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MISSION: EDUCATION FOR THE 21st CENTURY

**HOW INNOVATION POLICY COULD ACCELERATE THE
TRANSFORMATION OF THE GERMAN SCHOOL
SYSTEM**

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LAYOUT

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Summary

Despite all efforts to enhance both the quality and equality of the German school system, its performance has stagnated for decades. If the coronavirus pandemic is to trigger a process of transformation towards an equitable and effective school system of the 21st century, radically new strategies are required. This paper focuses on ‘missions’ – as a new generation of innovation policies supposed to tackle grand societal challenges. Missions have previously been implemented in societal fields such as energy, health and environmental policy. I argue that they should be tried out in the field of education policy as well. I will present the basic ideas of mission-oriented innovation policy and develop the outlines of a mission entitled 'Literacy and Numeracy for All Children' to illustrate how this approach could be transferred to the field of education.

Stagnation of the school system despite all efforts

The inauguration of a new federal administration in Germany at the end of 2021 has triggered great hopes for a fresh political start. In the field of education, these expectations can only be disappointed. Compared to other political areas, the programmes of the three parties forming the new governmental coalition are significantly less ambitious. However, there is a more important reason for why the likelihood of fundamental change is low: it is completely unclear as to how it could be organised.

The attempt to bring about major change in the school system is by no means new. Twenty years ago, the national shock following the publication of the OECD's first PISA study triggered many efforts to improve schools in Germany, to make them more effective and equitable. However, the coronavirus pandemic has revealed the limited success of these efforts. Major problems such as the dependence of academic success on a student's socio-economic background remain unsolved. At the end of the ninth grade, almost one in four pupils fails to meet the minimum requirements in reading, writing and maths. In addition, schools have exhibited a low degree of resilience vis-à-vis the disruption of their routines during the coronavirus pandemic – not least because the digitisation of schools had been utterly neglected.

Twenty years after PISA we thus have to ask ourselves: Why have all our efforts resulted in a multitude of small wins, but not in substantial change across the school system? From this diagnosis we must draw the right conclusions. After decades of school reforms lacking the desired effects we have to accept the sobering fact that our standard repertoire of action has been exhausted. If we want to develop an excellent and equitable school system for the 21st century, a fundamental change of course is required.

But where are new strategies to come from? The sources which used to feed new ideas of how to change the school system have largely run dry. Be it the orientation towards the most successful international school systems, such as those in Finland or Canada, or the recommendations of empirical educational research – all previous approaches have proven insufficient and new proposals for promising alternatives are lacking. This is why an increasingly exhausted discussion has been spinning in circles for years.

Tackling grand challenges through 'missions'

In the search for new strategies, we should therefore take a look over the fence at current developments in innovation research and innovation policy. In recent years, a new political instrument has become the focus of attention: so-called 'missions'. This approach has been made popular by innovation scholar Mariana Mazzucato in a series of publications.¹ The OECD,² the EU³ and German innovation policy⁴ regard mission-oriented innovation policy as particularly promising when it comes to developing and implementing creative, comprehensive and effective solutions to the grand societal challenges facing modern societies.

¹ E.g., Mazzucato, M. (2017). Mission-oriented innovation policy. UCL Institute for Innovation and Public Purpose Working Paper; Mazzucato, M. (2018a). Mission-oriented innovation policies: challenges and opportunities. *Industrial and Corporate Change* 27(5), 803–815.

² Larrue, P. (2021). The design and implementation of mission-oriented innovation policies: a new systemic policy approach to address societal challenges. *OECD Science, Technology and Industry Policy Papers*, No. 100. OECD Publishing.

³ Mazzucato, M. (2018b). Mission-oriented research & innovation in the European Union. European Commission.

⁴ <https://www.bmbf.de/bmbf/en/research/hightech-and-innovation/high-tech-strategy-2025/high-tech-strategy-2025.html>.

Missions are designed to address the most complex systemic problems, such as climate change. Problems such as these cannot be dealt with by interventions of limited scope, within the framework of the usual political competencies, and by means of conventional methods. For at the outset, effective solutions are unknown, as is the path along which new remedies can be found and implemented. Moreover, meeting such challenges requires major changes and adaptations in the realms of policy and administration, the economy and markets, and science and civil society.

The formulation of missions therefore does not depart from the question of what can be achieved with the usual instruments and within existing structures. Mission-oriented policy-making instead turns the question around: it focuses on a major challenge, asks what needs to happen in order to tackle it successfully and organises a problem-solving process guided by Mario Draghi's maxim: "Do whatever it takes". The policy design of missions is based on the following principles.⁵

(1) Missions address major challenges and provide a clear direction for tackling them

Missions focus on particularly large and complex societal challenges and formulate highly ambitious and inspiring visions for the future. At the same time, they set clear aims in order to provide all stakeholders with a clear understanding of the direction in which the further course of developments is supposed to unfold. To this end, missions must define measurable goals which are to be achieved in a limited period of time. This way, success and failure can be distinguished.

