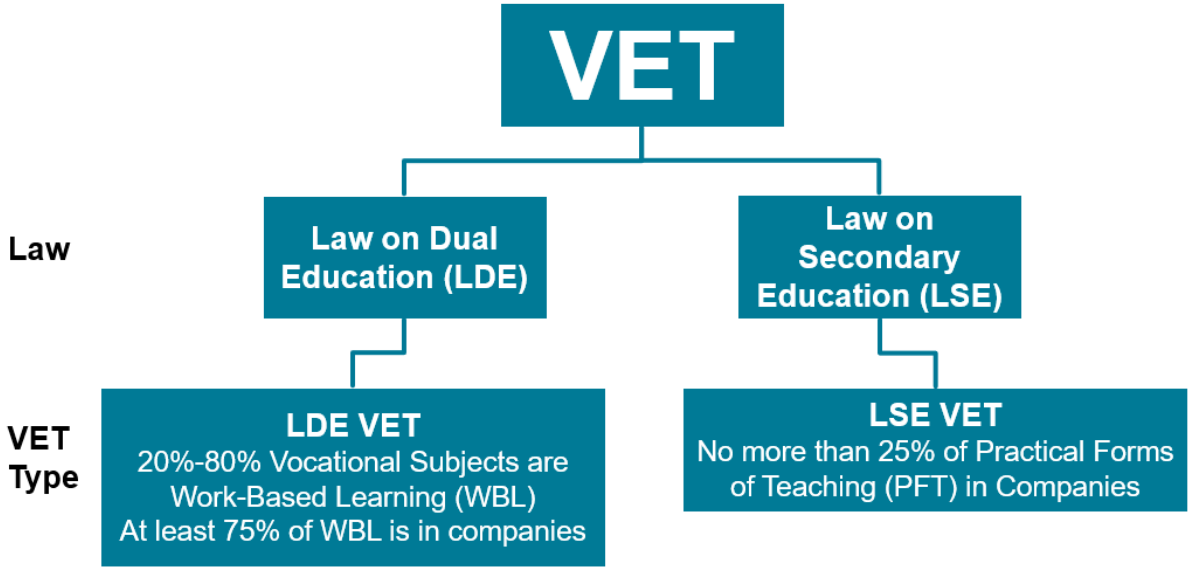
CCIS	Chamber of Commerce and Industry Serbia
CEP	Centre for Education Policy (Belgrade, Serbia)
Commission	Commission for Development and Implementation of Dual Education, Government of Serbia
LDE	Law on Dual Education
LDE VET	Vocational Education and Training based on the Law on Dual Education
LSE	Law on Secondary Education
LSE VET	Vocational Education and Training based on the Law on Secondary Education
MoESTD	Ministry of Education, Science, and Technological Development (Serbia)
NEET	Not in Education, Employment, or Training
PFT	Practical Forms of Teaching
RSA	Regional School Administration
SDC	Swiss Agency for Development and Cooperation
VET	Vocational Education and Training

Executive Summary

To address youth unemployment and to modernize its education system, Serbia adopted the Law on Dual Education (LDE) in November 2017[1], with implementation in the 2019-2020 school year. The LDE defines dual education (referred to in this report as LDE VET) as a model of teaching and learning delivery in secondary VET. In LDE VET, students acquire competencies through theoretical teaching in school, practice in school, and work-based learning (WBL) in companies.

This research is focused on two laws regulating VET in Serbia—the Law on Secondary Education (LSE) and the LDE. Figure i shows the VET delivery models to help readers understand the context and the terminology we will use in this report (see Appendix for legal references and profile time distribution examples). The 2020 LSE amendment requires that when more than 25% of Practical Forms of Teaching (PFT, a subset of vocational content) is done in companies, it must be done under LDE VET regulations.

Figure i: Summary of VET in Serbia



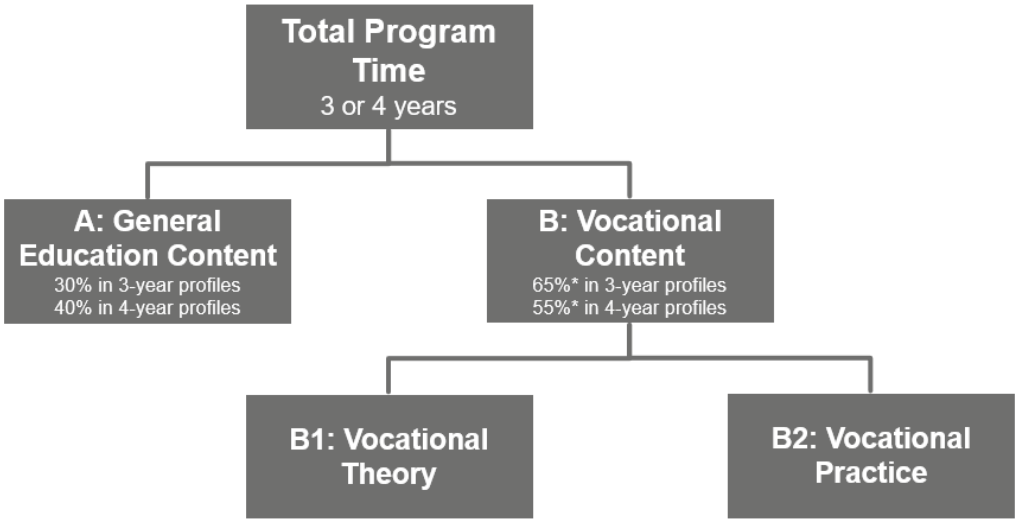
Serbian VET profiles last three or four years, and content is divided into general education (A) and vocational content (B). As shown in Figure ii, 3-year profiles spend approximately 65% of the total program time on vocational content, while 4-year profiles spend approximately 55%. There are two types within the vocational content: vocational theory (B1) and vocational practice (B2). Under the LSE, up to 25% of PFT (usually B2, can also include B1[2]) can be taught in the workplace. This means that at the absolute maximum, students in LSE VET profiles can spend up to 16.25% (3-year profile) or 13.75% (4-year profile) of their total program time in workplaces. The LDE states that between 20-80% of vocational content (B1+B2) is vocational practice (B2). Therefore, LDE VET students can spend between 13-52% (3-year) or 11-44% (4-year) of total program time on vocational practice (B2). The LDE further states that at least 75% of that vocational practice (B2) must be done in companies as WBL.

[1] https://www.srbija.gov.rs/tekst/en/129780/dual-education.php

[2] Practical forms of teaching include practical teaching, block teaching, professional practice, and exercises. Exercises can be part of B1, while the others typically fall into B2. Therefore, the maxima we report are theoretical maxima for a program where all vocational subjects are practical forms of teaching. These maxima overstate the reality, where students are getting much less total time in companies.

Therefore, students in LDE VET profiles can spend between 9.75-52% (3-year) or 8.25-44% (4-year) of the total program time on WBL.

Figure ii: Basic overview of VET profile time allocation



LSE VET ≤25% of Practical Forms of Teaching (PFT) can be in companies. PFT is mostly B2 but can also be B1.**
Full program professional practice in companies: 0%-16.25% (3y) or 0%-13.75% (4y)

LDE VET 20%-80% of B is B2/WBL. Full program WBL: 13%-52% (3y) or 11%-44% (4y).
No more than 25% of B2/WBL can be in schools***.
Full program B2/WBL in companies: 9.75%-52% (3y) or 8.25%-44% (4y)

*The remaining 5% comprises elective subjects. **LSE Rulebook on the implementation of practical teaching and professional practice, Art. 2. ***LDE, Article 6

Example VET profile time allocation in average weekly hours

In an average week, a student in a three-year VET profile would spend 1.5 days on general education and the remaining 3-3.5 days on vocational content. In a four-year profile, the student would spend approximately 2 days on general education and 2.5-3 days on vocational content.

In an LSE VET profile, students do most of their vocational content in school. They can do up to 25% of their vocational content in companies, so students could spend just under one day in companies per week. Specifically, students in three-year profiles could spend an average of just above 5 hours in the workplace weekly, and those in four-year profiles just under 4.5 hours.

In LDE VET profiles, students do 20-80% of their vocational content as WBL. For a three-year profile, that means 4.2-16.9 hours per week. For a four-year profile, it is 3.6-14.3 hours per week. If the school chooses to deliver the maximum 25% of WBL at school, then the minimum average weekly hours are 3.2 for three-year profiles and 2.7 for four-year profiles.

Unlike the LSE, the LDE includes detailed regulations for the role of companies in providing WBL. Table i summarizes the main differences between LDE VET and LSE VET. Following the amendments that took effect with the 2020-2021 school year, all VET with more than 25% of students' vocational practice in companies must be done under the LDE VET regulations.

Table i: **Summary of LDE VET and LSE VET (before 2020 and after 2020)**		
LDE VET	LSE VET before 2020	LSE VET after 2020
WBL is 20-80% of vocational content. No more than 25% of WBL may take place in schools	Students' professional practice can take place in schools or in companies or in both	Up to 25% of PFT can be in companies
Companies must have accreditation by CCIS	Not regulated	Company working conditions are assessed by schools
Enrollment policy in strong cooperation with CCIS on policy and local level	Not regulated	Not regulated
Licensed instructors required	Not regulated	Companies must assign mentors
Student remuneration required	Not regulated	Companies have the option to give students stipends under certain regulations
Career guidance and counseling required	Not regulated	Not regulated
Both school-company contract and student-company contracts required	School-company contract required, no contracts with students required	School-company contract required, student-company contracts only required when stipends are given
The structure and content of LDE VET and LSE VET education profiles are the same		

Source: LDE and LSE and associated bylaws/rulebooks, see Appendix

Data & Descriptive Statistics

We will present reports for two datasets. First is the **cross-sectional data**, comprising data collected in Fall 2020. Second is the three-year **panel data**, which represents the same schools every year in 2018-2019, 2019-2020, and 2020-2021. The two datasets overlap, with every respondent in the panel also in the cross-sectional data (but not the other way around).

The **cross-sectional data** includes schools, companies, RSAs, and regional CCIS offices. **We use cross-sectional data to analyze outcomes that (1) include non-school respondents and (2) relate to new issues**. The **panel data** only includes schools, and specifically only the schools that responded for all three cohorts. Therefore, **we use panel data to analyze outcomes where change over time is important**.

Cross-Sectional Data

The 2020-2021 survey, like its counterpart covering the 2018-2019 and 2019-2020 cohorts, samples all VET schools in Serbia, representatives of all RSAs, and regional CCIS offices. It also includes a sample of companies that engage with LDE VET. Table ii shows the sample size and responses rates for each actor group in the 2020-2021 sample. The sample includes schools from every RSA region and companies from 13 of the 17 CCIS regions.

Panel Data

148 schools responded to the survey in all three years 2018-2019, 2019-2020, and 2020-2021. This represents 46.12% of all VET schools in Serbia, which is very strong for a three-year panel. Schools from all RSA regions are included.

Table ii: Sample and response rates by actor group

Actor Group	Sample	Respondents	Response Rate
VET Schools	321	187	58.26%
Companies	491	79	16.09%
Regional School Administrations	15	13	86.67%
Regional CCIS Offices	17	14	82.35%
Total	844	293	34.72%

Cross-Sectional Data Results: 2020-2021 School Year

Innovation

When asked what specific innovation they must make in order to implement the LDE, every actor group reported some kind of innovation needs. However, compared to the previous survey wave, actors' need to innovate has gone down—especially for one-time innovations. The vast majority of each respondent group reports at least some need for innovation, with all RSAs innovating, 93% and 92%, respectively, of schools and companies innovating, and 80% of regional CCIS offices innovating.

Personnel is a major source of innovation, with 52% of schools hiring new WBL coordinators, 32% of companies hiring new employees for training, 64% of RSAs hiring new educational advisors, and 70% of regional CCIS offices hiring new employees related to LDE VET. Staff training and new teaching and training materials are also important sources of innovation. Compared to the last wave, some of the one-time innovation strategies are less important in the latest wave.

