

This is a skills world

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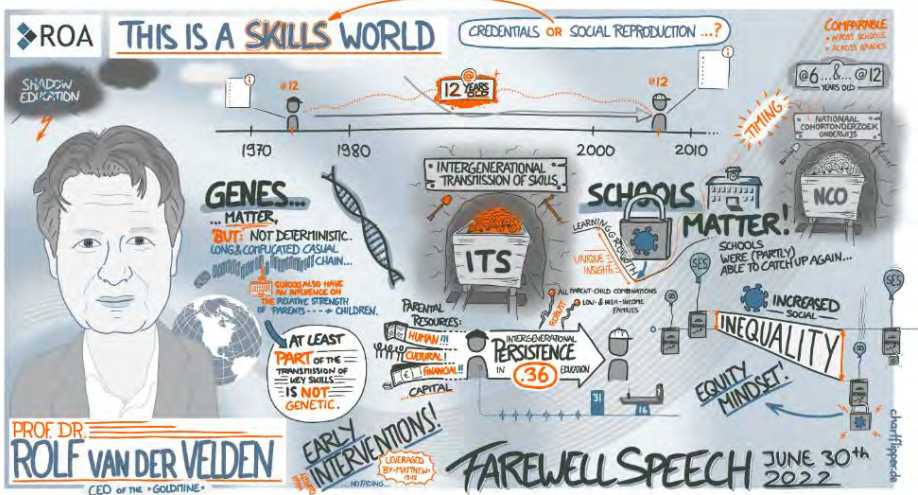
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This is a skills world

Rolf van der Velden



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This is a skills world

Farewell speech¹ by Rolf van der Velden
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Maastricht, June 30th, 2022

¹ This farewell speech is dedicated to my dear mentor, colleague, and friend Jaap Dronkers, who sadly passed away on March 16th, 2016. I am indebted to Arie Glebbeek, Tim Huijts, and Mark Levels for helpful comments on earlier versions of this speech.

This is a skills world

*This is a skills world
This is a skills world
And there is nothing
No nothing
That matters more*

*Skills make the world
Go round and round
Skills make productive
Get firms off the ground*

*Skills make you happy
And skills keep you alive
Skills make you involved
And make you wanna strive*

*This is a skills world,
Yes, it's a skills world
And there is nothing
That matters more*

Music: Etta James Orchestra

Vocals: Johan de Haan

<https://tinyurl.com/ThisIsASkillsWorld>

Dear rector, dean, members of the corona, colleagues,
family, and friends,

“This is a skills world”. Over the past decades, sociologists and economists have shown that education is associated to a range of relevant outcomes, such as success on the labour market, health, civic engagement, and social participation.² What is less clear is why education affects these outcomes? Is it related to the skills that are acquired in education or do credentials serve as an entry ticket to privileged positions? And what is the role of families? How can the strong intergenerational persistence in educational attainment be explained? And are social disparities reinforced in education or does education fulfil an emancipatory function?

In the past few years, I worked on two major projects that provide some relevant new insights. These will be served during the two main courses of today’s special menu: skills production in families and schools. Here is the rest of the menu:

- *Amuse: Three views on education*
- *Antipasti: Skills matter*
- *Primi piatti: Skills production in families*
- *Digestivo: Some reflections*
- *Secondi piatti: Skills production in schools*
- *Dolci: Conclusions and policy implications*
- *Il conto: Acknowledgements*

I hope you enjoy the meal: Buon appetito!

² See OECD (2007; 2010; 2012; 2013), Desjardins (2008), Levels, Van der Velden and Allen (2014), Hanushek et al. (2015; 2017).

Amuse: Three views on education

For starters and to give context to the findings of the projects, I would like to present three³ dominant views on why education is important, and how education affects social inequalities. In the first, the human capital theory (Becker, 1964), families and schools are regarded as the most important places where people acquire relevant skills. These skills make you successful in education, but also on the labour market. In this view, schools can serve as a place that can compensate for deficiencies in the family's learning environment, by providing additional learning opportunities. The key assumption is that the skills acquired in education make you productive in your future job and wages are based on this individual productivity.

In the second view, the credential theory (Collins, 1979), this productivity assumption is disputed. Education is regarded as a giant sorting machine, where students are selected and sorted on their general learning abilities. A key assumption is that relevant skills are acquired on the job, not in education, and wages are determined by characteristics of the job rather than characteristics of the job holder (Thurow, 1975). So, employers favour workers with the lowest expected training costs and use educational credentials as a signal for their general learning ability. In this view, success on the labour market is based on the relative ranking on the educational ladder and this induces a permanent pressure for individuals to obtain ever higher schooling levels.

The third view sees education as a way for elites in society to pass on their privileged position to their offspring. Unlike the aristocracy who could pass on this privileged position by birth right (ascribed), the elites in a meritocracy use education as the legitimate means to pass on their

³ A different way of framing these three views is education as an indicator of productive skills, education as a positional good and education as a means for social closure.

position (achieved). The social reproduction theory (Bourdieu and Passeron, 1977) claims that education is tailored towards the norms and values of the upper- and middle-class families. These families possess the cultural capital needed to be successful in education. This relates to knowing what is important, knowing how to navigate, speaking the 'same language' and other cultural practices that induce a positive behaviour towards learning and school.

It is not very fruitful to see these different views as a battle in which there can only be one winner. There is an element of truth in all three and it is better to look for conditions where one or the other mechanism becomes more dominant.⁴ Let's first have a look at evidence showing that skills matter in the first place.

Antipasti: Skills matter

Sociologists and economists have convincingly demonstrated a strong association between wages and key skills such as literacy and numeracy,⁵ but this does not automatically imply that these skills drive the productivity in a job. In fact, both human capital and credential theory predict a strong association, but the underlying mechanism is assumed to be very different. In the human capital world these key skills directly affect productivity in the job, while in the credential world, they provide the basis for relevant specific skills that are developed on the job. As these are usually not measured, they are picked up in the measurement of general key skills. This is what is known as the 'omitted variable bias'.

Three years back, we proposed a way to distinguish between the two interpretations (Van der Velden and Bijlsma, 2019). Our basic assumption

⁴ See Van de Werfhorst (2011), who was one of the first to make this argument.

⁵ OECD (2013), Levels, Van der Velden and Allen (2014), Hanushek et al. (2015; 2017), Hampf, Wiederhold and Woessmann (2017), Verhaest et al. (2018).

was that – in line with human capital theory - skills can only affect productivity if they are being used. This is the rationale of the ‘effective skill’ concept, that we developed. Effective skill is defined as the product of skill proficiency times the use of these skills. If the skills are not used, the effect on wages is zero, no matter how high the skill proficiency is. And the other way around.

Table 1: Effective skills and individual productivity

Variables	Model 1	Model 2	Model 3
Skill proficiency	13.2***	1.6	
Skill use	9.3***	-2.6	
Skill proficiency*skill use		1.2***	1.2***

Source: Van der Velden and Bijlsma (2019); parameter estimates; *** p<0.01

We used data from the large-scale assessment of adults’ key skills, PIAAC,⁶ to test this assumption. First, we looked at the separate effects of skill proficiency and skill use on wages (Model 1). As you can see, both have a strong effect. In Model 2, we included the interaction term. Note that if general skills would have no direct effect on the productivity, as predicted in credential theory, this interaction term would be insignificant. However, if the interaction term is the only significant term in the equation, this would imply that skills can only affect wages if they are being used. And this is what human capital theory would predict.