(2) Missions focus on the entire innovation chain and mobilise contributions from different scientific disciplines and societal sectors

Missions stimulate activities along the entire chain of innovation, from basic and applied research to the entrepreneurial development of new solutions and their implementation and diffusion in practice. This process is not designed as a linear one. Feedback loops between all the actors involved may occur at all stages of development. To cope with the diversity and complexity of major challenges, contributions from different scientific disciplines (natural sciences, social sciences and humanities), societal areas (e.g., technology, education and social affairs) and from both established stakeholders and new entrants from

⁵ Based on Mazzucato (2018a); Mazzucato (2018b).

the state, the economic sector and civil society must be mobilised and harnessed. In other words, missions unleash a country's full societal potential, directing it towards the long-term development and diffusion of new solutions.

(3) Missions facilitate experimental action and test a variety of solutions

Missions do not prescribe appropriate ways to develop new solutions. Rather, they explicitly allow for the probing of different and unconventional ways of problem solving. Clearly defined goals are thus combined with a broad variety of experimental bottom-up developments, the outcomes of which can combine into increasingly complex new arrangements of solutions. To this end, missions open up protected spaces in which many different problem-solvers from the public and private sectors as well as academia can work long term on the development of solutions aligned with the mission's goals.

Mission-oriented policies also differ from the usual funding programmes in terms of governance. Dedicated innovation agencies play an important role as facilitators.⁶ Equipped with their own budget, highly qualified staff and considerable autonomy, they are tasked with identifying promising developments at an early stage and helping novel solutions to achieve a breakthrough by means of a wide range of supportive instruments.

Missions in the field of education

Today, missions are being implemented in many different societal areas. The German 'Energiewende' is one of the best-known examples. Oriented towards the goals of achieving CO₂ neutrality, the phasing out of nuclear power and achieving energy security, a new system of sustainable energy generation and use has emerged over the decades and continues to be built. It combines different sub-technologies such as wind power and solar energy, as well as new grids and storage technologies. The current EU research framework

⁶ Agencies such as Sweden's Vinnova or Germany's SprinD are modelled on the US Defense Advanced Research Projects Agency (DARPA). DARPA is credited with playing a major role in the development of groundbreaking new technologies such as the internet or the Global Positioning System (GPS).

programme 'Horizon Europe' also encompasses five missions in the areas of climate change, medicine and environmental protection.⁷

So far, education has been entirely excluded from these developments. If the coronavirus pandemic is to trigger a new transformational dynamic with the potential to overcome decades of stagnation in the public school system, this needs to change.

How would a mission have to be designed in order to successfully contribute to the development of a 21st-century school system? And how would such an approach differ from conventional innovation policies in education? In what follows, I seek to answer these questions by proposing a mission: 'Literacy and Numeracy for All Children'.⁸

(1) Missions address major challenges and provide a clear direction for tackling them

The school of the future will certainly teach many skills and competencies that are not yet part of its standard repertoire. But as an indispensable requirement, it needs to guarantee the academic success of all children, regardless of their social or economic background. This points to one of the most severe weaknesses of the German school system. On average, almost every fourth child fails to meet the minimum standards in reading, writing and maths in Grade 9. In some states, these figures are much worse.⁹ This negatively impacts on the lives of the children and families affected, as well as the cohesion of society and the country's economic performance. A mission 'Literacy and Numeracy for All Children' would send a clear signal that this state of affairs is no longer to be accepted.

After all, poor performance at school is not a matter of fate. The most effective schools demonstrate that virtually all children can achieve at high levels. So instead of trying to reduce the number of low-performing pupils by a few per cent, as we have done so far, we should set ourselves a much more ambitious goal: In 25 years, at least 95 per cent of all

⁷ https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/missions-horizon-europe_en.

⁸ Of course, the capabilities of the schools of the future will reach far beyond the mastery of basic skills. Digital competencies, democracy education or deeper learning are of utmost importance, too. However, these tasks may be addressed within the framework of separate missions in order to reduce the complexity of the processes at hand.

⁹ Stanat, P., et al. (Eds.) (2016). IQB-Bildungstrend 2015. Sprachliche Kompetenzen am Ende der 9. Jahrgangsstufe im zweiten Ländervergleich. Münster, New York: Waxmann; Stanat, P., et al. (Eds.) (2019). IQB-Bildungstrend 2018. Mathematische und naturwissenschaftliche Kompetenzen am Ende der Sekundarstufe I im zweiten Ländervergleich. Münster, New York: Waxmann.

students should master the expected standards in reading, writing and maths by the end of Year 9.