Key Finding

Implementing the LDE has required innovation from all actors, although the pace is leveling off compared to previous years.

The main innovation in 2020-2021 is hiring and training new personnel to expand capacity for LDE implementation.

Networks & Partnerships

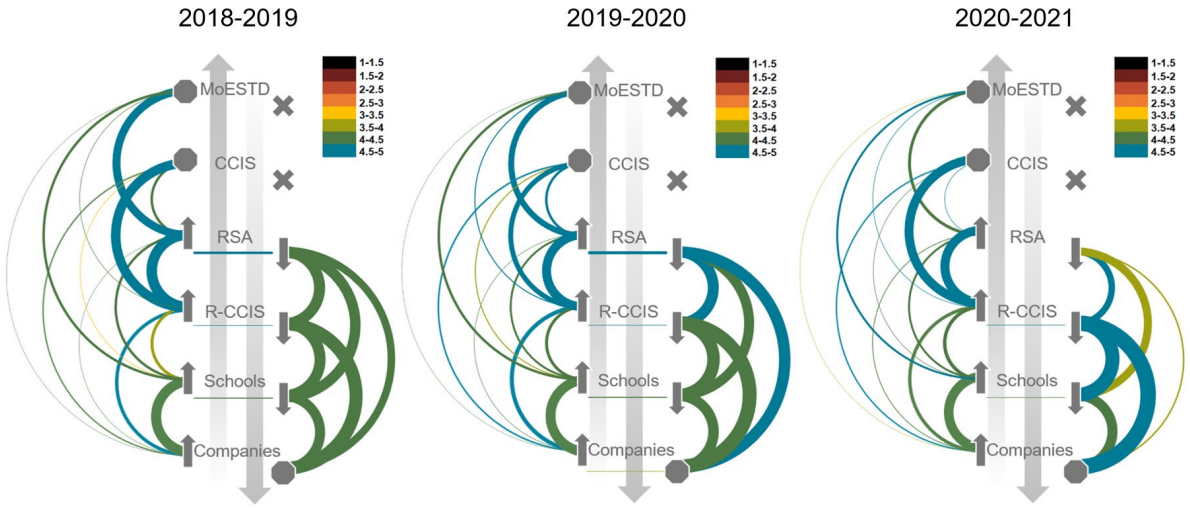
Partnerships continue to shift in the overall network of actors engaged with VET in Serbia. Figure iii shows the networks in all three years, with the color of the line showing satisfaction and thickness showing relationship intensity—the product of how many individual originating

actors report working with the receiving actor, multiplied by the frequency of relationships when they do exist.

Across all three years, we see a pattern of high and stable actor satisfaction throughout the network. While satisfaction shows an overall small increase over the years, the frequency of actors' relationships adapts as the system changes. The network is consolidating, with each actors' total number of cooperation partners shrinking. Relationship intensity was stable in total, indicating a similar level of coordination across years.

In general, RSAs report a much lower intensity of coordination in 2020-2021 than the other years, with decreases in every relationship. The change in RSAs' role in the network appears to be a change of consolidation and efficiency. In contrast, regional CCIS offices report higher intensity of coordination in 2020-2021 than the other years, especially with CCIS. Thus, as the LDE shifted some tasks from schools to companies, we now see a similar pattern where tasks and relationships have shifted from RSAs to regional CCIS offices.

Figure iii: Actor networks in 2018-2019, 2019-2020, and 2020-2021



*Notes: The **left** side of each figure shows relationships moving from actors at the bottom of the figure to those at the top, and the right side shows relationships moving down. Actors' **vertical order** does* not *represent importance or power. Line **thickness** represents relationship load, the product of how much respondents report working with their partners and the frequency with which members of the originating actor group report cooperating with members of the receiving actor group. **Line color** represents actors' satisfaction with the relationship, as shown in the legend.*

Key Finding

Actors' satisfaction with cooperation slightly but steadily increased in all three years.

Coordination intensity was stable from 2019-2020 to 2020-2021, but it appears regional CCIS offices are taking over tasks under LDE that were done by RSAs under LSE.

COVID-19 and Dual Education

Among schools, most (93%) acknowledged that the pandemic had created problems for dual education. Some schools (31%) stopped WBL or school-based training during the pandemic.

However, a number of schools (38%) also shared the solutions they and their school partners have developed to address the problems raised by the pandemic.

A larger group of companies report that the pandemic did not create major disruptions in training (38%). However, 13% of companies report that they have stopped training during the pandemic and 29% report major problems. 21% of companies have made adaptions to deal with the problems created by COVID-19, but many of these involve reducing the number of students they train or the time those students spend in WBL.

Key Finding

The COVID-19 pandemic has been a major disruption for VET from both the schools' and companies' perspectives. Both actors have developed alternatives like online courses, but students' learning overall and WBL specifically have still been affected in most cases.

Panel Data Results: Development over Time

School Participation

The share of schools offering LDE VET for first-year students has increased dramatically over the three cohorts we study. In 2018-2019, only 3% of schools in the sample offered at least one LDE VET profile. In 2020-2021 26% of all VET schools in the sample offer at least one LDE VET profile. Table iii shows the change for schools by year. Because the sample represents approximately half of the schools in Serbia, the numbers do not duplicate the official statistics. However, they show the trend and show development within the sample.

Due to legal changes in January 2020, LSE VET either became school-based[3] or had to follow LDE regulations. Therefore, especially between 2019-2020 and 2020-2021, we observe a major shift in the data from schools offering LSE VET with professional practice in companies to schools offering LDE VET profiles.

Table iii: School VET Types by year

VET Type, Schools	2018-2019	2019-2020	**2020-2021**
LSE VET, students' professional practice in schools	68%	75%	**65%**
LSE VET, students' professional practice in companies	30%	16%	**9%**
LDE VET*	3%	9%	**26%**
Total	100%	100%	**100%**

*Notes: *Schools listed as LDE VET offer at least one LDE VET profile, not exclusively LDE VET profiles.*

Key Finding

Although LSE VET is still the most common mode of VET delivery in Serbia, the number of schools in the sample that offer at least one LDE VET profile has increased dramatically from 3% in 2018-2019 to 26% in 2020-2021.

[3] According to the OCED (2018) definition, less than 25% work-based learning is school-based VET.

According to the data, most of the schools offering LSE VET with students' professional practice in companies switched to LDE VET in 2020-2021 after the legislative changes.

Student Enrollment

We continue to focus on first-year VET students. The number of LDE profiles and classes per school has increased each year. In 2018-2019, schools offering LDE VET offered 1.6 profiles on average. In 2019-2020, that grew to 3.35 profiles. In the 2020-2021 school year, schools offering LDE VET have an average of 4.12 profiles per school.

We observe 1199% growth from the first to the last year of this panel. From 2018-2019 to 2019-2020, LDE VET grew 469%, then more than doubled (256%) again to the most recent cohort. LDE VET schools are serving approximately 33 first-year students on average in 2018-2019, 62 students in 2019-2020, and 76 students on average in the cohort that started in 2020-2021. The biggest growth is in profiles that fall into the *Mechanical Engineering and Metalworking* cluster, along with those in *Electrical Engineering*.

Most first-year VET students that participate in LDE VET are male students. In 2018-2019, 82% of LDE VET students were male students. That number reduced to 63% in 2019-2020, but rose again to 73% in 2020-2021. In contrast, 54% of LSE VET students in 2020-2021 were male students. Given that LDE VET provides better working conditions and is based on evidence that should make for a more effective program, this is not a trivial issue.

Key Finding

In sampled schools, the number of students in LDE VET has increased dramatically, growing 1199% from the 2018-2019 school year to the 2020-2021 school year.

LDE VET continues to mainly serve male students, with 73% male students in 2020-2021 compared to 54% male students in LSE VET profiles in the same year.

Increased enrollment in the *Mechanical Engineering and Metal* cluster and the *Electrical Engineering* cluster have been major drivers of growth.

Initial Outcomes

Schools are generally satisfied with LDE VET (4.2 out of 5 points), with satisfaction increasing over the observation period—especially between 2018-2019 and 2019-2020. Schools report that their students' satisfaction is similar to their own (4.3), although slightly lower in 2018-2019 and 2019-2020. Only in 2020-2021 does students' satisfaction outperform that of their schools.

Key Finding

Schools satisfaction with LDE VET is increasing over time, as is their perception of their students' satisfaction. Currently schools are very satisfied with LDE VET.

It is impossible to determine how the COVID-19 pandemic influences satisfaction, but there is likely some influence that we need to bear in mind when considering this data.

LDE Implementation Fidelity

The LDE and its bylaws increase the regulation of WBL for students doing LDE VET. This includes all LDE VET profiles implemented by schools and companies as of implementation in 2019-2020. This section explores implementation fidelity and the changes in related practices from 2018-2019 to 2020-2021. Specifically, the LDE regulates WBL time, company accreditation, instructor licensing, student remuneration and compensation, and contracts. Table iv shows the results for each of these key indicators.

Table iv: LDE implementation fidelity

	Year	LDE VET	LSE VET
WBL time Weekly in-company learning hours *(standard deviation)*	2018-2019	3.4 hours/week *(3.1 hours)*	3.5 hours/week *(7.4 hours)*
	2019-2020	2.9 hours/week *(3.9 hours)*	4.1 hours/week *(7.7 hours)*
	2020-2021	1.8 hours/week *(3.3 hours)*	0.5 hours/week *(1.9 hours)*
Company accreditation (%)	2018-2019	-	-
	2019-2020	77%	5%
	2020-2021	76%	2%
Instructor licensing (%)	2018-2019	-	-
	2019-2020	81%	11%
	2020-2021	73%	4%
Student Remuneration (%)	2018-2019	40%	5%
	2019-2020	35%	4%
	2020-2021	62%	0%
Non-Monetary Compensation for students (%)	2018-2019	60%	23%
	2019-2020	42%	20%
	2020-2021	41%	3%
Company-Student Contracts (%)	2018-2019	60%	31%
	2019-2020	38%	15%
	2020-2021	70%	3%
Company-School contracts (%)	2018-2019	80%	66%
	2019-2020	50%	65%
	2020-2021	78%	44%

Notes: Standard deviation is a measure of variation in the data. When standard deviation is higher, there is more variation in the time students spend in the workplace each week. When standard deviation is lower, student's weekly workplace learning hours are more similar across observations.

Key Findings	
WBL Time	LDE VET students in 2020-2021 spend more time in companies than LSE VET students, with more consistent experiences. The first-year students in the sample are doing less WBL than the average weekly minimum, but this may be due to COVID-19 and them being in the first year of a longer program.
Company Accreditation	Company accreditation rates are stable despite program expansion, indicating that CCIS and companies are maintaining their accreditation pace.
Instructor Licensing	Schools report that most companies have licensed trainers, but program expansion has made it difficult to keep up with the number of trainers needed.
Student remuneration	LDE VET students must be remunerated, and remuneration rates continue to increase but are not 100%.
Non-monetary compensation	LDE VET students must receive non-monetary compensation, but only a minority of students do. The rate of non-monetary compensation is stable but not 100%.
Company-student contracts	The share of LDE VET students who have contracts with their host companies continues to grow, but some schools are not sure whether their students have these contracts.
Company-school contracts	Schools report that they have contracts with companies for a strong majority of LDE profiles, but still not all as required by law.

Conclusions

The implementation of the LDE in Serbia shows further progress, which is very encouraging. In the following, we summarize key findings and, based on that evidence, make recommendations.

Successes & Recommendations

Personnel is a major source of innovation. This should be strengthened in the coming years so that the LDE program can be developed into the main road in Serbia.

Implementing the LDE continues to require constant innovation from all actors. The main innovation in 2020-2021 is hiring and training new personnel to expand capacity for LDE implementation, which will be a crucial part of the continued success of this initiative.

Actors' satisfaction with cooperation slightly but steadily increased in all three years, despite the challenges associated with developing new relationships and establishing new working patterns. This is a major achievement.