This is indeed what we find. Not only is the interaction term significant, but it also renders the main effect of skill proficiency and skill use non-significant. In other words, the whole effect is subsumed by this

⁶ For more information on PIAAC, see OECD (2013).

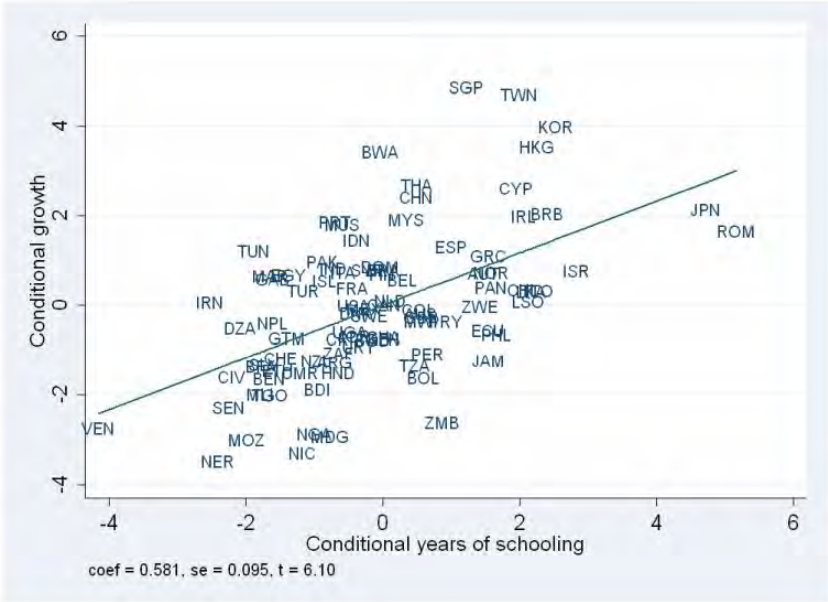
interaction term, which is nothing else than the product of skill proficiency and skill use. Remember, that this is how we defined the effective skill concept. If we leave out the main terms and only look at 'effective skill' (Model 3), the estimate is basically the same. This implies that there is only an effect of literacy and numeracy on wages if these key skills are being used.

The results speak clearly in favour of a human capital interpretation of key skills. These skills are relevant not because they provide the basis for job-specific skills, but because they are being used in the job. Nevertheless, there is also other evidence that points to some credentialism. Since the early 60s, economists have shown the relevance of human capital for economic growth, by including years of schooling in their economic production functions. Although these studies show strong correlations, there was an empirical problem: the very strong rise in schooling attainment around the world was not matched by similar increases in economic growth.⁷ In a classic article in the *Journal of Economic Literature*, Rick Hanushek and Ludger Woessmann (2008) show that only skills matter for productivity. They present the following graph on the relation between years of schooling and economic growth.⁸

⁷ See e.g., Pritchett (2006).

⁸ More specifically, they look at growth in real GDP per capita in the period 1960-2000 and relate that to average years of schooling in 1960, and average test scores on international student achievement tests to estimate the skills of the work force.

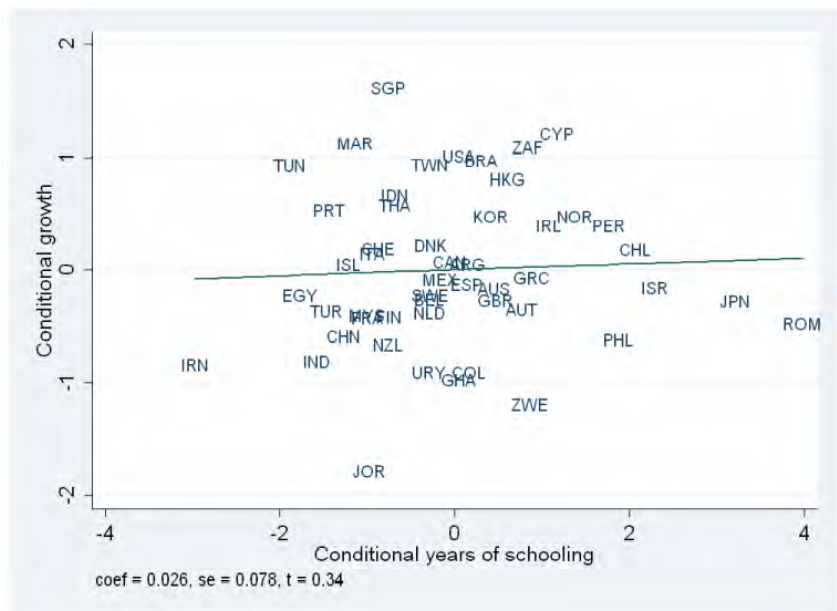
Figure 1: Relation between years of schooling and economic growth



Source: Hanushek and Woessmann (2008)

As you can see, this relation is quite strong. The more years of schooling, the higher the growth in GDP in the period 1960-2000. In the next step, they used the results of several international skill assessments, such as PISA, PIRLS or TIMSS, to estimate the skill levels associated with a year of schooling in each country. Then they looked again at the relation between years of schooling and economic growth, but now controlling for the skills levels associated with these years of schooling. The results change drastically. Instead of a strong relation, they find no relation at all.

Figure 2: Relation between years of schooling and economic growth after controlling for cognitive skills



Source: Hanushek and Woessmann (2008)

This implies two things. First, and in line with human capital theory, years of schooling are only associated with economic growth, if more years of schooling imply higher skills levels. But second, the ‘schooling paradox’ also points to elements of credentialism as in some countries the average schooling level is higher than expected based on GDP: not all years of schooling are converted into economic growth.

Now we have shown that key skills are important, what do we know about their determinants? In the first main course, we will look at one of the most important places where these key skills are produced: the family.

Primi piatti: Skills production in families

In the past few years, I was the unpaid CEO of the Intergenerational Transmission of Skills project⁹, internally also referred to as the 'Goldmine company'.

Figure 3: The Goldmine company



The early diggers of the Goldmine. From left to right: Rick Hanushek, Guido Schwerdt, Babs Jacobs, Stan Vermeulen, Rolf van der Velden and Simon Wiederhold

⁹ For project details, see [link](#).

Here you see some of the early diggers. In the Goldmine, we linked data of some 25,000 parents to some 41,000 of their children.¹⁰ What makes this dataset unique in the world is that we have math and language test scores for parents and children, both assessed at age 12 with the same test: the CITO-test. This is a high-stakes national test in the Netherlands that is used to determine track placement in secondary education. This allows us to unravel what is driving the strong intergenerational transmission of education.

The effect of parents' educational attainment on children's education has been studied by many scholars.¹¹ The relation is quite strong as can be seen in Figure 4. The size of the correlation, 0.36, is comparable to what has been found in other studies.

¹⁰ The data of the parents are based on the Education Cohort Studies carried out in the 70s and 80s: SMVO, SLVO and VOCL. In these panel surveys, large national representative samples of 12-year-olds were followed in their educational career. The respondents conducted a short version of the national school performance test (CITO) and an Intelligence-test. A questionnaire was sent to their parents to assess characteristics of the family's SES. The data of the original respondents were linked to CITO-scores and educational careers of their children from 2005 onwards, using register data. Moreover, register data were used to assess characteristics of the household, such as income, wealth, number of siblings, divorce etc. For more information on the dataset, see Jacobs, Van der Velden and Vermeulen (2021).

