THE UNIVERSITY *of* EDINBURGH

FACULTY OF PSYCHOLOGY AND
EDUCATIONAL SCIENCES

Methodology of Educational Sciences Research Unit
KU Leuven

Centre for Research in Digital Education
University of Edinburgh

The rise to power of edtech brokers

Exploring the emergence of new intermediaries in digital education policy and practice

Carlos Ortegón

Doctoral thesis offered to obtain the degree of Doctor of Educational Sciences (PhD) within the framework of a Global PhD at KU Leuven and the University of Edinburgh

Supervisor(s): Prf. Dr.

Mathias Decuypere
Ben Williamson
Eline Vanassche

September 2025

Summary

The goal of this doctoral dissertation is to conceptualize and empirically scrutinize *educational technology brokers* as a new kind of actor that mediates relationships between schools, academia, governments and industry. Edtech brokers are defined as intermediary organizations that guide schools in the procurement, adoption, and pedagogical use of edtech. Their services include the promotion of hardware (i.e., laptops, tablets, smartboards) and software (i.e., apps, platforms, data management systems), the creation of knowledge of "what works" in educational technology, and pedagogical guidance to schools in the form of workshops and training sessions.

This project investigates edtech brokers through in-depth case studies of four edtech broker organizations operating in Europe selected from a wider range of brokers identified at the outset of the project. The cases were purposefully selected to explore the multifacetdness of brokers, and to emphasize the different ways in which they operate. Through four empirical studies, this project has two main goals. The first one is to disentangle the main practices through with brokers connect traditionally differentiated spheres of public education, private edtech markets, governments, and research centers. The second one is to understand how, when performing such practices, brokers influence and transform the actors they connect. From an analytical perspective, this project stresses the embeddedness and relationality of edtech brokers in an attempt to capture their agency as emerging experts in education policy and practice.

The dissertation is comprised of four chapters, each of them addressing different layers of edtech brokerage. The first chapter is grounded on an exploration of the edtech sector and the policies about school digitization, specifically studying three cases of edtech brokers. It offers an initial conceptualization of the different types of edtech brokers, including the main ways in which they mediate between schools and the edtech market, and the most prominent education imaginaries that guide their actions. The second study explores the different ways in which brokers build evidence of "what works" for guiding schools in the usage and adoption of edtech, as well as the impact this evidence has in markets and governments. The third study focuses on how edtech brokers, through coaching and training sessions to schools, aim to encourage teachers towards the use of edtech, reconfiguring in important ways the notion of teacher professionality in a digital age. The fourth study explores edtech brokering "in action", studying how brokers' new forms of expertise operate in school, placing emphasis on how their practices are received, negotiated or even contested when they arrive in local school settings.

The concluding section offers analytical, empirical and methodological contributions to study edtech brokers, and extend an invitation to continue the empirical explorations on intermediary actors operating in education policy and practice. These actors, of which edtech brokers are an exemplary case, demand further investigations as they play an important role in defining, among other things, how schools and school systems continue to digitalize, how edtech markets gain access to school systems, and how governments enact policy reform and imaginaries into the locality of schools.

Lay abstract

This dissertation explores an intermediary type of organization operating in education policy and practice that we have called edtech brokers. Edtech brokers are defined as organizations that operate in between schools and the edtech industry, guiding schools in the process of edtech procurement and adoption. Edtech brokers, depending on the case, can also have connections with policy centres and research centres.

Edtech brokerage is an emergent international phenomenon as schools and school systems continue to use more digital technologies in their daily lives. Edtech brokers guide schools in deciding what hardware and software to use, and they do so through coaching and training sessions, or by providing "evidence-based" knowledge to schools so that they can take informed decisions.

Studying edtech brokers is important to better understand if and how public schools and the private edtech industry are working together to advance goals of digitalization in schools. To explore how brokers connect schools and industry, and also research and policy centers, this dissertation uses website analysis of edtech brokers, interviews and observations. The interviews were conducted to professionals working in broker organizations but also to teachers and coordinators who participated in coaching sessions provided by brokers.

Ultimately, this thesis provides a rich description and analysis of edtech brokers as emerging authorities in educational policy and practice, connecting different educational actors and promoting common goals for digitalization. The findings of this thesis are useful to better understand the landscape of actors that are currently giving shape to schools and school systems as they continue to change because of the influence of digital technologies.

Publications

Published or accepted journal articles, and articles submitted for publication

- Chapter 1. Setting the stage: Mapping edtech brokerage.
    - Authors: Ortegón, C., Decuypere, M., Williamson, B.
    - Original title: Mediating Educational Technologies: Edtech brokering between schools, academia, governance, and industry
    - First author: Ortegón, C.
    - Publication status: Published in journal *Research in Education*
    - DOI: https://doi.org/10.1177/00345237241242990

- Chapter 2. How do edtech brokers build evidence?
    - Authors: Ortegón, C., Williamson, B., Decuypere, M.
    - Original title: Edtech brokers and evidence governance: knowledge intermediaries in the education technology market
    - First author: Ortegón, C.
    - Publication status: Published in journal *Globalisation, Societies and Education*
    - DOI: https://doi.org/10.1080/14767724.2024.2439419

- Chapter 3. How do edtech brokers shape teacher professionality?
    - Authors: Ortegón, C., Decuypere, M., Williamson, B.
    - Original title: "Enthuse and inspire": Edtech brokers and the affective construction of teacher innovation
    - First Author: Ortegón, C.
    - Publication status: Published in journal *International Studies in Sociology of Education*
    - DOI: https://doi.org/10.1080/09620214.2025.2501123