Schools' satisfaction with LDE VET is increasing over time, as is their perception of their students' satisfaction. This is a very important milestone in the implementation of the LDE. It allows policymakers to address some of the following challenges more rigorously.

Challenges & Recommendations

Although a lot of progress has been made, there are some challenges on the way to an internationally recognized dual VET system that also respects OECD standards. We name the most important aspects hereafter.

Fundamentally, the question is whether LSE learners should spend time at work at all if this time is not clearly and completely regulated to the same standards enjoyed by students' peers in LDE VET profiles. Overall, this weakens the dual education approach and leads to unequal treatment of companies. We recommend that this fundamental discussion be conducted comprehensively during the revision of the laws.

LSE VET is still the most common mode of VET delivery in Serbia. However, the number of schools in the sample that offer at least one LDE VET profile **has increased dramatically and** many schools that had offered LSE VET switched to LDE VET in 2020-2021. The number of students in LDE VET in the sample has also increased dramatically. However, LDE VET continues to mainly serve males. The focus in the future should be on **diversifying and expanding the profiles available as LDE profiles**.

WBL is a key component of LDE VET. We recommend having a **detailed discussion in 2021** about

1) How many days should be spent on the job to improve the cost-benefit ratio[4] and
2) Whether it should continue to be permissible for LSE programs to also train youth on the job without having to meet the same regulatory framework.
3) How to reach the OECD criteria for dual VET (>25% WBL out of total program time).

We also recommend discussing a revision of the LSE to **reduce the variation in hours, contracts, payment, and conditions for students' professional practice in companies in LSE VET profiles**. This will strengthen all VET programs in Serbia including LDE VET profiles.

In general, we recommend that the **number of days spent in WBL be regulated more uniformly**. In principle, it is important to speak of **days rather than hours**. From the company's point of view and in terms of improving the cost-benefit ratio, it is important that learners spend full days at work.

Along the same lines as the previous comments, **no learning should take place in the workplace without companies being accredited and having trained instructors**. This means that it is a key priority for 100% of LDE VET students to be in accredited companies with trained instructors.

LDE VET students must be remunerated, compensated, and fully protected by contracts. However, none of those items are in place for 100% of students. The question arises whether there are incentives to achieve better commitment or whether sanctions can be imposed.

In the interest of standardizing the regulations with the companies, we recommend that there should be **only one regulation for all relationships with companies. The regulations for the LDE program should be applied to all in-company learning.**

[4] See Bolli, Caves, Pusterla, & Renold (forthcoming). "New dual education program in Serbia: Do benefits exceed costs for participating companies?" *CES Studies*.

Introduction

In the third quarter of 2020, the youth unemployment rate among 15-to-24-year-olds in Serbia was 26.5%[5], along with a NEET rate of 15.7%[6]. Young people with a secondary school diploma are the most affected by this trend. Therefore, providing employment and education opportunities for youth is a key objective in Serbia. One of the measures the Government of the Republic of Serbia is using to address these issues is the introduction of a dual model of vocational education and training (VET) into the national system of secondary VET. Dual VET, which requires the combination of education at school and in the workplace, is also clearly mentioned as a priority topic in two very important state documents: the Economic Reform Program and the Government Working Plan for 2020-2022.

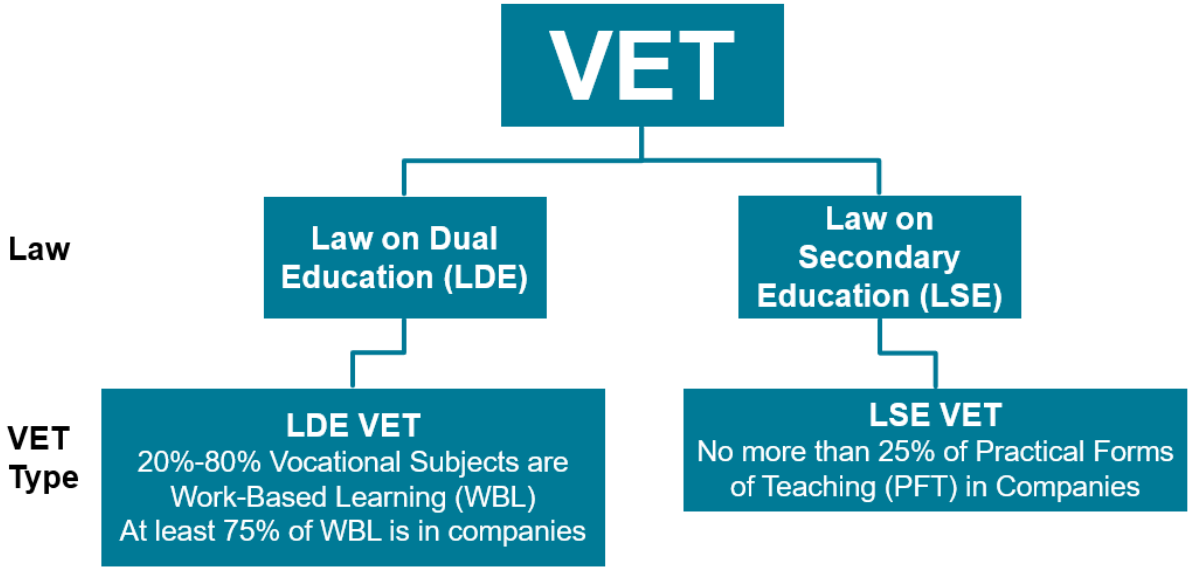
To address youth unemployment and to modernize its education system, Serbia adopted the Law on Dual Education (LDE) in November 2017[7], with implementation in the 2019-2020 school year. The LDE defines dual education (referred to in this report as LDE VET) as a model of teaching and learning delivery in secondary VET. In LDE VET, students acquire competencies through theoretical teaching in school, practice in school, and work-based learning (WBL) in companies. The competencies students learn align with their occupational profile's qualification standards and with its teaching and learning curriculum. The LDE regulates specific activities of companies, schools, the Chamber of Commerce and Industry Serbia (CCIS) along with CCIS regional offices, and the Ministry of Education, Science, and Technological Development (MoESTD) along with its regional school administrations (RSAs).

This research is focused on two laws regulating VET in Serbia—the Law on Secondary Education (LSE) and the LDE. It is important to note the differences between VET under the LDE and the LSE. The LSE pre-dates the LDE and allows for various approaches to VET delivery (referred to collectively as LSE VET in this report). Specifically, LSE VET allows for the implementation of students' professional practice in schools, in companies, and in a combination of the two. Following amendments in early 2020, the time students in LSE VET profiles can spend in companies is limited to 25% of their practical forms of teaching (PFT), which is mostly vocational practice but can also include vocational theory in some cases.

Figure 1 shows the VET delivery models to help readers understand the context and the terminology we will use in this report. Although it was previously possible for students in LSE VET profiles to do any amount of professional practice in companies, the 2020 amendments require that any amount of professional practice in companies that exceeds 25% of PFT must be done under LDE VET regulations. Therefore, LSE VET profiles cannot meet the OECD's (2018) definition of dual VET programs. Profiles in the LDE VET model can potentially be dual VET, but only in the cases where students spend more than 25% of total program time doing WBL in companies.

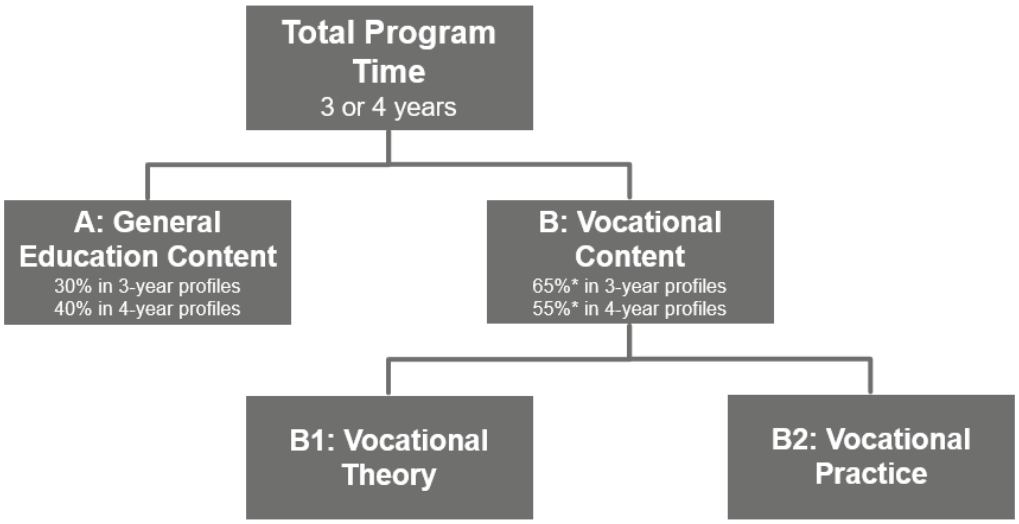
[5] https://data.stat.gov.rs/Home/Result/2400020107?languageCode=en-US&displayMode=table
[6] https://data.stat.gov.rs/Home/Result/2400020403?languageCode=en-US&displayMode=table
[7] https://www.srbija.gov.rs/tekst/en/129780/dual-education.php

Figure 1: Summary of VET in Serbia



Serbian VET profiles last three or four years, and content is divided into general education (A) and vocational content (B). As shown in Figure 2, 3-year profiles spend approximately 65% of total program time on vocational content, while 4-year profiles spend approximately 55%. There are two types of vocational content: vocational theory (B1) and vocational practice (B2).

Figure 2: Basic overview of VET profile time allocation



LSE VET ≤25% of Practical Forms of Teaching (PFT) can be in companies. PFT is mostly B2 but can also be B1.**
Full program professional practice in companies: 0%-16.25% (3y) or 0%-13.75% (4y)

LDE VET 20%-80% of B is B2/WBL. Full program WBL: 13%-52% (3y) or 11%-44% (4y).
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Full program B2/WBL in companies: 9.75%-52% (3y) or 8.25%-44% (4y)

*The remaining 5% comprises elective subjects. **LSE Rulebook on the implementation of practical teaching and professional practice, Art. 2. ***LDE, Article 6

Under the LSE, up to 25% of PFT (usually B2, can also include B1[8]) can be taught in the workplace. This means that at the absolute maximum, students in LSE VET profiles can spend up to 16.25% (3-year profile) or 13.75% (4-year profile) of their total program time in workplaces. Students usually spend much less time in workplaces than this maximum.

The LDE states that between 20-80% of vocational content (B1+B2) is WBL (B2). Therefore, LDE VET students can spend between 13-52% (3-year) or 11-44% (4-year) of total program time on WBL (B2). The LDE further states that at least 75% of that WBL (B2) must be done in companies. Therefore, students in LDE VET profiles can spend between 9.75-52% (3-year) or 8.25-44% (4-year) of the total program time on in-company WBL.

Example VET profile time allocation in average weekly hours

In an average week, a student in a three-year VET profile would spend 1.5 days on general education and the remaining 3-3.5 days on vocational content. In a four-year profile, the student would spend approximately 2 days on general education and 2.5-3 days on vocational content.

In an LSE VET profile, students do most of their vocational content in school. They can do up to 25% of their PFT in companies, so students could spend at most just under one day in companies per week. Specifically, students in three-year profiles could spend at most just above 5 hours in the workplace weekly, and those in four-year profiles just under 4.5 hours. The reality is usually far less time spent in workplaces.

In LDE VET profiles, students do 20-80% of their vocational content as WBL. For a three-year profile, that means 4.2-16.9 hours per week. For a four-year profile, it is 3.6-14.3 hours per week. If the school chooses to deliver the maximum 25% of WBL at school, then the minimum average weekly hours are 3.2 for three-year profiles and 2.7 for four-year profiles.

Unlike the LSE, the LDE includes detailed regulations for the role of companies in providing WBL. One of the flagship regulations in the LDE requires that students be remunerated for their time in companies, and another is that companies must have licensed instructors and be certified to train LDE VET students. Table 1 summarizes the main differences between LDE VET and LSE VET. Following the amendments that took effect with the 2020-2021 school year, all VET with more than 25% of PFT in companies must be done under the LDE VET regulations.