¹¹ E.g., Bourne et al. (2018), Treiman and Ganzeboom (2000), and Breen and Müller (2020).

Figure 4: Relation between educational attainment of parents and children’s initial track placement in secondary education



Source: Jacobs and Van der Velden (2021)

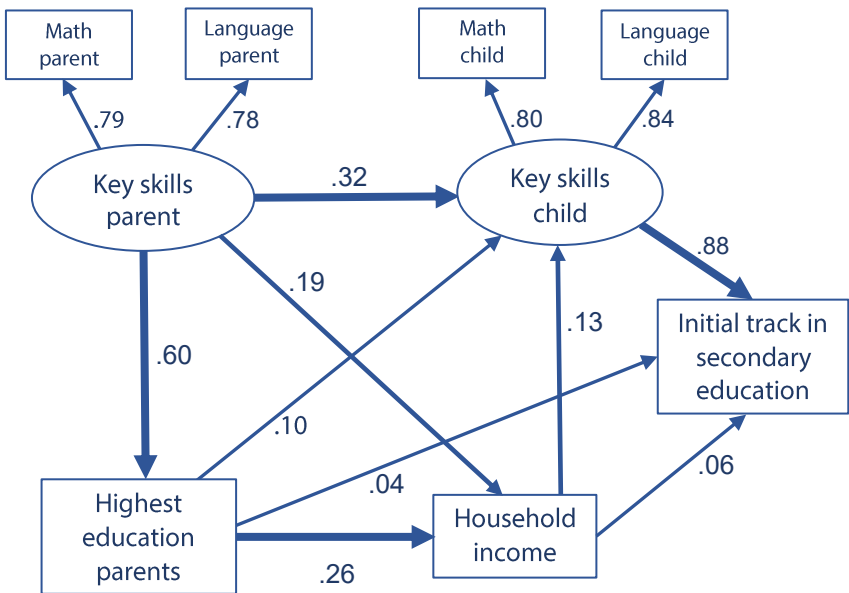
This correlation might be driven by three types of resources that are related to parents’ education:

- Parents’ *human capital* or key skills, understood as the math and language skills that are crucial to be successful in education and provide the basis for further skill development.
- Parents’ *cultural capital* or soft skills, such as familiarity with the culture at school and knowledge of the educational system, that make it easier to successfully navigate through education.¹²
- And parents’ *financial capital*, that enable them to ensure a stimulating learning environment in terms of equipment and extra tuition.

Figure 5 presents a structural equation model linking the different resources to children’s skills and initial track placement.

¹² We do not measure this component directly. Instead, we assume that after controlling for parents’ human capital and financial capital the ‘remaining’ effect of parents’ education on educational outcomes of their offspring largely reflects this cultural capital component.

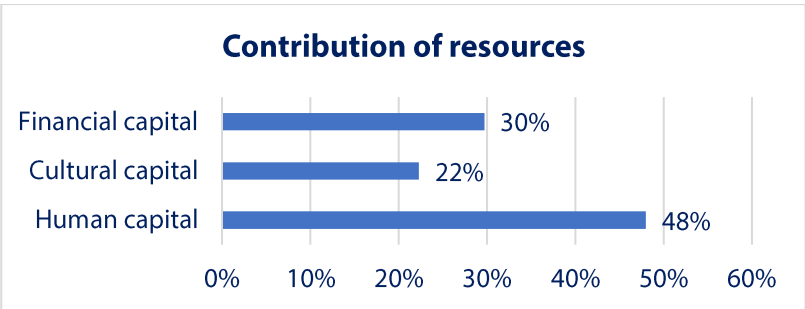
Figure 5: Family resources and children’s skills and initial track placement



Source: Jacobs and Van der Velden (2021)

What is the relative contribution of each of these resources to the strong correlation between parents’ education and the choice of initial track in secondary education of their children?

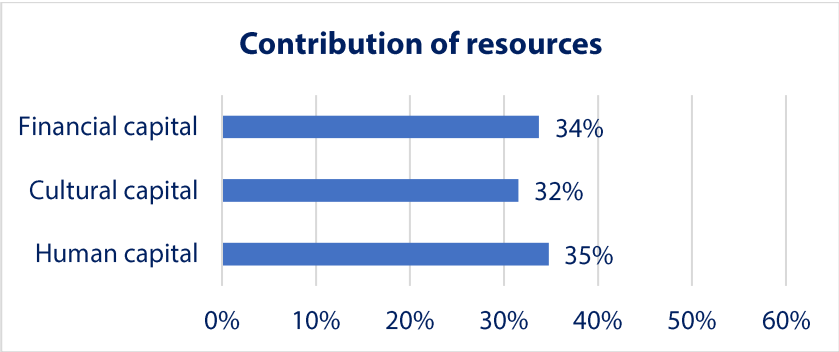
Figure 6: Contribution of parental resources on initial track choice



Source: Jacobs and Van der Velden (2021)

The human capital or key skills of the parents account for 48% of the education mobility effect. Financial resources account for 30% and parents’ cultural capital or soft skills for 22%. Now, we must stress that this is the role of different resources at the first important transition in Dutch education: the choice of a secondary school track. We also looked at another important transition later in the career, namely the decision to leave school without a full upper secondary qualification (Van Vugt, Van der Velden and Levels, in progress).

Figure 7: Contribution of parental resources on early school-leaving



Source: Van Vugt, Van der Velden, and Levels (in progress)

Here we find that the role of cultural capital has become more important (32% instead of 22%), largely at the expense of the role of human capital (decrease from 48% to 35%). The role of financial resources has remained the same.

Still, the impact of the intergenerational transmission of skills at the first important transition is substantial,¹³ and the effect size is very robust across different groups.¹⁴

¹³ Authors like Marks (2014) take this as evidence for a decline of the social component in educational mobility which is heavily disputed by authors like Bourne et al. (2018).

¹⁴ We find similar effect sizes across the different cohorts, across different parent-child combinations (father-son, father-daughter, mother-son, mother-daughter)

Digestivo: Some reflections

If the family is so important, two points of reflection may be raised.

1. Is this all genetic?
2. Do schools matter at all?

The latter point will be addressed in the second main course of this meal. Let's first have a look at the first point. The strong influence of the human capital of the parents suggests that a large part of the intergenerational transmission of education is caused by genetic differences with cognitive abilities being passed on from parents to their biological children. And no doubt genetic differences are very important. Last year, an interesting book appeared written by Kathryn Paige Harden, called "Genetic Lottery: Why DNA matters for social equality." She makes the case to take genetics seriously in improving our understanding why some students do better in school than others. She has several key messages:

1. Genes are important drivers of educational outcomes. Depending on the type of studies that are being used, they determine between 15% (based on Genome Wide Association Studies (GWAS)) and 40% (based on twin studies) of educational attainment.¹⁵ The former studies are likely to provide a lower-bound estimate while the latter provide an upper-bound estimate. But she also argues that a strong influence of genes on educational outcomes is no excuse for a lack of social policy.¹⁶

and across different income groups (low versus high incomes families (see Jacobs and Van der Velden, 2021)).