(2) Missions take the entire innovation chain into account and mobilise contributions from different scientific disciplines and social fields

The problems we deal with in education are complex and stem from many different sources. Therefore, an educational mission needs to mobilise the contributions of a broad variety of actors, nudging their work in the desired direction. Today, the large public school-development projects in Germany rely almost exclusively on cooperation between state schools and educational researchers, excluding the private sector. However, this approach has failed to deliver effective solutions for the problems of schools over decades. We need to accept that its potential is exhausted.

Instead, the contributions of private-sector actors need to be embraced as indispensable elements of productive innovation systems. Hence, they should be mobilised in more comprehensive and targeted ways in the future. EdTech start-ups and innovative non-profit organisations should play an important role in the development and distribution of new solutions, thus filling the gap between applied research, on the one hand, and the implementation and diffusion of innovation in schools, on the other.

Moreover, an educational mission would actively involve civil society actors when it comes to defining the challenges to be addressed and to formulating visions and goals that guide action, aiming to ensure broad societal approval and legitimacy.

(3) Missions enable experimental action and test a variety of solutions

Obviously, the highly ambitious goals proposed above cannot be achieved by means of conventional projects. A mission 'Literacy and Numeracy for All Children' would create favourable conditions for trying out new and different approaches, seeking to develop solutions much faster and applying them on a much larger scale than has been usual and possible so far.

A network of 100-percent-schools

For example, we might create a network of '100-percent-schools' which are given the mandate that *all* their students must achieve the expected standards in reading, writing and

maths. As we do not yet know how this can be done reliably and on scale, these schools would be provided with additional financial and human resources; they would also enter into close collaborative relationships with research universities. But unlike existing laboratory schools, they would work towards the clear goal of developing effective new teaching programmes and organisational models suitable for adoption and use in a multitude of schools.

Promoting research-based start-up companies

The proposed mission would also invest massively in the development of new digital technologies, such as intelligent tutoring systems for reading, writing and maths which adapt to the students' level and development of knowledge. Based on this, digital start-up companies might create and bring to the market new programmes to provide teachers with reliable and effective tools for better instruction and to facilitate the self-directed learning of students outside of schools. By promoting the emergence of a vibrant Ed-Tech industry, Germany would strengthen its position in an international growth market, in which domestic companies have played only a minor role so far.

Nationwide implementation of tutoring systems

Equipped with these new instruments, innovative tutoring systems could be set up in all schools, as recommended by the scientific advisory body of the German ministers of education.¹⁰ Complementing regular instruction, students would receive additional support in small groups, provided by qualified teaching assistants on the basis of tried and tested methods. This would create a safety net for all those pupils unable to keep up, even under the conditions of a significantly improved classroom instruction.

An innovation agency in education

When it comes to developing and implementing ambitious policies such as these, a mission in education would no longer rely on subordinate administrative bodies which were not created to facilitate innovation in the first place and that have proved unable to deliver. Instead, a novel agency for educational innovation should be created. Similar to SprinD, Germany's agency for disruptive innovation, it would be equipped with a substantial budget

¹⁰ https://www.kmk.org/fileadmin/pdf/KMK/StaewiKo/2021/2021_06_11-Pandemiebedingte-Lernruckstaende-aufholen.pdf

and high freedom of manoeuvre, in order to provide a permanent platform for the development and diffusion of educational innovation, seeking to push forward promising new solutions in agile ways.

Conclusion

The proposed mission 'Literacy and Numeracy for All Children' borrows extensively from the world of technical innovation. Admittedly, this approach is rather alien to the field of education. Missions in education would differ significantly from our habitual ways of organizing innovation in education, and they have to. For if we do not change the methods we employ to bring about change in schools, the results will not change either. Under these circumstances, the school system's performance will continue to stagnate for another 25 years.

However, if that's the case, we might experience a scenario that does not play much of a role in current discussions on education reform: In two or three decades, a Tesla-moment might occur in education. At that point, the products and services of EdTech companies may have become attractive enough for the affluent middle class to begin turning away from a public school system perceived as outdated. In the long run, this could result in a privatisation of schools and education as well as an increase in social inequality on a scale that is hardly imaginable today. In addition, we would observe the digital colonisation of Germany in this particularly sensitive societal field.

If this scenario is accepted as being possible, at least in theory, sticking to business as usual is simply no option. Instead, we should give missions a try in education. Let us tackle the great challenges facing schools with courage, let us set ambitious goals, and let us seek novel solutions in agile ways, working collaboratively and with endurance! If the federal government and the states recognise the opportunities that open up for major innovation in schools, they could create a whole new momentum and set the course for the development of an excellent and equitable school system of the 21st century.

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