[8] Practical forms of teaching include practical teaching, block teaching, professional practice, and exercises. Exercises can be part of B1, while the others typically fall into B2. Therefore, the maxima we report are theoretical maxima for a program where all vocational content is PFT. These maxima overstate the reality, where students are getting much less total time in companies. However, there are no regulations in the LSE or its rulebooks that specify how much vocational content is PFT, so we are forced to use the maximum possible allocation.

Table 1: **Summary of LDE VET and LSE VET (before 2020 and after 2020)**		
LDE VET	LSE VET before 2020	LSE VET after 2020
WBL is 20-80% of vocational content. No more than 25% of WBL may take place in schools	Students' professional practice can take place in schools or in companies or in both	Up to 25% of PFT can be in companies
Companies must have accreditation by CCIS	Not regulated	Company working conditions are assessed by schools
Enrollment policy in strong cooperation with CCIS on policy and local level	Not regulated	Not regulated
Licensed instructors required	Not regulated	Companies must assign mentors
Student remuneration required	Not regulated	Companies have the option to give students stipends under certain regulations
Career guidance and counseling required	Not regulated	Not regulated
Both school-company contract and student-company contracts required	School-company contract required, no contracts with students required	School-company contract required, student-company contracts only required when stipends are given
The structure and content of LDE VET and LSE VET education profiles are the same		

Source: LDE and LSE and associated bylaws/rulebooks, see Appendix

Research Plan

The overall goal of this research is to provide evidence for the MoESTD, CCIS, and the Commission for Development and Implementation of Dual Education (Commission), supporting those institutions as they make decisions on the future of LDE VET in Serbia. We also aim to provide information for schools, companies, students, parents, and others interested in education in general and dual education in particular.

In concrete terms, this report originates from the LDE's transitional article, which mandates a three-year monitoring and evaluation period covering the initial implementation of the law. During that time, the Chair of Education Systems at ETH Zurich and the Centre for Education Policy (CEP) within the SDC project "Support in Development and Establishment of National Model of Dual Education" closely monitor the implementation and impact of the LDE to generate evidence-based policy recommendations that to improve the LDE after the three-year monitoring period.

The research project, summarized in Table 2, combines longitudinal and cross-sectional observation of the implementation process and its impact. We investigate the success factors and barriers affecting implementation, as well as the effects of the LDE, with the goal of informing post-transition-period revisions of the law. We collect data at five key moments in the implementation process: pre-implementation, the start of implementation, the end of the first year, the start of the second year, and the end of the second year.

Table 2: Overall implementation research plan

Phase	Research and Report	Implementation timeline	Report date
1	Interview-based research1	Pre-Implementation	Spring 2019
2	Survey/questionnaire-based research 1*	Start of implementation	Fall 2019
3	Interviews-based research 2	End of first year	Spring 2020
4	**Survey/questionnaire-based research 2**	**Start of second year**	**Fall 2020**
5	Interviews-based research 3	Reflection	Spring 2021

*Note: *This report is phase 4, survey/questionnaire-based research 2*

The interviews have mainly explored success factors and barriers to LDE implementation. Those interviews, described in Renold et al. (2019) and Renold et al. (2020b), focused on the first phase of the research before full and official implementation of the LDE. In both rounds of interviews, we conducted approximately 200 interviews with a variety of actors, including government representatives, trade unions, regional school administrations (RSAs), regional CCIS offices, schools, companies, students, parents, donor partners, and international community actors. We found strong general awareness, willingness, and motivation among all actors regarding the LDE. Most interviewees see the law as a good fit for the needs of Serbia's students and companies, emphasizing the value of WBL in linking theory and practice, providing a qualified labor force for employers, and helping young people access jobs after graduation.

The survey we describe in this report casts a broad net to investigate LDE implementation and its impact. Like the first survey, this survey asks all VET schools, RSAs, and regional CCIS offices about their activities related to VET. The first survey covered first-year VET students in

the 2018-2019 school year and the 2019-2020 school year (Renold et al., 2020a). This survey adds the 2020-2021 cohort of first-year students. In both surveys, we also sample a smaller group of companies that are involved in LDE VET through CCIS or are in the process of accreditation.

The survey focuses on first-year VET students in each year to capture the difference between the cohorts immediately before and after LDE implementation. The goal is to find how much students' VET experiences have changed as the LDE goes into effect, find initial indicators of its impact, and identify possible barriers and bottlenecks.

Data & Descriptive Statistics

We will present reports for two datasets. First is the **cross-sectional data**, comprising data collected from the survey in Fall 2020. Second is the three-year **panel data**, which represents repeated data on the same schools for the 2018-2019, 2019-2020, and 2020-2021 school years. The two datasets overlap, with every respondent in the panel also in the cross-sectional data but not the other way around. Each dataset has strengths and limitations, so we use them for different types of analysis.

The **cross-sectional data** includes companies, RSAs, and regional CCIS offices, while the panel only comprises schools. We have data for RSAs and regional CCIS offices in all cohorts, but those actors do not report detailed information on students' participation in LDE VET, while schools do. For companies, the sample is not sufficient to provide a meaningful panel. The cross-section also includes a larger number of schools because it includes schools who answered for the first time in the most recent survey wave. However, although we can compare cross-sectional data to the same indicators in previous years, this type of data can be biased by the different individuals who respond for each year. For example, we might observe a change in how many schools participate in LDE VET from one year to the next, but if different schools respond every year then our observed change might not represent reality.

Therefore, **we use cross-sectional data to analyze outcomes that (1) include non-school respondents and (2) relate to new issues** like the COVID-19 pandemic that are not included in previous survey waves. Specifically, we will use the cross-sectional dataset to analyze actors' innovation, changes in the network of actors, responses to the pandemic, and new barriers to implementation. We can still compare cross-sectional results to past cross sections, but without drawing strong conclusions about the change over time.

The **panel data** only includes schools, and specifically only the schools that responded to both survey waves covering all three cohorts. This dataset is smaller, but we can interpret the changes we observe over time with more confidence. Therefore, **we use panel data to analyze outcomes where change over time is important**, including the change in schools' LDE VET participation, change in students' LDE VET enrollment, and change in LDE VET implementation fidelity. The major limitation of this approach is that smaller sample for past cohorts will appear to change the results for those cohorts, but the interpretation of changes will be more valid.

Cross-Sectional Data

The 2020-2021 survey, like its counterpart covering the 2018-2019 and 2019-2020 cohorts, samples all VET schools in Serbia, representatives of all regional school administrations (RSAs), and regional Chamber of Commerce and Industry Serbia (CCIS) offices. It also includes a sample of companies that engage with LDE VET through CCIS.

Table 3 shows the sample size and responses rates for each actor group in the 2020-2021 school year sample. We dropped repeated entries and any incomplete responses, so the table reports the final, reduced number of responses used throughout this analysis. An overall response rate of 34.72% for an email survey is very strong, with very high rates from the RSA and regional CCIS offices, and a 58.26% response rate from secondary VET schools. Among the individuals filling out the survey on behalf of their school, company, RSA, or regional CCIS office, respondents are 47.59% female and 52.41% male.

The detailed data we collected focuses on first-year VET students. Thus, the full dataset from both surveys covers last cohort before full LDE implementation in 2018-2019, the first implementation cohort in 2019-2020, and the second cohort in 2020-2021.

The response rate for this round of the survey is slightly lower than it was in 2019. Responses from VET schools falling from 74.77% in the same population size, and the company sample grew while usable responses fell, making for a response rate change from 29.18% in 2019 to 16.09% in this 2020 sample. These companies represent 28,023 workers with an average of 359 workers per company. We focus mainly on the data from schools, and the response rate there remains robust. The schools in the sample represent 31,016 first-year students in total, with an average of approximately 168 first-year students per school.

Table 3: Sample and response rates by actor group

Actor Group	Sample	Respondents	Response Rate
VET Schools	321	187	58.26%
Companies	491	79	16.09%
Regional School Administrations	15	13	86.67%
Regional CCIS Offices	17	14	82.35%
Total	844	293	34.72%

Regional coverage varies between RSAs and regional CCIS offices because RSAs represent the education system and MoESTD regional network while regional CCIS offices represent the CCIS system. There are 15 RSAs and 17 regional CCIS offices (16 regional offices plus the Belgrade chamber). Schools from every RSA region responded to the survey, as shown in Table 4. The response rates from all regions are between 43% and 73%. Beograd is the lowest, while Leskovac and Zrenjanin are the highest. Only Zrenjanin has a higher response rate in the 2020 than the 2019 survey (rising from 70.59% to 73.53%), all others fell slightly. In Čačak, Kragujevac, and Užice, the response rates fell from 100% in the first-round survey to between 55% and 62% in the second round.

Table 4: Regional representation and response rates for schools		
RSA Region	**Responding Schools**	**Response Rate**
Beograd	22	43.14%
Čačak	5	55.56%
Jagodina	8	66.67%
Kragujevac	7	58.33%
Kraljevo	10	66.67%
Kruševac	4	44.44%
Leskovac	17	62.96%
Niš	16	55.17%
Novi Sad	20	58.82%
Požarevac	8	50.00%
Sombor	11	52.38%
Užice	10	62.50%
Valjevo	15	65.22%
Zaječar	8	61.54%
Zrenjanin	25	73.53%
Total	186*	99.47%*

**Notes: One school did not report its RSA region*

In the smaller sample and respondent group of companies, there are responses from 13 of the 17 CCIS regions. Zaječar, Kikinda, Požarevac, Sombor, and Čačak are missing. Response rates by region range from 0% to 19.23%, with Novi Sad having the most responses. Beograd, Leskovac, Niš, and Sremska Mitrovica all had response rates above 10%. Although the average company in the sample has 359 workers, the size range in the sample is from 1 full-time-equivalent employee to 8,130. The median company in the sample has 48.5 full-time-equivalent employees. Most are small and medium companies, with 74.36% under 250 and 51.28% under 50 employees.

Table 5 shows representation by industry sector, with manufacturing and other services as the largest sectors. These sectors are also the best represented in the 2019 data, with a higher percentage of manufacturing companies and lower share of other service companies in the 2020 data. Unlike the 2019 survey data, the 2020 data includes the information and communication sector—although the sample is very small. Because our sample only includes companies engaged with CCIS for LDE VET, the industries listed in Table 5 tend to reflect industries where WBL is possible, not the total industry profile of Serbia.

Table 5: Company representation by industry	
Industry sector	**Companies (%)**
Manufacturing	39.19%
Other Service Activities	22.97%
Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	9.46%
Accommodation and Food Service Activities	6.76%
Construction	5.41%
Professional, Scientific and Technical Activities	5.41%
Electricity, Gas, Steam and Air Conditioning Supply	4.05%
Agriculture, Forestry and Fishing	1.35%
Water Supply; Sewerage, Waste Management and Remediation Activities	1.35%
Transportation and Storage	1.35%
Information and Communication	1.35%
Human Health and Social Work Activities	1.35%
Total	100.00%

Notes: The following industries are not represented, generally because they are not offered as LDE VET profiles: Mining and Quarrying; Financial and Insurance Activities; Real Estate Activities; Administrative and Support Service Activities; Public Administration and Defense, Compulsory Social Security; Education; Arts, Entertainment and Recreation.

Panel Data

There are 148 schools in the panel, meaning that they responded to the survey in all three years 2018-2019, 2019-2020, and 2020-2021. This represents 46.12% of all VET schools in Serbia, which is very strong for a three-year panel. The panel only includes schools that responded for all three cohorts of first-year VET students, so it is a smaller group than the full sample for any individual year.

The panel shows change over time because it uses the same sample of schools for all three years, but its validity depends on whether the panel is representative across schools. In Table 6 we show the regional representation and response rate in the panel. Although the total coverage rate is slightly lower than in any individual wave, the overall representation across regions is very consistent, generally between 40-60%. Beograd is slightly lower at 31.37%. Further reinforcing the representation in the results, we do not observe major changes between the previously reported results for the first two cohorts and the new results with the panel sample.