¹⁵ See Harden (2021: p. 126). Other studies come up with similar estimates, e.g., Branigan, McCallum, and Freese (2013), and Silventoinen et al. (2020). The latter study uses 28 twin cohorts and estimates the genetic component in educational outcomes to be 43% while shared environment accounts for 31%.

¹⁶ She cites the economist Goldberger's example of short-sightedness. Short-sightedness no doubt is strongly related to genetic factors and still we find it fair to create a level-playing field by providing eyeglasses to those who are impaired. Basically, it is not different in the case of genetic disadvantages that affect skill development.

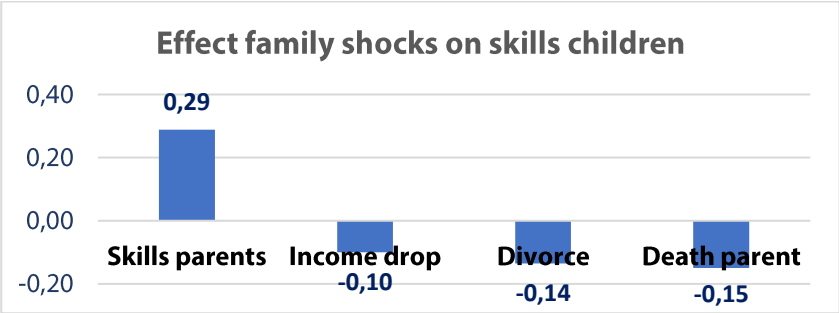
2. However, unlike some other genetic influences, they are not deterministic, and there is a long and complicated causal chain from genes to outcomes, involving numerous interactions with the social environment.¹⁷

The complexity of the causal chain between genes and outcomes can also be demonstrated in our Goldmine data. In Jacobs, Kalmijn, and Van der Velden (in progress), we show that shocks in the family, like a significant drop in the family's household income, divorce, or death of one of the parents have a strong negative effect on the test scores of children. This is illustrated in Figure 8 showing that these shocks have substantial absolute effects ranging from one-third to almost half of the main effect of parents' skills.¹⁸

¹⁷ There is also evidence that part of the intergenerational transmission of skills results from factors outside the family. In another Goldmine paper by Hanushek et al. (2021), we looked at the intergenerational transmission of being relatively strong in math compared to language. This relative strength in math is also transmitted from parents to children with a correlation of 0.10. We isolated the part of parents' variation in being relatively strong in math that can be contributed to differences in the school environment of these parents. Interestingly, that part is also transmitted from parents to children and the effect size is the same, namely 0.10. In other words, part of the transmission of skills is really caused by social interactions between parents and their children without genetic influences.

¹⁸ We also ran placebo analyses looking at the effect of these family shocks taking place after the children took the CITO-test. The effects of divorce or parental death after the children took the CITO-test are much smaller and only significant at $p=0.10$ corroborating a causal interpretation of these shocks. For the decrease in the family's household income however, we see no difference: the placebo analyses show a significant negative effect of -0.08.

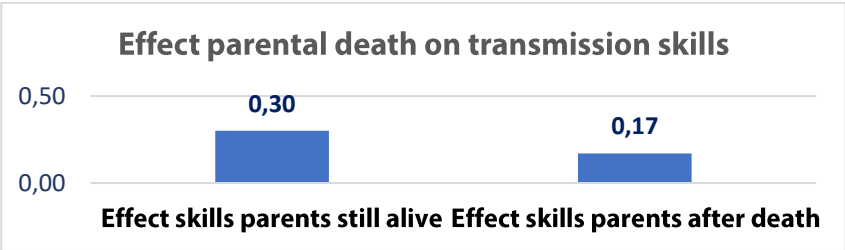
Figure 8: Family shocks and children’s skills



Source: Jacobs, Kalmijn, and Van der Velden (in progress)

In the case of parental death, the shock also affects the ‘normal’ transmission of skills, distorting the causal chain.

Figure 9: Parental death and intergenerational transmission of skills



Source: Jacobs, Kalmijn, and Van der Velden (in progress)

In Figure 9, you can see that when both parents are still alive, the effect of parents’ skills on children’s skills is 0.30. In case the parent of whom we have the test score at age 12 dies before the children took the CITO-test, the effect size is only 0.17. This means that the causal chain gets distorted, and the intergenerational transmission of skills is decreased with some 45%.¹⁹

¹⁹ The placebo analysis looking at parental death occurring after the test was taken shows no significant difference (estimate of intergenerational transmission of skills is 0.30).

But what about the role of schools?

Secondi piatti: Skills production in schools

Is it possible that high-skilled parents get high-skilled children, because they choose better quality schools for their kids? We also looked at that. We performed further analyses assessing whether high-quality schools mediate the intergenerational transmission of skills.²⁰ The initial results suggest that on average higher-skilled parents do choose high-quality schools and the quality of these schools is also substantially related to the skills development of children. However, the quality of schools was independently related to the skills of children and did not mediate the effect of parental skills. Therefore, we can conclude that families and schools can be seen as two independent places where skills are developed.

This brings us to another company I would like to tell you about: the ‘Silvermine’. The Silvermine (co-directed by my colleague Carla Haelermans and myself) involves the creation of a large national dataset: the Netherlands Education Cohort Study.²¹ As part of this project, we collected test results on learning growth from grade 1 (age 6) till grade 5 (age 11). We got data from some 2,200 primary schools in the Netherlands (appr. 30%) covering 475,000 unique students for the period 2017/2018 till 2021/2022. The tests to measure learning growth are taken twice per year with a midterm test in January-February and an end-of-term test in June-July. Most schools use a national test, so that results can be compared across schools. The interesting thing is that these tests

²⁰ See Bles et al. (in progress). For the quality of schools, we looked at the CITO scores of schools at the age at which children would enter school, controlled for input characteristics.

²¹ In Dutch: Nationaal Cohortonderzoek Onderwijs (NCO). For more information on NCO, see [link](#) and Haelermans et al. (2020).

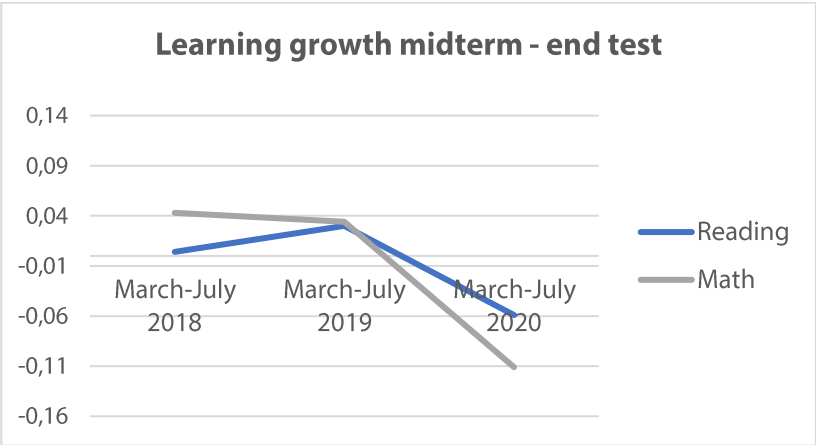
measure performance in math and language on a continuous scale from grade 1 to grade 5, so that for each period, we can observe how much a student gained in performance relative to others.

As you know, COVID-19 hit the schools in March 2020. At that moment, schools were closed for a period of eight weeks and students were sent home and were obliged to follow on-line education. This happened without prior warning, and it took some time for schools (and for parents) to get things organized. In a way, this can be seen as a natural experiment: what will happen with the skills development of children if there are no schools? This is the sort of experiment that no ethical committee would ever approve, but still, it yields very important information. It is hard to get a good estimate about the effects of schools²², as initial education is mandatory and differences between schools are relatively modest due to standardization of curricula and national quality controls. But what happens if they cannot go to school?

The pandemic offered us a unique possibility to study such effects. Interestingly, the midterm test in 2020 was taken just before the first school closure, while the end-of-term test was taken directly after. By comparing the learning growth during the first school closure with the learning growth in the same period before the pandemic, we get an idea of the contribution of schools to skills development.

²² Instead, researchers had to exploit differences in school-starting age or summer breaks to estimate such effects. See e.g., Hanushek and Woessmann (2015) on school starting age and Downey, von Hippel and Broh (2004), Burkam et al. (2004), and McEachin and Atteberry (2016) on summer breaks.

Figure 10: Learning growth in period March-July between midterm test and end-of-term test



Source: NCO

Figure 10 presents the learning growth from March to July between the midterm test and the end-of-term test. The first two periods present the pre-pandemic years and the third one is the period of the first school closure.²³ The learning growth of students slowed down with between 0.06 (reading) and 0.11 (math) of a standard deviation, which is equivalent to 5-9 weeks²⁴ attending school. Note that this is very close to the actual number of weeks that schools were closed (namely eight weeks including two weeks of holiday).

So, there is no doubt that schools are important: they are and without schools, children will not develop their skills well. But what about social inequality? One of the things we observe in most countries that have a well-functioning education system, is that social inequality at the end of

²³ We standardize the learning growth per domain and per grade on the pre-pandemic data, with a mean zero and standard deviation one. So, the average learning growth in the period March-July 2020 reflects how much this learning growth is decreased, compared to the pre-pandemic period. For more information, see Haelermans et al. (2021; 2022).

²⁴ Given an average learning growth of some 0.5 sd per year.

the schooling period is larger than at the beginning.²⁵ In other words, disparities across social classes tend to increase instead of decrease during the time that students go to school. Some scholars see this as evidence that education reproduces social inequality (Bourdieu and Passeron, 1977; Lukas, 2001). But this is a naïve view on how skills develop. Children with higher skills provoke more intellectual stimuli from their environment and therefore develop their skills even more, than children with low skills, even if they go to the same school and have the same teacher. This is also referred to as the Matthew²⁶ effect: “For unto everyone that hath shall be given ...” (Matthew 25:29). The real test whether schools reproduce social inequality or dampen social disparities, is to look what happens with these disparities when schools are closed, and children mainly depend on their direct family to develop their skills.

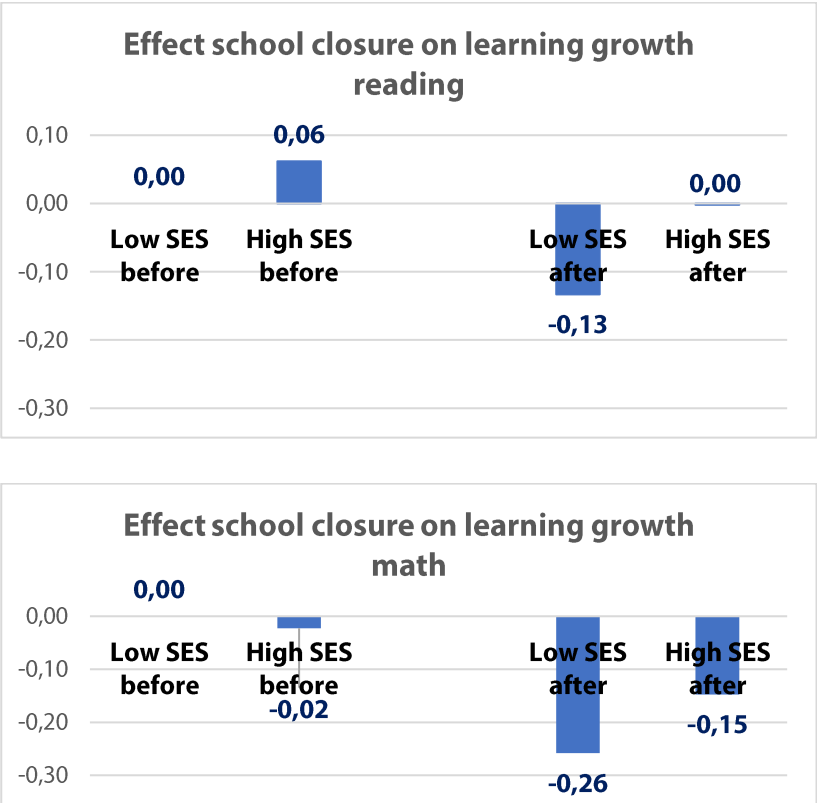
We looked at that as well²⁷ and the results clearly indicate an increase in social disparities during the first school closure. In Figure 11, we see the results for reading and math. Both high-SES and low-SES students were negatively affected by the first school closure, but the negative effect for the last group was much stronger. So, we can conclude that social disparities increased during the first school closure, thus providing evidence that schools dampen social disparities.

²⁵ This is partly related to differential skills development, but also to differential choices at branching points in the educational career (see Boudon, 1974).

²⁶ This is what Cunha and Heckman (2007) refer to as the ‘skills beget skills’ thesis.

²⁷ For more information, see Haelermans et al. (2021; 2022) and De Leeuw et al. (2022).

Figure 11: Standardized learning growth by SES before and during first school closure



Source: NCO

Dolci: Conclusions and policy implications

The three views revisited

It is time to present the dessert. What have we concluded so far and what does this imply for the previously presented three views on education?

In line with human capital theory, we have concluded that individual skills are the main driving factor affecting productivity both at micro and macro level. At the same time however, educational attainment levels have risen in several countries without a corresponding increase in GDP ('years of schooling paradox'). This is mainly due to inherent pressures to follow ever higher levels of education to be successful on the labour market and this is typically in line with what credential theory would predict.

Looking at the role of different resources affecting the persistence of educational attainment, we observe that the first transition at age 12 is mainly affected by the human capital in the family. The intergenerational transmission of skills is the dominant mechanism affecting initial track choice at age 12 and this is in line with a human capital view on skills production in families. However, other resources such as cultural and financial capital are relevant as well, and the relevance of cultural capital becomes stronger when we look at later transitions, such as the choice at age 18 to obtain a full upper-secondary qualification or leave school early, which points to elements of social reproduction.

The pandemic offered a good opportunity to look at the skills production in schools. Schools are in a way the big winner in this story. In line with the human capital view, schools are extremely important in developing relevant skills. Another important conclusion is that education dampens social disparities, a conclusion that clearly contradicts the social reproduction theory.

All in all, my conclusion is that most of the evidence presented today is in favour of a human capital interpretation on the role of education. To be successful in education or work, it is not sufficient to have a high learning ability. This learning ability needs to be converted in skills that are relevant and families and schools are the most important places to develop such skills. And later in work, these skills need to be used to be productive: This is a skills world at least for the most part. At the same

time, we can conclude that there is credentialism and some findings related to the intergenerational persistence of education clearly point to the relevance of social reproduction.