Table 6: Regional representation and response rates for schools		
RSA Region	**Responding Schools**	**Response Rate**
Beograd	16	31.37%
Čačak	5	55.56%
Jagodina	7	58.33%
Kragujevac	7	58.33%
Kraljevo	7	46.67%
Kruševac	2	22.22%
Leskovac	13	48.15%
Niš	12	41.38%
Novi Sad	16	47.06%
Požarevac	7	43.75%
Sombor	9	42.86%
Užice	10	62.50%
Valjevo	12	52.17%
Zaječar	5	38.46%
Zrenjanin	19	55.88%
Total	147*	45.79%*

**Notes: One school did not report its RSA region*

Results: 2020-2021 School Year

The analyses in this section use the **cross-sectional dataset**. We examine how different actors are innovating and how the network of actors' relationships has evolved over the past three years. Both of these analyses use cross-sectional data despite the comparison across years because all actor groups are important, and the panel data covers schools only. In addition, this section displays results for how those involved with LDE implementation have coped with the COVID-19 pandemic, which is only relevant for the newest cohort.

Innovation

When asked what specific innovation they have to make in order to implement the LDE, every actor group reported some kind of innovation needs. However, compared to the previous survey wave, actors' need to innovate has gone down—especially for one-time innovations. The vast majority of each respondent group reports at least some need for innovation, with all RSAs innovating, 93% and 92%, respectively, of schools and companies innovating, and 80% of regional CCIS offices innovating. Table 7 shows results by actor group and innovation type.

Table 7: Innovation requirements by actor

Innovation type	Schools	Companies	RSAs	Regional CCIS
Buy new equipment	16%	7%		
Develop new digital platforms for learning/training	18%	7%		
Develop new mentoring programs	30%			
Develop new procedures to ensure students' safety		24%		
Develop new processes of matching students and companies	41%			
Develop new processes to certify companies for training				10%
Develop new processes to monitor training	34%	30%	45%	40%
Develop new scheduling or organization of classes/training	36%	38%		
Develop new teaching/training materials	50%	38%	9%	60%
Develop new teaching/training methods	32%	20%		
Hire a new educational adviser/employee			64%	70%
Hire a new WBL/training coordinator	52%	4%	9%	10%
Hire new employees for human resources		5%		
Hire new employees for training		32%		
Ongoing Innovations				
Implement new cooperative activities with companies/schools	41%	26%	27%	20%
Implement new coordination activities with regional CCIS/RSAs			27%	0%
Provide new teacher/trainer/employee training	43%	31%	36%	90%
No innovation	7%	8%	0%	20%

Note: Survey participants were asked to choose all innovation types that apply to their institution, so the numbers do not sum to 100% by column. Percentages are calculated out of all respondents who got the question, that is schools and companies with students in LDE VET and RSAs or regional CCIS offices that report there are students in their areas doing LDE VET. N=44 schools, 74 companies, 11 RSAs, and 10 regional CCIS.

Personnel is a major source of innovation, with 52% of schools hiring new WBL coordinators, 32% of companies hiring new employees for training, 64% of RSAs hiring new educational advisors, and 70% of regional CCIS offices hiring new employees related to LDE VET. New personnel and changing requirements both mean that new training is necessary, and all actor groups have provided that to their employees due to LDE VET (43% of schools, 31% of companies, 36% of RSAs, and 90% of regional CCIS offices). New teaching and training materials are also an important source of innovation.

Compared to the last wave, some of the one-time innovation strategies are less important in the latest wave. For example, only 10% of regional CCIS offices still needed to develop new processes to certify companies for training, even though that was a major innovation need previously. It is not clear how much these changes are driven by implementation progress or by the COVID-19 pandemic, which required additional measures and shifted priorities. The part of the change that is driven by implementation progress would indicate that earlier innovation investments are paying off, but we cannot observe how large that part is.

Key Finding

Implementing the LDE has required innovation from all actors, although the pace is leveling off compared to previous years.

The main innovation in 2020-2021 is hiring and training new personnel to expand capacity for LDE implementation.

Networks & Partnerships

Partnerships continue to shift in the overall network of actors engaged with VET in Serbia. Figure 3 shows the networks in all three years, with the color of the line showing satisfaction with the relationship and thickness showing relationship intensity—the product of how many individual originating actors report working with the receiving actor, multiplied by the frequency of relationships when they do exist. This network shows both directions for every relationship, so, for example, the relationship from schools to companies is different from the relationship from companies to schools.

Across all three years, we see a pattern of high and stable actor satisfaction throughout the network. There are slight increases every year in how satisfied actors report they are with their cooperation partners, from 4.2 in 2018-2019 to 4.3 in 2019-2020 and finally to 4.4 in 2020-2021 (all on a 1-to-5 Likert scale). The highest satisfaction over all three years is the relationship from regional CCIS offices to RSAs (4.8), followed by regional CCIS to the MoESTD and national CCIS (both 4.7), then RSAs to regional CCIS offices. The highest-satisfaction relationships in 2020-2021 are from regional CCIS offices to RSAs and the MoESTD (both 5.0). Across all three years, the least-satisfied relationships are still above the three-point neutral mark. The only exception is the 2020-2021 relationship from companies to the MoESTD (2.8, shown in a more yellow color in Figure 3).

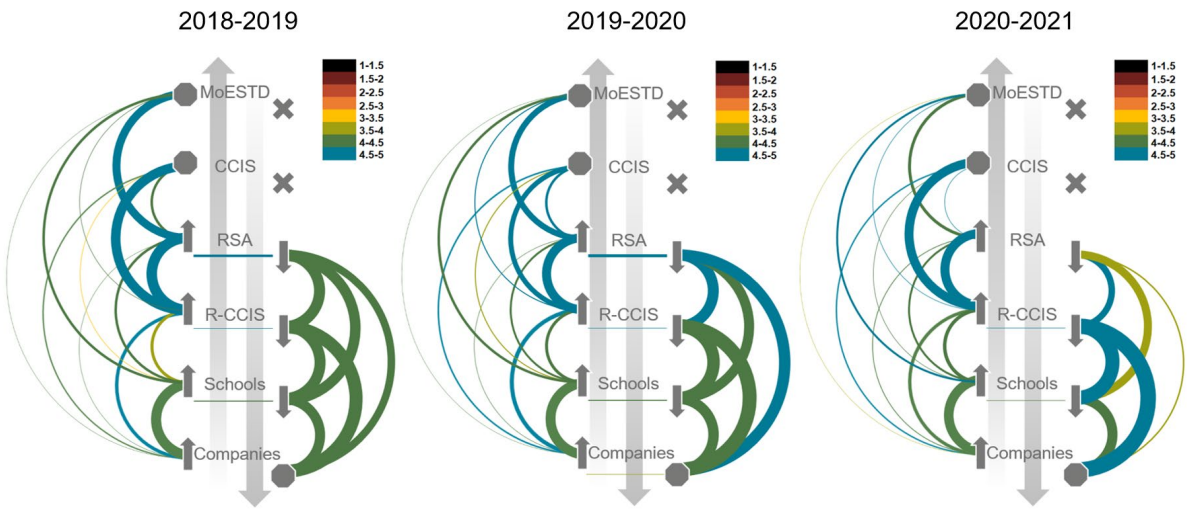
While satisfaction shows an overall small increase over the years, the frequency of actors' relationships is more volatile as the system changes. The average frequency with which actors work together increased from 4.0 to 4.1 between 2018-2019 and 2019-2020. It fell back to 3.9

in 2020-2021. At the same time, the number of relationships reported also fell, indicating a more consolidated network.

Relationship intensity was stable in total, indicating a similar level of coordination across years. However, certain relationships changed significantly. Most notably, the relationship from RSAs to companies shrank considerably—as visible in the outermost right-hand arc on the bottom of each chart in Figure 3. Fewer RSAs reported working with companies, and when they did the frequency of contact was lower in 2020-2021 than it was in previous years. RSAs' satisfaction with those relationships was also lower. In general, RSAs report a much lower intensity of coordination in 2020-2021 than the other years, with decreases in every relationship. In contrast, regional CCIS offices increased their coordination intensity, especially with the national CCIS, schools, and companies.

The change in RSAs' role in the network appears to be a change of consolidation and efficiency. As the network develops over time, actors can move away from their start-up roles and towards more permanent functional roles in the system. That appears to have been the case especially for RSAs. For example, the relationship between RSAs and companies shrank significantly between 2019-2020 and 2020-2021, but RSAs are not legally charged with company cooperation. Regional CCIS offices, whose relationships with both schools and companies have strengthened and improved, are responsible for that cooperation. The LDE shifted some tasks from schools to companies, and we see a similar pattern where tasks and relationships have shifted from RSAs to regional CCIS offices.

Figure 3: Actor networks in 2018-2019, 2019-2020, and 2020-2021



*Notes: The **left** side of each figure shows relationships moving from actors at the bottom of the figure to those at the top, and the right side shows relationships moving down. Actors' **vertical order** does* not *represent importance or power. Line **thickness** represents relationship load, the product of how much respondents report working with their partners and the frequency with which members of the originating actor group report cooperating with members of the receiving actor group. **Line color** represents actors' satisfaction with the relationship, as shown in the legend.*

Key Finding

Actors' satisfaction with cooperation slightly but steadily increased in all three years.

Coordination intensity was stable from 2019-2020 to 2020-2021, but regional CCIS offices are taking over tasks under LDE that were done by RSAs under LSE.

COVID-19 and Dual Education

This survey does not deal extensively with the COVID-19 pandemic that started in early 2020, but it is impossible to discuss anything happening in 2020 without acknowledging it. We included one question in the 2020-2021 version of the survey, asking schools and companies how COVID-19 has affected dual education for them. More schools than companies answered the non-mandatory open question (30 schools, 13 companies).

Among schools, most (93%) acknowledged that the pandemic had created problems for dual education. Some schools (31%) stopped WBL or school-based training during the pandemic. For example, "In the last school year, from the middle of March, students did not attend apprenticeships in companies or in the school workshop, so the pandemic had a lot of impact." There was a major interruption to both school-based and workplace professional practice. Many schools reported reduced WBL time or a complete cessation of WBL, either because of company restrictions or the schools' decisions. This may have affected first-year students less in profiles where students have more WBL in later years.

However, a number of schools (38%) also shared the solutions they and their school partners have developed to address the problems raised by the pandemic. Most of these referred to online coursework and training, like this one, "The practical part of the teaching is still being realized. The theoretical part is online." Many schools are using online courses to compensate for lost time in schools and workplaces. However, even when classes are moved to hybrid models or online, schools acknowledge the difficulty of adapting to restrictions and safety measures while delivering content and support to students.

A larger group of companies report that the pandemic did not create major disruptions in training (38%). However, 13% of companies report that they have stopped training during the pandemic and 29% report major problems. 21% of companies have made adaptions to deal with the problems created by COVID-19, but many of these involve reducing the number of students they train or the time those students spend in WBL. According to companies, the pandemic may have affected first-year students more strongly. For example, "Due to the pandemic and the transition to online teaching, there is no possibility of dual education. Second graders came to online classes regularly, but first graders did not start with us at all. We hope to continue with the activities at the beginning of the second half of the year."

Key Finding

The COVID-19 pandemic has been a major disruption for VET from both the schools' and companies' perspectives. Both actors have developed alternatives like online courses, but students' learning overall and WBL specifically have still been affected in most cases.

Results: Development over Time

This section presents results from the **panel data**, which follows the same schools over all three years. This sample covers nearly half of all VET schools in Serbia and includes every RSA region. However, the numbers presented here will not precisely match the official statistics that cover all of Serbia—the purpose is to track detailed implementation data over time. The main interpretation purpose of these results is to show how LDE implementation has developed, not to report how frequently various results are observable in Serbia in general.

Results are generally stable, but especially where sample sizes are small there are some deviations from the results we presented in the previous report since the sample has changed. For example, not all schools answered the survey in all three years and we no longer include those who answered previously but do not answer the most recent survey. Therefore, some numbers change slightly but we gain a reliable trend by **tracing developments in the same schools and profiles over time**.