I also want to stress that arriving at these conclusions was only possible because we have data on skills. We should not underestimate how much progress has been made since these data sets have become available. The international student assessments like PISA and TIMMS, and the adult skills surveys like PIAAC, have greatly contributed to our knowledge about the relevance of education. This also holds for the unique data that we have developed for the Netherlands both on the intergenerational transmission of skills as well as on the learning growth in primary education. They all show how relevant skills are and how they are related to characteristics of education systems, schools, and families.

There are however three developments that threaten an optimal skills development and that should be addressed by policy. These are the hard nuts to crack: the social disparities in skills development and educational choices, the overall decline in skills levels, and the growing importance of shadow education.

Nut # 1: Increasing social disparities

For several years now, the Inspectorate of Education has sounded the alarm about the raising inequalities in education (Inspectie voor het Onderwijs, 2019). The inequality in educational opportunities is a persistent problem that is not always easy to address. However, over the years, some successful interventions have been developed. To decrease social disparities, policy should focus on interventions from which the most vulnerable would profit most. 'Raising the floor' (Harden, 2021)²⁸ is

²⁸ In her book Harden (2021) distinguishes three types of interventions. 'Levelling down' basically means that gaps are being closed because higher skilled are denied optimal development. This is clearly the least preferred type of intervention as it lowers overall quality. 'Raising the floor' means that

the best way to help all, and to close the gap between social groups at the same time. This relates to the type of interventions that higher-skilled students do not necessarily need to go ahead, but which truly make a difference for the lower-skilled. A good example of an intervention that focuses directly on increasing skill levels is Early Childhood Education and Care (ECEC).²⁹ What makes ECEC so effective is that potential effects are amplified because of the Matthew-effect, thus making them more efficient than interventions at a later stage (Cunha and Heckman, 2007)

Development of key skills for vulnerable children is the most important policy to close the social gap. But we should not turn a blind eye on the relevance of the other two mechanisms affecting educational opportunities for children: the role of cultural capital (soft skills) of the parents and the role of financial resources. Improving engagement of low-educated parents in school is important to counterbalance the lack of knowledge and navigating skills in education and can be applied for young children³⁰ as well as young adolescents.³¹

interventions are aimed at increasing skill levels for the disadvantaged, without hurting the skills development of the higher-skilled. 'Left behind' are the interventions from which the higher skilled profit most, thus increasing the overall skills levels, but also increasing the social inequalities.

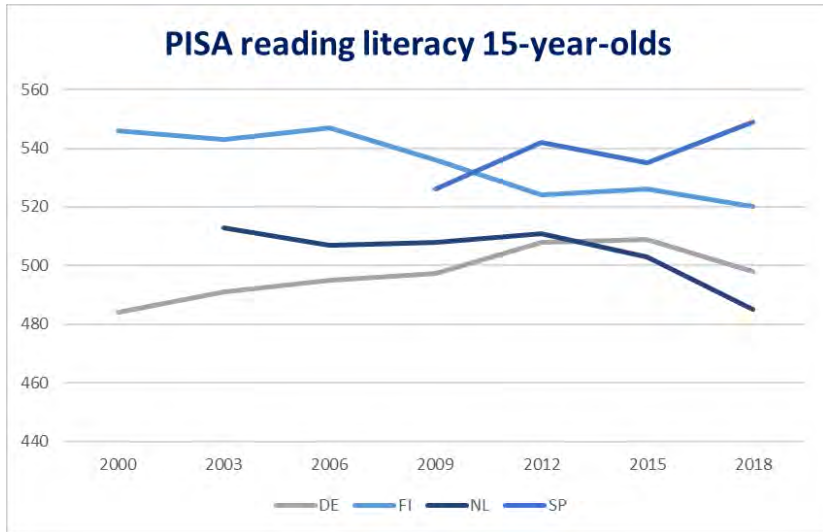
²⁹ A recent meta-analysis by Van Huizen and Plantinga (2018) looks at recent studies exploiting natural experiments to identify the causal effects of universal ECEC arrangements. Using 250 estimates from 30 different studies, they show that ECEC can be very effective but only if the quality is high. Moreover, the gains are concentrated among the disadvantaged youth and there is no evidence of these effects fading out over time.

³⁰ Some examples of evidence-based interventions for young parents are listed in Breuer et al. (2021) varying from relatively simple interventions like parent-school meetings (Avvisati et al., 2014) to the intensive 'Incredible Years' training (Menting, Orobio de Castro, and Matthys, 2013). See also Lavecchia, Liu, and Oreopoulos (2016).

³¹ An example of a successful intervention aimed at young adolescents is the German mentoring program (Resnjanskij et al., 202021).

Nut # 2: Declining skill levels

Figure 12: PISA scores on reading literacy for selected countries



Source: OECD (2022)

Key skills are extremely important, but in the Netherlands, we face a long-term downward trend at least for reading literacy (Inspectie voor het Onderwijs, 2018; OECD, 2019). In Figure 12, you see results for PISA for some selected countries in the period 2000-2018. For the Netherlands, we observe a decrease in average reading scores of some 28 points or more than a quarter of a standard deviation. This is a substantial decrease! In the international ranking we dropped from rank 9 to rank 26. Former champion Finland also shows a downward trend, dropping from the top position to rank 7. But such a declining trend is not true for all countries. It is interesting to see how a country like Germany made the opposite move. After what they call the 'PISA-shock' in the early 2000s, all alarm bells went off and everything was geared towards gaining a better ranking in the next years. And with some success. They increased their

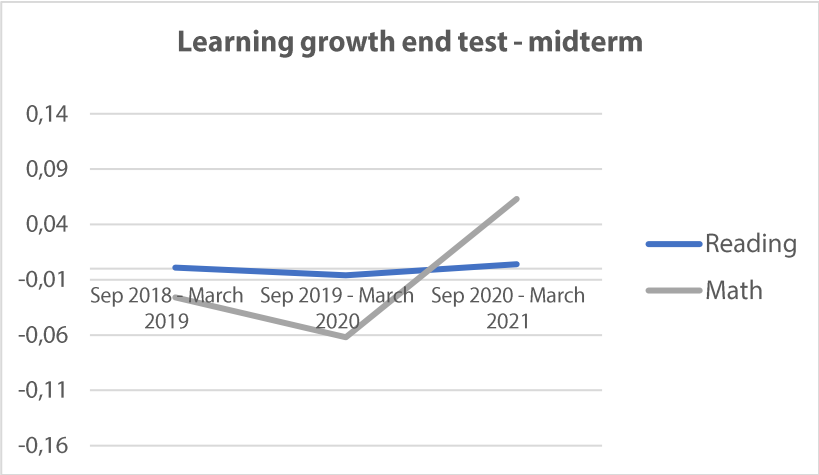
scores and now rank higher than the Netherlands.³² And look at Singapore (and other eastern Asian countries). They have a top position in all domains since they started participating and are still increasing their proficiency level.

One of the differences between Singapore and the Netherlands is that they take skill proficiency levels seriously. Despite their superior ranking, Singapore sent a top-level delegation to Europe in 2014, to see what they could learn from other countries. And they made it what we call 'chefsache'. The delegation was led by their Minister of Education. Compare that to the Dutch. In the past ten years, while we were slowly slipping away in the international ranking, there has been no delegation sent abroad headed by our Minister of Education to see how we can stop this downward trend. This demonstrates that it is simply not regarded 'chefsache'. It would be good if the new Ministers, Robbert Dijkgraaf and Dennis Wiersma, will make this their top priority.

I am quite optimistic that we can make such a change, not only because of the above examples of Germany and Singapore, but also because the pandemic affected our mindset. One of the most fascinating conclusions from the Silvermine papers, is not that the pandemic had such a negative effect on the school performance of young children. That was to be expected. No, the real interesting finding was to see how resilient Dutch schools are and how well they did in catching up.

³² They increased from 484 in 2000 to 509 in 2015 and then fell back again to 498.

Figure 13: Learning growth in period September-March



Source: NCO

Figure 13 shows the increase in the learning growth in the period between September 2020 and March 2021. Note that this period included a second school closure, but still, we see a clear upward trend for math.³³ If we consider the whole period, there is still a considerable learning loss (see Haelermans, 2021), but not as dramatic as in the first period.

Keep in mind that these schools have been under immense pressure for a long period, and still they were able to achieve this. In my view, this was possible because there was a strong sense of urgency among all stakeholders, making sure that ‘all hands were on deck’. Schools focused on their core tasks of developing math and language skills. This shows what you can achieve if you all share the same goal. But it also involves making choices as was nicely illustrated in a book by educational practitioners Eva Naaijken and Martin Bootsma (2018) under the provoking title: “And what if we would just start teaching again?” (“En wat

³³ Because the scales are different, the learning growth cannot be directly compared to the one in Figure 10.

als we nu weer eens gewoon gingen lesgeven”). Their main message: set priorities and strengthen the central role of the teacher.³⁴

Nut # 3: Increase of shadow education

In the previous analyses we have shown that financial resources also play an important role in the persistence of educational attainment. This role is probably stronger than expected in a country like the Netherlands that is known for its equitable funding.³⁵ It is more than likely that the role of financial resources will increase in the coming years, given the recent rise in shadow education (Elffers, 2018; Onderwijsraad, 2021). Nowadays, more than a quarter of Dutch students in primary and secondary education make use of some sort of shadow education (Bisschop et al., 2019) and this is disproportionally consumed by children from high-income families.

It is not easy to address this. Parents know that education is important and understand that increasing their offspring’s skill levels is crucial for success. They also feel that education is increasingly a positional good, and thus it is hard to stop their quest for the highest educational attainment. The only fundamental way to address this is by weakening

³⁴ They were offered the opportunity to put this into practice and turned a mediocre school in Amsterdam into an excellent one in just a few years.

³⁵ Note however that the funding only compensates for being unlucky in the environmental lottery (e.g., having low-educated parents), but not for being unlucky in the genetic lottery. In contrast, the school weight score assessed by Statistics Netherlands explicitly corrects these social disadvantages for IQ differences (see Posthumus et al., 2016). This is questionable from a cognitive-developmental perspective as well as from a moral-philosophical one. Even if we would agree to this view on equity, we can also think of it from the school’s perspective. Primary schools are expected to achieve certain minimum skills levels (so-called ‘referentie niveaus’). These minimum goals are more difficult to achieve when a school has a large population with a below-average IQ. This means that schools will have an incentive to select students with higher IQ upon entrance as they will not be compensated for this additional effort. By explicitly controlling for this part of the lottery, while compensating for being unlucky in the environmental lottery, the funding is fundamentally inconsistent.

the returns to educational attainment. In the past decades these have increased substantially, and educational attainment increasingly offers the only entry ticket to desired social positions.³⁶ This has been justified as legitimate as it is supposed to be based on merit. However, merit is a weak basis, if we acknowledge the fact that achieving a top position in education is only to a limited extent due to hard work and to a great extent affected by being lucky in the genetic and environmental lottery: i.e., your genes and the family you are born in. Acknowledging this, provides a strong argument to rethink how we value different occupations and associated earnings.³⁷ In the words of Nobel Prize winner Amartya Sen (2000): *“The rewarding of merit cannot be done independent of its distributive consequences”*.

Il conto: Acknowledgements

At the end of my farewell speech, it is time to take a step back. Exactly 32 years ago, in June 1990, I started working at ROA and I feel that my professional career in the past three decades and the development of ROA as an institute are intricately intertwined. Many, many people have been crucial in this professional journey, and I probably cannot do justice to all of them, but I will give it a try.

First, I would like to thank the UM board for appointing me and for always being so open and accessible. And by the way, thank you also for postponing the UM-wide introduction of ‘Integrale Bedrijfsvoering’ until after my retirement: that is great farewell gift! I also thank our deans, in

³⁶ Specifically in countries like the US, see Markovits (2019) for a nice illustration.

³⁷ This adds to existing critique on meritocracy which points out that meritocracy divides society in ‘winners’ and ‘losers’ (Markovits, 2019; Sandel, 2020). In the meritocratic ideology the former group thinks they ‘deserve’ all benefits associated with a higher educational attainment, while the latter group gets humiliated by suggesting it is their own fault.

particular Philip Vergauwen and Peter Møllgaard for their active support in the integration process of ROA in the faculty.

A great thank you to former directors of ROA, Hans Heijke and Thomas Dohmen for supporting me, the current director (and master chef) Didier Fouarge for being a great successor, and all members of the management board Frank Cörvers, Mark Levels and Carla Haelermans. It was a great pleasure working with you. A special thanks should go to my former colleague and comrade in arms, Andries de Grip. Andries, sharing the responsibility of directorship, meant double pleasure and half of the problems. I have learned a lot from you, and I thank you for 30+ years of friendship.

Since I joined in 1990, ROA has grown from an institute of some 15 people to more than 65 staff members nowadays. The fact that it is organized so efficiently is largely due to the professional qualities of our support staff: thanks to all.³⁸

While serving this meal, I hope that I passed another message as well: the fun you get from cooking with nice colleagues, using interesting data and studying relevant topics. There is really nothing in the world that makes you happier than that. I have been so lucky that I often could work in projects that fulfil all three aspects. Seven years ago, I started the NCO-project together with Mark Levels and later Carla Haelermans. Many of the findings I presented today would not have been possible without this project. This was only possible due to an enthusiastic, hard-working team both at ROA and at NRO.³⁹ It is incredible what we achieved in past seven

³⁸ Our secretariat (Miranda Boere, Fabiënne van Gelder, Mariëlle Retz, Suzanne Souren), finance staff (Joyce Gruijthuijsen, Melissa Llanes), quality assurance (Margo Romans) and statistical analysts (Sander Dijksman and Timo Huijgen). Thanks also to the UM staff: Michiel Korsten (HR), Elke Königs (finance), Cindy Schröder and Remy Timmers (legal), Kyril Bruurs, Paul Hick and Richard Thal (ACO).

³⁹ In particular: Bas Aarts, Henry Abbink, Sabine Baumann, Ineke Bijlsma, Willemijn Havermans, Arnold Hendrikse, Timo Huijgen, Madelon Jacobs, Melanie

years. The development of NCO was also made possible thanks to the support of our program committee and technical advisory group who always believed in us and were dedicated to make it a success.⁴⁰ Thank you all.

When I mention NCO, I should also mention Education Lab Netherlands, initiated, and developed by Tijana Breuer and Inge de Wolf. Tijana and Inge: you have done an amazing job and I am proud of what you have achieved in the past three years. Thanks also to Ilja Cornelisz and Chris van Klaveren who contributed greatly with their inspiring intellectual input. The efforts of the four of you culminated in winning a major grant of the Growth Fund (Ontwikkelkracht): a well-deserved prize!