School Participation

The share of schools offering LDE VET for first-year students has increased dramatically over the three cohorts we study. In 2018-2019, only 3% of schools in the sample offered at least one LDE VET profile. In 2019-2020 that rose to 9%, and in 2020-2021 more than a quarter of all VET schools in the sample offer at least one LDE VET profile (26%). Table 8 shows the change for schools by year.

The number of schools offering only LSE VET has decreased over the three years we study. Schools with LDE VET have at least one LDE VET profile, and most also continue to offer LSE VET profiles. That decrease is driven by a decline in the number of schools that offer LSE VET with students' professional practice in companies. Due to legal changes in January 2020, LSE VET with professional practice in companies had to fall under certain cutoffs, so it either became school-based[9] or had to abide by the LDE regulations. Therefore, especially between 2019-2020 and 2020-2021, we observe a major shift from schools offering LSE VET with professional practice in companies to schools offering LDE VET profiles.

Table 8: VET Types by year

VET Type, Schools	2018-2019	2019-2020	**2020-2021**
LSE VET, students' professional practice in schools	68%	75%	**65%**
LSE VET, students' professional practice in companies	30%	16%	**9%**
LDE VET*	3%	9%	**26%**
Total	100%	100%	**100%**

*Notes: *Schools listed as LDE VET offer at least one LDE VET profile, not exclusively LDE VET profiles.*

[9] According to the OCED (2018) definition, less than 25% work-based learning is school-based VET.

Key Finding

Although LSE VET is still the most common mode of VET delivery in Serbia, the number of schools in the sample that offer at least one LDE VET profile has increased dramatically from 3% in 2018-2019 to 26% in 2020-2021.

According to the data, most of the schools offering LSE VET with students' professional practice in companies switched to LDE VET in 2020-2021 after the legislative changes.

Student Enrollment

We continue to focus on first-year VET students. The number of LDE profiles and classes per school has increased each year. In 2018-2019, schools offering LDE VET offered 1.6 profiles on average. In 2019-2020, that grew to 3.35 profiles. In the 2020-2021 school year, schools offering LDE VET have an average of 4.12 profiles per school.

The increase in profile availability for LDE VET is also related to an increase in the number of first-year students in LDE VET profiles. LDE VET profiles have an average of 20.6 students per school in 2018-2019, 18.6 students in 2019-2020, and 18.4 students in 2020-2021. Combined with the increase in profiles per school, this means LDE VET schools are serving approximately 33 first-year students on average in 2018-2019, 62 students in 2019-2020, and 76 students on average in the cohort that started in 2020-2021.

Table 9 shows the number of students per profile per year in our sample of LDE VET first-year students that attend schools in the panel data. We observe 1199% growth from the first to the last year of this panel. From 2018-2019 to 2019-2020, LDE VET grew 469%, then more than doubled (256%) again to the most recent cohort.

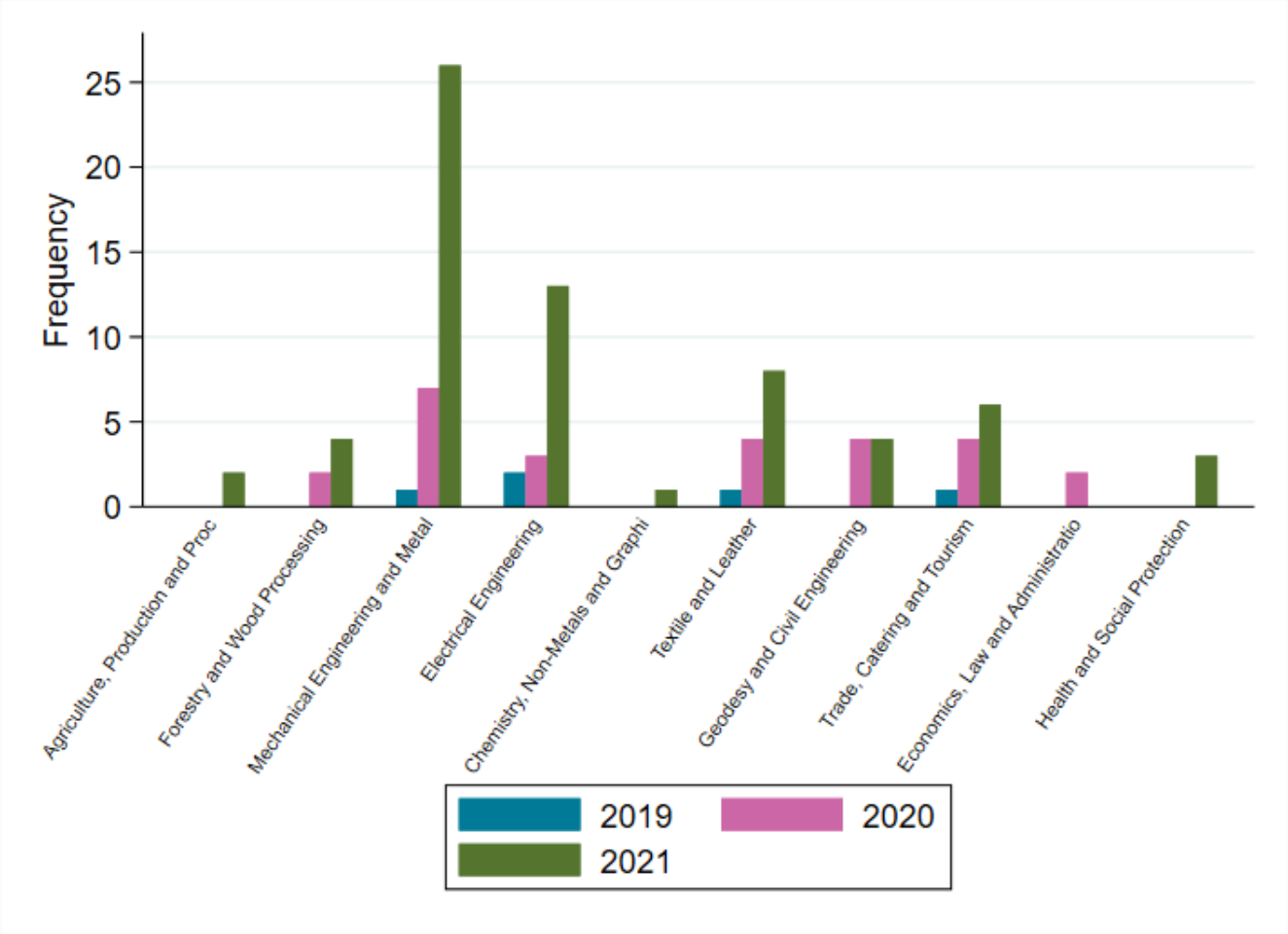
The majority of first-year VET students that participate in LDE VET are male students. In 2018-2019, 82% of LDE VET students were male students. That number reduced to 63% in 2019-2020, but rose again to 73% in 2020-2021. In contrast, 54% of LSE VET students in 2020-2021 were male students. Given that LDE VET provides better working conditions and is based on evidence that should make for a more effective program, this is not a trivial issue. Students in LDE VET have regulated working hours, remuneration, certified trainers, and accredited company learning environments, which students in LSE VET do not have to the same extent. In addition, LSE VET profiles are limited to 25% of PFT in companies with the rest taking place at school. This makes the program a school-based VET program according to the OECD definition (OECD, 2018). LDE VET profiles can have WBL for at least 25% of the total program time, so they can be dual VET programs. However, the LDE also allows for less WBL so many would still be classified as school-based VET. Evidence shows that school-based VET programs are less effective at improving key labor market outcomes compared to dual VET programs (e.g. Bolli, Egg, & Rageth, 2017). Therefore, the gender difference in LDE VET compared to LSE VET may drive gender inequity if allowed to continue.

Table 9: First-year enrollment by profile cluster and year						
Profile cluster*	2018-2019		2019-2020		2020-2021	
	LDE VET		LDE VET		LDE VET	
	N	%	N	%	N	%
Agriculture, Production and Processing of Food	0	0%	0	0%	31	3%
Chemistry, Non-Metals and Graphics	0	0%	0	0%	21	2%
Culture, Art and Public Information	0	0%	0	0%	0	0%
Economics, Law and Administration**	0	0%	79	16%	0	0%
Electrical Engineering	28	27%	60	12%	214	17%
Forestry and Wood Processing	0	0%	45	9%	78	6%
Geodesy and Civil Engineering	0	0%	47	10%	68	6%
Geology, Mining and Metallurgy	0	0%	0	0%	0	0%
Health and Social Protection	0	0%	0	0%	147	12%
Hydrometeorology	0	0%	0	0%	0	0%
Mechanical Engineering and Metalworking	24	23%	102	21%	394	32%
Personal Services	0	0%	0	0%	0	0%
Textile and Leather	28	27%	82	17%	145	12%
Trade, Catering and Tourism	23	22%	68	14%	137	11%
Traffic	0	0%	0	0%	0	0%
Total	103	100%	483	100%	1235	100%

**Profiles clustered by industry, see Appendix for detailed groups*
***Sources indicate that there are no LDE VET profiles available in the* Economics, Law, and Administration *cluster, but multiple schools report offering that profile.*

Figure 4 shows the number of classes within each educational profile cluster by year. Like the student enrollment numbers, the number of LDE VET classes has also increased dramatically every year. The biggest growth is in profiles that fall into the *Mechanical Engineering and Metalworking* cluster, along with those in *Electrical Engineering*. Later years also have many more profiles available in a more diverse set of clusters, which may help LDE grow to serve a diverse range of students and regional economies. In addition, this growth has happened despite the COVID-19 pandemic, indicating that the measures taken to continue training during the pandemic have been at least somewhat successful.

Figure 4: LDE VET classes by profile in 2018-2019, 2019-2020, and 2020-2021



Key Finding

The number of students in LDE VET has increased dramatically, growing 1199% from the 2018-2019 school year to the 2020-2021 school year.

LDE VET continues to mainly serve male students, with 73% male students in 2020-2021 compared to 54% male students in LSE VET profiles in the same year.

Increased enrollment in the *Mechanical Engineering and Metal* cluster and the *Electrical Engineering* cluster have been major drivers of growth.

Initial Outcomes

We asked schools to report how satisfied they are with the VET profiles they offer and to give their opinion about students' satisfaction. The data is reported at the profile level. Overall, satisfaction is high for in all profiles we observe, and is high for students in the opinion of their schools.

Table 10 shows schools' satisfaction, disaggregated by year. Schools are generally satisfied, with satisfaction increasing over the observation period—especially between 2018-2019 and 2019-2020. Schools report their students' satisfaction similar to their own, although slightly lower in 2018-2019 and 2019-2020. Only in 2020-2021 does students' satisfaction outperform that of their schools.

Table 10: Schools' satisfaction and opinion of student satisfaction

Schools' satisfaction	LDE VET Profiles
2018-2019	3.6*
2019-2020	4.3
2020-2021	4.2
Student satisfaction	**LDE VET Profiles**
2018-2019	3.4
2019-2020	4.0
2020-2021	4.3

**Responses are on a 1-to-5-point Likert scale with 1 very unsatisfied, 3 is neutral and 5 very satisfied*

Key Finding

Schools satisfaction with LDE VET is increasing over time, as is their perception of their students' satisfaction. Currently schools are very satisfied with LDE VET.

It is impossible to determine how the COVID-19 pandemic influences satisfaction, but there is likely some influence that we need to bear in mind when considering this data.

LDE Implementation Fidelity

The LDE and its bylaws increase the regulation of WBL for students doing LDE VET. This includes all LDE VET profiles implemented by schools and companies as of implementation in 2019-2020. This section explores implementation fidelity and the changes in related practices from 2018-2019 to 2020-2021.

Students in LSE VET with less than 25% of their PFT in companies are not covered by the LDE, but we do expect some changes due to the revision of the LSE and its bylaws. We show trends in LSE VET with students' professional practice in companies as a non-implementation comparison group.

It is important to consider the dramatic expansion of LDE VET from 2019-2020 to 2020-2021 in the sample. This means that there are more students in LDE VET, so an indicator that remains stable in terms of percentage has actually grown in absolute numbers—if 10% of LDE VET students get some benefit in all three years, then a much larger number of students get that benefit in 2020-2021 compared to 2019-2020. Although the goal is for all requirements to be implemented with 100% fidelity, stability in the rate of fidelity—which means massive expansion in numbers—is a good sign at this point in the process.

WBL Time

The LDE states WBL should account for 20-80% of students' vocational content (B1+B2)[10]. This leaves range for wide variation in workplace training hours. For LSE VET, time spent on vocational content is defined but the time spent in companies is not, as long as it stays below the 25% threshold of the total PFT time.

Students in LDE VET have several options for WBL structure, as defined by the curriculum of their particular profile. For example, they can do their WBL every week, as a block of courses at the end of each semester, or starting from the second year. In addition, it is very common in all countries with VET for students to increase their WBL time as they advance through the years of their programs, and this study focuses on first-year students to accurately identify differences by cohort. Therefore, we expect that the data presented here on first-year VET students will below their average WBL time in the full multi-year program.

In 2018-2019 and 2019-2020, we observe that LDE VET students have much less variation in their time spent at companies compared to LSE VET students. Table 11 shows the average hours per week and the standard deviation, which is larger when there is more variation in the data. Although the averages are similar between LDE VET and LSE VET in 2018-2019 and 2019-2020, the standard deviations are far higher for LSE VET. This indicates that LSE VET students' time in companies was far less regulated in these profiles.

In LSE VET, students can spend no more than 5 or 4.5 hours per week in companies on average in three- and four-year profiles, respectively. The Average of 0.5 hours per week fits into this requirement. In LDE VET, students should spend between 3.2-16.9 (three-year) or 2.7-14.2 (four-year) hours per week in companies on average. The overall average of 1.8 hours per week is below this benchmark. This may be due to the students being first-years or it may be related to the COVID-19 pandemic.

[10] Based on the regulations in the LDE, article 6. See Figure 2 and its example for detailed calculations.

The COVID-19 pandemic affected all parts of education and training, but for WBL especially it had major impact. Companies and schools reported changing, reducing, or eliminating WBL due to the pandemic and its effects. Therefore, we recommend that readers interpret this data lightly and wait for future years to draw strong conclusions.

Table 11: Time learning in companies

	Year	LDE VET	LSE VET
Weekly in-company learning hours *(standard deviation)*	2018-2019	3.4 hours/week *(3.1 hours)*	3.5 hours/week *(7.4 hours)*
	2019-2020	2.9 hours/week *(3.9 hours)*	4.1 hours/week *(7.7 hours)*
	2020-2021	1.8 hours/week *(3.3 hours)*	0.5 hours/week *(1.9 hours)*

Notes: Standard deviation is a measure of variation in the data. When standard deviation is higher, there is more variation in the time students spend in the workplace each week. When standard deviation is lower, student's weekly workplace learning hours are more similar across observations.

In the 2020-2021 school year, after the amendments to the LDE and LSE had taken effect, we see a dramatic drop in the average number of hours per week that LSE VET students spend in companies. The average hours per week is far below the threshold set by the LDE. The new regulations require that LSE VET students spend no more than 25% of their PFT time in companies, otherwise they must follow the LDE VET regulations.

Schools report that first-year students spend on average 21% of their WBL time in companies in LDE VET profiles, and 4% in LSE VET profiles. When asked what percentage of students' total vocational practice time will be spent in companies over the whole course of the multi-year VET program, schools report an average of 45% for LDE VET profiles and 13% for LSE VET profiles. This is equivalent to approximately 27% of total time in LDE VET profiles and 8% of total time in LSE VET profiles. Therefore, evidence suggests that students will do more WBL later in their VET programs.

Key Finding

LDE VET students in 2020-2021 spend more time in companies than LSE VET students, with more consistent experiences. The first-year students in the sample are doing less WBL than the average weekly minimum, but this may be due to COVID-19 and them being in the first year of a longer program.

Company Accreditation

The LDE requires that companies be accredited as training companies by CCIS. This was only mandatory starting in 2019-2020 after implementation of the LDE. Table 12 shows the percentage of their profiles where schools report that training companies are accredited. The share is stable from 2019-2020 to 2020-2021, despite a huge increase in the size of LDE in Serbia. CCIS has been able to maintain its pace of accreditation despite the program's expansion. LSE VET students do not generally work in accredited companies.

Table 12: Accredited companies			
	Year	LDE VET	LSE VET
Training companies accredited by CCIS for training	2018-2019	-	-
	2019-2020	77%	5%
	2020-2021	76%	2%

Key Finding

Company accreditation rates are stable despite program expansion, indicating that CCIS and companies are maintaining their accreditation pace.

Licensed Instructors

The LDE requires that companies have certified instructors when implementing LDE VET profiles. Official CCIS certification for instructors under the LDE was available for the first time in the 2019-2020 cohort. As shown in Table 13, most schools' LDE VET profiles are taking place in companies where licensed instructors oversee learning. However, the number falls slightly from 2019-2020 to 2020-2021. This may reflect the increased number of companies offering training and the fact that, although CCIS continues to certify new trainers, the expansion of LDE outpaces that supply. LSE VET students do not typically have licensed trainers when they do professional practice in companies, and trainer licensing is not required. However, under the new regulations they should have designated mentors.

Table 13: Licensed instructors			
	Year	LDE VET	LSE VET
Training companies with licensed instructors	2018-2019	-	-
	2019-2020	81%	11%
	2020-2021	73%	4%

Key Finding

Schools report that most companies have trainers, but program expansion has made it difficult to keep up with the number of trainers needed.

Student Remuneration & Compensation

The LDE requires students to be paid for their time in WBL. Table 14 shows that very few students in LSE VET are paid, while the majority of students in LDE VET are. This is an improvement over time, especially since the first year reflects a certain degree of bias towards early adopters while many more companies and schools are involved in later years. Although not all LDE VET students are being paid as required, the improvement is significant.

Table 14: Student remuneration and compensation			
Status	Year	LDE VET	LSE VET
Remuneration	2018-2019	40%	5%
	2019-2020	35%	4%
	2020-2021	62%	0%
Non-Monetary Compensation	2018-2019	60%	23%
	2019-2020	42%	20%
	2020-2021	41%	3%

**Percentages are calculated at the school-profile level.*

Non-monetary compensation includes food, transportation, housing, insurance, and other opportunities for companies to remunerate their students. The LDE requires that employers shall provide necessary equipment, travel reimbursement, meal reimbursement, and insurance, along with accommodation in some cases.

Table 14 also shows non-monetary compensation rates by year and workplace type as reported by schools. The LDE VET students' compensation rates are essentially stable, especially when considering that the higher numbers in 2018-2019 are driven by early adopters and a much smaller sample size. LSE VET rates of non-monetary compensation are also much lower, but such compensation is not required for LSE VET and there are many more responses in 2020-2021 from LSE VET schools that may also bias the results downward.

Key Finding

LDE VET students must be remunerated, and remuneration rates continue to increase.

LDE VET students must receive non-monetary compensation, but only a minority of students do. The rate of non-monetary compensation is stable.

Both numbers are not 100% as required by law.

Contracts

The LDE requires two types of contracts—one between companies and students (along with their parents), and a second between companies and schools to formalize the LDE VET relationship. Table 15 shows contracts by VET type and year, as reported by schools.

Contracts between the company and student increased for students in LDE VET profiles, with the dip from 2018-2019 most likely due to a small sample size of LDE VET schools in that year. The total does not reach 100% in 2020-2021 mainly because many schools responded that they are unsure of whether their students have contracts with companies. Students in LSE VET are not required to have contracts with their host companies, and very few do with the percentage declining over the years.

Table 15: Contracts			
Contract	Year	LDE VET	LSE VET
Company-Student	2018-2019	60%	31%
	2019-2020	38%	15%
	2020-2021	70%	3%
Company-School	2018-2019	80%	66%
	2019-2020	50%	65%
	2020-2021	78%	44%

The second contract is between schools and companies. Schools report these contracts in most LDE VET profiles, with the number relatively stable over time but growing since full implementation increased the number of schools participating in LDE VET. The revised LSE requires school-company contracts, and about half of such partnerships have contracts.

Key Finding

The share of LDE VET students who have contracts with their host companies continues to grow, but some schools are not sure whether their students have these contracts.

Schools report that they have contracts with companies for a strong majority of LDE profiles, but still not all as required by law.

Conclusions

The implementation of the LDE in Serbia shows further progress, which is very encouraging. In the following, we summarize key findings and, based on that evidence, make recommendations.

Successes & Recommendations

The results show a number of successes and improvements that Serbia's LDE VET actors can build upon as they continue to establish the program.

Personnel is a major source of innovation, with 52% of schools hiring new WBL coordinators, 32% of companies hiring new employees for training, 64% of RSAs hiring new educational advisors, and 70% of regional CCIS offices hiring new employees related to LDE VET. This important development should be strengthened in the coming years so that the LDE program can be developed into the main road in Serbia.

Implementing the LDE continues to require constant innovation from all actors, although the pace is leveling off compared to previous years. This is even more important during the COVID-19 pandemic. The main innovation in 2020-2021 is hiring and training new personnel to expand capacity for LDE implementation, which will be a crucial part of the continued success of this initiative.

Actors' satisfaction with cooperation slightly but steadily increased in all three years, despite the challenges associated with developing new relationships and establishing new working patterns. This is a major achievement. Coordination intensity was stable from 2019-2020 to 2020-2021, but intensity for RSAs decreased while regional CCIS offices increased coordination intensity. Serbia can be satisfied with the fact that the intensity of coordination among RCCIS has increased, because this coordination is necessary for the implementation of the LDE. We encourage all stakeholders to continue developing the network for both coordination and cooperation.

Schools' satisfaction with LDE VET is increasing over time, as is their perception of their students' satisfaction. Currently schools are very satisfied with LDE VET. This is a very important milestone in the implementation of the LDE. It allows policymakers to address some of the following challenges more rigorously.

Challenges & Recommendations

LSE VET is still the most common mode of VET delivery in Serbia. However, the number of schools in the sample that offer at least one LDE VET profile **has increased dramatically from 3% in 2018-2019 to 26% in 2020-2021**. Many schools that had offered LSE VET profiles with students' professional practice in companies switched to LDE VET following the amendments to the LDE and LSE. This is a very important milestone. We recommend fostering that development.

The number of students in the sample in LDE VET has increased dramatically, growing 1199% from the 2018-2019 school year to the 2020-2021 school year. LDE VET continues to mainly serve male students, with 73% male students in 2020-2021 compared to 54% male students in LSE VET profiles in the same year. Increased enrollment in the *Mechanical Engineering and Metal* cluster and the *Electrical Engineering* cluster have been major drivers of growth. Although these are mostly positive developments, the focus in the future should be on **diversifying and expanding the profiles available as LDE profiles**. This should also help address the gender difference.

LDE VET students in 2020-2021 spend more time training in companies than LSE VET students, although the number of hours at work has decreased since the introduction of the LDE and is under the lower threshold set by LDE. We recommend having a **detailed discussion in 2021** about:

1) How many days should be spent on the job to improve the cost-benefit ratio[11] and
2) Whether it should continue to be permissible for LSE programs to also train youth on the job without having to meet the same regulatory framework.
3) How to reach the OECD criteria for dual VET (>25% WBL out of total program time).

In 2018-2019 and 2019-2020, we observe that there is much less variation in how much time LDE VET students spend at companies compared to LSE VET students. In view of the up-coming revision of the LDE (and correspondingly of the LSE), we recommend discussing a revision of the LSE to **reduce the variation in hours, contracts, payment, and conditions for students' professional practice in companies in LSE VET profiles**. The current regulations allow for wide variation across profiles, across schools within the same profile, and generally across student experiences. All profiles should have clearly regulated in-company

[11] See Bolli, Caves, Pusterla, & Renold (forthcoming). "New dual education program in Serbia: Do benefits exceed costs for participating companies? *CES Studies*.

learning requirements, and the training differences across programs must be clearly visible. This will strengthen all VET programs in Serbia including LDE VET profiles.