Then my secret project in the past 3 years: the 'Goldmine company'. This group is now rapidly expanding and currently counts some 20+ researchers. This is what I think science is all about: working on relevant

Monfrance, Margo Romans, Chayenne Smeets, Lynn van Vugt, and Sanne van Wetten here at ROA and to Wendy l'Ami, Gerard Baars, Sophie Brolsma, Liesbet de Haas, Kelly Irvine, Annemarijke Jolmers, Jelle Kaldewaij, Nina Ouddeken, Marit van Ree, Niels Rijke, and Bodine van Wingerden at NRO. Thanks also to our colleagues from Statistics Netherlands, Oxsana Balabay, Sabine Gans, Ivo Gorissen, Mark Groen, Sebastiaan Looijen, Marga Sloombeek, Tanja Traag, and René Wetters as well as Marleen Michels from bureau Make a Change who helped us realize this project. Thanks also to our colleagues from ParnasSys, ESIS, CITO, DIATAAL, BOOM and ICE who provided the national test data.

⁴⁰ I would like to thank our chair, Herman van de Werfhorst, who has guided us with his strategic and scientific excellence and Saskia Schenning and Eugène Bernard who paved the way to enter the schools. Eugène was crucial in his role as my consigliere in the early years of the project. Thanks also to Dinand Webbink and Roel Bosker who is taking over the role of chair of the program committee. Roel: we started our academic careers by working together on the so-called Groningen-cohort. It stands to reason that we should finish our academic career by working on the NCO: education panel surveys are thus the alpha and omega of our careers. Finally, I need to mention some of the colleagues at the Ministry of Education, Science and Culture: Fons Dingelstad, Annemieke Kolle, Marc van der Steeg, and Ib Waterreus as well as colleagues at the Inspectorate of Education, in particular Bert Bulder who sadly passed away last year, Harry Heemskerk and Roxanne Korthals. You have all been crucial in creating support at the policy level.

issues with great data and an enthusiastic team. Thanks to the early diggers: Per, Rick, Guido, Stan, Simon, and specifically to Babs who stood side-by-side when we started delving the first nuggets. From this moment on, you are officially appointed as Chief Data Officer (CDO) of this company.

I also had great pleasure working in several international projects. For more than two decades I was involved in PIAAC. I learned a lot from working with very good partners in the international consortium and I would like to thank Irwin Kirsch from ETS for leading this project and Tim Huijts for taking over my role as coordinator.⁴¹ I also enjoyed coordinating the international graduate survey REFLEX⁴² and working in related projects like CHEERS and HEGESCO.

The basis for our involvement in these international projects originates in the school-leaver and graduate surveys that we started in the early 90's. The biggest success is the HBO-Monitor, which has been carried out for more than 30 years now. Thanks to Christoph Meng, and Barbara Belfi for further developing this project so well. Thanks also to our colleagues from DESAN.⁴³

I would also like to thank all other staff I worked with in different projects. Just to name a few: my colleagues in the flexibility project⁴⁴, the creativity

⁴¹ I also thank our colleagues at the OECD in particular William Thorn, Glenda Quintini, and Marco Paccagnella. Thanks also to my colleague Jim Allen who assisted me during the first cycle and to Marieke Buisman whom I worked with in several follow-up projects in the Netherlands.

⁴² Together with my colleague Jim Allen, I worked with a very large team, of whom I would like to mention Adela García Aracil, Jean-Jacques Paul, José Ginés Mora (Pepe), Michele Rostan, and Liv Anne Støren in particular: thanks for being such good partners.

⁴³ In particular: Monique van Alphen, Han van Dongen, and Hans Rutjes.

⁴⁴ Per Bles, Roxanne Korthals, Melline Somers, Dinand Webbink, and Katarina Wessling.

project,⁴⁵ the project on gender differences⁴⁶ and the project on craftsmanship.⁴⁷ For the latter project I still bear good memories of our joint weekend in a monastery in St-Michielsgestel and the project ended with a well-deserved first prize of best policy report 2019.⁴⁸ We can be proud of that achievement.

A special word of thanks goes to my PhD's: supervising you has been the cherry on top and contributed so much to my pleasure in work.⁴⁹

There are three people that deserve specific credits. One of them is my former PhD student Marie-Christine Fregin who started her own research line here at ROA on Artificial Intelligence and future of work. Marie: I am really impressed of what you have achieved and how you developed your own style of academic leadership. You are an example for us all and I really like staying involved as an academic advisor in your projects for the next few years.

Then Carla Haelermans, my successor as program leader and coordinator of the NCO-team. Carla: I am so glad that you decided to join ROA a few years ago and I am confident that under your leadership the program and NCO will flourish as never before.

⁴⁵ Barbara Belfi, Kim van Broekhoven, Diana Dolmans, Roy Erkens, Karel Janssen, Arie van der Lugt, Scheltus Jan van Luijk, Raymond Montizaan, Eline Pragt, Julie de Ronde, and Trudie Schils.

⁴⁶ Barbara Belfi, Marloes de Hoon, Jelle Jolles, Frans Kaiser, Judith Keizer, Renze Kolster, Mark Levels, Christoph Meng, and Hans Vossensteyn.

⁴⁷ Thijs Bol, Marieke Buisman, Didier Fouarge, Mark Levels, Arjan van der Meijden, Christoph Meng, Regina Petit, Jesper Rözer, Herman van de Werfhorst, and Anneke Westerhuis.

⁴⁸ Awarded by the Dutch Sociological Association NSV and the Association for Policy Research VBO.

⁴⁹ In chronological order: Inge de Wolf, Judith Semeijn, Christoph Meng, Tanja Traag, Charlotte Büchner, Hans Corten, Martin Humburg, Marie-Christine Fregin, Alexandra de Gendre, Kim van Broekhoven, Alexander Dicks, Lynn van Vugt, Per Bles, Babs Jacobs, and Milan Kovacevic.

Finally, Mark Levels. Mark: you are not 'just a good colleague'. In the past decade you were one of my main support pillars. Meanwhile you have developed a very successful research program of your own, with the award of a large research grant from the Growth Fund as the latest success. I admire your strength and strategic vision: you are truly a great sociologist.

I am indebted to the people who fostered my love for sociology and for educational research: my supervisor Wim Meijnen who gave me the opportunity to start working on the Groningen-cohort, my good old friend Arie Glebbeek who always kept me sharp with his intellectual input, and my mentor and friend Jaap Dronkers who sadly passed away a couple of years ago. He would have loved working in the Goldmine, and I dedicate this farewell speech to him.

Tot slot, maar eigenlijk het belangrijkste: mijn familie. Janneke, jij bent mijn soulmate. Dank voor alles wat je in mijn leven betekend hebt. Corinne en Hester: jullie zijn fantastische kinderen en ik ben zo trots op wat jullie bereikt hebben. Ik ben ook heel blij met jullie partners Nora en Noël. Tante Tiel: u bent sinds het overlijden van mijn eigen moeder 35 jaar geleden mijn vervangmoeder. Dank voor alles wat u gedaan hebt. En dan natuurlijk mijn kleinkinderen: Sara en Thijmen. Ik denk dat het tijd wordt dat opa gaat zorgen voor wat intergenerationele overdracht van skills.

Ik heb gezegd.

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