In general, we recommend that the **number of days spent in WBL be regulated more uniformly**. The minimum hours per week spend in the company should at least be 20% in the first year, or approximately one day. In principle, it is important to speak of **days rather than hours**. From the company's point of view and in terms of improving the cost-benefit ratio, it is important that learners spend full days at work. Based on empirical evidence, it is clear that LDE VET students spend more time at work. This is very important and should be developed further. Fundamentally, the question is whether LSE learners should spend time at work at all if this time is not clearly and completely regulated to the same standards enjoyed by students' peers in LDE VET profiles. Overall, this weakens the dual education approach and leads to unequal treatment of companies. We recommend that this fundamental discussion be conducted comprehensively during the revision of the laws.

Along the same lines as the previous comments, **no learning should take place in the workplace without companies being accredited and having trained instructors**. This means that it is a key priority for 100% of LDE VET students to be in accredited companies with trained instructors. This number is improving but has not yet reached the 100% benchmark. Although this is a big challenge for the CCIS, it helps to professionalize workplace learning.

LDE VET students must be remunerated according to the law, and remuneration rates continue to increase. **LDE VET students must also receive non-monetary compensation**, but rates of compensation are stable at a minority of students. In both cases the evidence shows that numbers are not 100% as required by law. This issue needs to be discussed as part of the revision of both laws. The question arises whether there are incentives to achieve better commitment or whether sanctions can be imposed.

Regarding the **contracts** that have been completed, research shows that the LDE VET program is well on its way, although there is still catch-up work to be done before the law is properly implemented everywhere. For the LSE program, on the other hand, research shows that the implementation of the amendments is not well executed overall. In the interest of standardizing the regulations with the companies, we therefore recommend that there should be **only one regulation for all relationships with companies. The regulations for the LDE program should be applied to all in-company learning.**

Limitations

Although the response rate and representation of the school panel is exceptional, we do not have sufficient observations or representation to present the results of a company panel. In addition, this report is descriptive and does not present causal analyses.

This survey deals with three cohorts of first-year VET students in Serbia. The response rates from schools, RSAs, and regional CCIS offices are exceptional, but both the sample and response rate from companies is less representative. We do not cover the entire population of VET students, focusing only on first-year VET students. The respondents themselves are individuals who represent their organizations, but may not reflect the views of the organization on the questions where we asked for opinions on satisfaction. In addition, all self-reported information, even of concrete data like student numbers, is subject to some degree of potential measurement error or bias.

In order to keep the survey to a manageable length, we focus on collecting detailed information about students' experiences in companies and keep to the profile level. Therefore, we do not observe variation across individual students or classes within a profile at a given school. Schools have, on average, one class per profile, but when there are classes that contain both LDE VET and LSE VET students in the same profile, since it is not common situation anymore, we categorized the entire class as LSE VET. Therefore, we may be very slightly under-reporting LDE VET in this report.

Collecting data at the profile level also means that our data may affect results. If variation in behavior occurs mainly across profiles, as we expect, then we capture this by averaging across profiles. However, if most of the variation occurs at the school level then we over-weight the experiences of larger schools. We performed sub-sample analyses to compare larger and smaller schools and found no significant differences, which indicates that variation is primarily on the profile level.

Outlook

This study is part of an ongoing research agenda to support and understand LDE implementation in Serbia and eventually to provide evidence for a revision of the LDE. The next study will be the final wave before the total revision of the law. It will be a final round of interviews with high-level VET actors in the MoESTD, CCIS, and similar bodies. That study will also capture as well as the in-depth experiences of actors in RSAs, regional CCIS offices, schools, and companies as sampled here. Finally, it will examine students' and parents' experiences, which are not captured here.

The main purpose of the entire implementation research effort related to the LDE is supporting the total revision of the LDE after the transition period. We will continue to collect insights that can support the Commission in its efforts. Now that the revision is getting closer, we are also collating the findings from all implementation research projects to develop an evidence basis for the revision.

References

Bolli, T., Egg, M. E., & Rageth, L. (2017). Meet the need: The role of vocational education and training for the youth labour market (No. 429). *KOF Working Papers*.

OECD (2018), *OECD Handbook for Internationally Comparative Education Statistics 2018: Concepts, Standards, Definitions and Classifications*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264304444-en.

Renold, U. Caves, K. M, Maldonado-Mariscal, K., Oswald-Egg, M.E, Markovic, J., Veselinovic, Z., Stankovic, D., Ceneric, I., Todorovic, M. (2019). Implementation of the Serbian Law on LDE VET First Report on Drivers and Barriers in the Pre-Implementation Phase. *KOF Studies*, 129. ETH Zurich.

Renold, U., Caves, K. M., Oswald-Egg, M. E., Maldonado-Mariscal, K., Markovic, J., Veselinovic, Z., & Todorovic, M. (2020a). Implementation of the Serbian Law on Dual Education: Second Report on Barriers and Drivers in the Implementation Phase. *CES Studies,* 4. ETH Zurich.

Renold, U., Caves, K. M., Oswald-Egg, M. E., Markovic, J., Veselinovic, Z., & Todorovic, M. (2020b). Implementation of the Serbian Law on Dual Education: Third Report on Drivers and Barriers. *CES Studies*, 8. ETH Zurich.

Appendix: Legal References

The information in this report is based on the Law on Secondary Education (and associated bylaws, rulebooks) an the Law on Dual Education (and associated bylaws, rulebooks) as of the 2020 amendments. These sections are of particular relevance.

LSE Rulebook on the implementation of practical teaching and professional practice

Article 2:

Practical forms of teaching (hereinafter: PFT) which develop practical knowledge, skills, abilities, and attitudes in secondary vocational education are the following: practical teaching, block teaching, professional practice, and exercises.

Curriculum, i.e. teaching plan and programme, of a specific occupational profile (hereinafter: CC) contains some or all aspects of teaching from the Paragraph 1 of this Article.

Practical teaching is a form of teaching that implies two manners of realization:

1) as a separate teaching subject within the list of vocational subjects;
2) as a form of realization of one or more different vocational subjects/modules.

Block teaching is a form of teaching that implies the realization of lessons of a specific vocational subject on several teaching days in a row.

Professional practice is a form of teaching that implies three manners of realization:

1) as a separate vocational subject, with the manners of realization being practical teaching or block teaching;
2) as a form of realization of one or more different vocational subjects/modules;
3) as a holiday practice, which can be a separate vocational subject or it is realized within specific vocational subjects, usually in the form of block teaching; holiday practice is realized in the occupational profiles whose specific occupation, i.e. work technology, due to its seasonal character, requires that certain practical skills be acquired after the end of the school year, i.e. during the school holidays, in accordance with the annual work plan of the school.

The manner of organizing and the duration of professional practice are established by the curriculum.

Exercises are a form of teaching vocational subjects by which the previously learned subject matter is practically applied and practised and through which practical knowledge, skills, abilities, and attitudes are developed. In cooperation with an employer, it is possible to realize just that part of exercise classes the outcome of which is, in accordance with the CC, the development of skills, the acquisition of routine in performing tasks, practising work techniques and business procedures, etc. It is not possible to realize the exercise classes at an employer if their outcome is the practice of arithmetic tasks, making technical drawings, etc. as is the case of certain general education and general vocational subjects.

Employer can be a legal entity or an entrepreneur whose field of economic activity enables the delivery of the contents specified in the relevant curriculum.

Mentor is a person employed by an employer or an entrepreneur who, in cooperation with a teacher, delivers a specific teaching content in order to achieve the knowledge, skills, abilities, and attitudes of students prescribed by the qualification standard and curriculum.

Teacher is a teacher of practical instruction or a teacher of vocational subjects, employed at the school, in charge of monitoring and contributing to the achievement of students' knowledge, skills, abilities, and attitudes within PFT.

Organiser of practical teaching and exercises is a person employed at the school in charge of planning and organizing educational work related to PFT delivered at a school, businesses, or institutions.

The student's personal card is a document created and kept by the teacher in order to record the time, activities, and progress of a student during the implementation of the PFT at an employer. It is kept as a written document or in the electronic form, and it is the basis for keeping records in the book on educational work as well as for assessing students.

Article 3

For each individual PFT, as an integral part of curriculum, a specific class load is defined for each grade, total class load on the level of the entire education, learning outcomes, and teaching contents through which a student should reach them.

The total class load envisaged for the realization of PFT is implied in this rulebook as the sum of class load of practical teaching, block teaching, professional practice, and exercises, defined in the CC.

Article 4

Practical forms of teaching in accordance with the CC can be realized at a school, at an employer or combined, partly at a school and partly at an employer.

Article 5

When PFT is delivered at a school, it is realized in school workshops, cabinets, laboratories, on the school farm or other appropriate school premises in accordance with the CC. Whenever it is possible, PFT should be organized as a simulation of work processes and harmonized with the content of theoretical instruction.

Article 6

Depending on the scope of PFT realized at an employer, there are two different manners of their realization:

1) If the share of PFT realized at an employer is higher than 25% of the total class load envisaged for the realization of PFT in accordance with the Article 4 of this Rulebook, the law governing dual education is applied, as well as the rulebooks in relation to it;
2) if the share of PFT realized at an employer is equal to or lower than 25% of the total class load envisaged for the realization of PFT in accordance with the Article 4 of this Rulebook, the law governing secondary education and this rulebook are applied.

Article 8: The organizer of practical teaching and exercises, in cooperation with the employer, evaluates the fulfilment of conditions in terms of space, equipment, means of work, and occupational safety at the employer for the implementation of PFT for a specific occupational profile.

1) The conditions regarding the space and equipment for the implementation of PFT are defined by the rulebook that prescribes detailed conditions in respect to the space, equipment, and teaching aids in vocational schools for a specific occupational profile and field of work.
2) The conditions regarding the occupational safety at an employer are prescribed by laws and by-laws regulating the area of occupational safety.

3) If there are conditions for the implementation of PFT at an employer, the school concludes a contract with the employer in accordance with the Article 30 Paragraph 2 of the Law on Secondary Education.

LDE: Information on the scope, period, and location of work-based learning

Article 6:

1) Work-based learning shall account for at least 20%, but no more than 80% of the total number of vocational subject classes, in compliance with the relevant curriculum.
2) Work-based learning shall be organised during the school year in keeping with the school calendar, between 8am and 8pm, with a maximum duration of six hours per day, or 30 hours per week, in compliance with the curriculum.
3) Work-based learning may not be conducted from 10 p.m. to 6 a.m. the following day.
4) Work-based learning shall be organised entirely at one or more employers, in compliance with the curriculum.
5) By way of derogation from paragraph 4 hereof, part of work-based learning may be organised at a school where this is provided for in the curriculum, or if work-based learning cannot be delivered in its entirety at an employer.
6) The number of work-based learning classes organised at schools shall not exceed 25% of the total number of work-based learning classes envisaged in the curriculum.

Appendix 2: Examples of time distribution

The following are examples of A + B1 + B2 distributions in LDE & LSE VET profiles.

Three-year profile

Industrial mechanic profile LSE & LDE (curriculum is the same)	
First year	
A	525 learning hours per year
B1 + B2	655 learning hours per year
Second year	
A	350 learning hours per year
B1 + B2	795 learning hours per year
Third year	
A	248 learning hours per year
B1 + B2	803 learning hours per year

Four-year profile

Mechatronic technician LSE & LDE (curriculum is the same)	
First year	
A	666 learning hours per year
B1 + B2	471 learning hours per year
Second year	
A	510 learning hours per year
B1 + B2	668 learning hours per year
Third year	
A	374 learning hours per year
B1 + B2	736 learning hours per year
Fourth year	
A	403 learning hours per year
B1 + B2	527 learning hours per year