- Chapter 4. What happens when edtech brokerage lands in schools?
    - Authors: Ortegón, C., Williamson, B., Decuypere, M.
    - Original title: Enacting Edtech: Educational technology brokers and industry-schools translations
    - First author: Ortegón, C.
    - Publication status: Submitted in journal *Learning, Media and Technology*
    - DOI: none

Additional forms of publications, or papers with more than two first authors

- None

Relationship between doctoral thesis and master's theses or other papers

- Chapter related to the own’s master thesis or paper
    - None
- Chapter related to the another master thesis or paper
    - None

Statement about the use of GenAI

- None

Table of Contents

Introduction

1.1. Overview of the project and research questions

The goal of this doctoral dissertation is to conceptualize and empirically scrutinize educational technology brokers as a new kind of intermediary actor that mediates relationships between schools, academia, governments and industry. Edtech brokers occupy a strategic in-between position in the education sector by cultivating relations and connecting traditional government agencies, edtech companies, schools and research centers in order to shape digital transformation in schools. They do so by guiding schools in the procurement and use of edtech, playing an influential role in constructing the digital infrastructures of software and hardware required for school administration, data storage and teaching and learning. Coupled with guidance on procurement, brokers equally provide workshops and training sessions on the proper usage of the edtech products they promote, contributing to a re-professionalization of the teacher in an increasingly digital age (Hartong & Decuypere, 2023).

Besides guidance on procurement and pedagogical use of edtech, brokers additionally create and circulate 'evidence-based' knowledge of 'what works' in edtech, doing so in an environment characterized by a lack of independent evidence to evaluate the edtech products that are routinely marketed and sold to schools (Hillman, 2022). The knowledge that edtech brokers produce is designed to be used at school and system levels to take informed decisions when choosing amongst all the possible edtech products and services available on the market. The evidence claims made by edtech brokers also play a role in shaping the market possibilities of both big tech companies and edtech start-ups, the latter of which often face numerous difficulties to keep afloat in a competitive and scarce environment (Decuypere et al., 2024). When promoting and advancing particular instances of edtech in schools, edtech brokers align and actively collaborate with policy agendas that promote digital technologies to tackle different educational problems, including teacher overwork, staff shortages, and low quality of instruction (Bergviken Rensfeldt & Player-Koro, 2024; Lewis, 2017).

Edtech brokerage is an international phenomenon, with identified cases in Europe, North and South America, Australia and Asia. While edtech brokers often capitalize on their knowledge of the local market, policy and practice contexts in which they operate, they can also operate beyond their immediate geographical boundaries and advance more global agendas of digital transformation. They can take different forms, operating as private organizations, as publicly

funded educational initiatives, or as philanthropic alliances between private, public and research sectors. In all cases, brokers locate themselves in a privileged position between the for-profit edtech industry and state school education, occupying a mediating role of supporting the goals of schools, edtech companies, policy agendas, and research centers at the same time. Although edtech brokers have remained largely unexplored in the academic literature, their increasing presence in schools raises important questions about their composition, distinctive operations, educational values and concrete influence in modifying the relationship between the private edtech industry and public school systems.

Acknowledging the potential of brokers in mediating relationships between distinct and traditionally separate actors such as governments, for-profit edtech companies, and public state education, the present doctoral dissertation has two main goals: First, it aims to provide empirical insight into brokers' distinctive *practices of mediation*, that is, the practices through which edtech brokers connect actors and shape relations across the education sector, ultimately materializing a set of possibilities, conditions, and constraints for edtech usage in schools. Second, it aims to tease out how such practices shape and modify the actors that edtech brokers connect, namely schools, governments, instances of the edtech industry, and research centers. The main research questions of this dissertation are:

- RQ1. What are the main *practices* through which edtech brokers mediate between schools, edtech industry, government, and research centers?
- RQ2. What concrete changes in schools, edtech companies, government organizations, and research centers can be attributed to brokers' practices of mediation?

By answering these research questions, this project contributes to a better understanding of an increasingly relevant actor in education policy and practice that has often remained largely unexplored but has nonetheless gained prominence in enabling, shaping and curating the processes around the ongoing digital transformation of education.

1.2. Edtech brokers and the digitalization of education

To understand the significance of edtech brokers in educational policy and practice, it is important to situate them within the wider phenomenon of the *digitalization of education*, namely the process whereby digital technologies become integrated into everyday learning, teaching, management, and administration of data (Selwyn, 2021; Williamson, 2017a). Education, like every other segment of social and cultural life, has always co-evolved alongside

advancements in science and technology (Latour, 1991). Acknowledging this continuum, I refer with 'digitalization of education' to the increasing presence of laptops, platforms, algorithmic tools and data infrastructures into school practices of teaching, learning, management and administration (Alirezabeigi et al., 2020a; Hartong & Förschler, 2019; Perrotta et al., 2021; Röhl, 2025; Tierens, Decuypere, & Hartong, 2024).

Following Flury and Geiss (2023), it is not easy to pinpoint the precise moment in which digital technologies became prevalent in schools. This is specially the case because, depending on the national case, "different actors involved in the introduction of computers into education advocated for diverse concepts and approaches, and both national and local policies and curricula shifted in priorities over time" (p. 5). However, it is possible to suggest some general lines of development, including the first discussions in Europe on computer education during the 1960s and 1970s, or the important changes that took place during the 1970s and 1980s, including the introduction of computer hardware together with the introduction of computer education, either included in regular subject area courses, as a subject in its own right, or as an elective course (p. 3). While every national and regional case is bound to their own specificities, different processes of digitalization were actively promoted and advertised through a discourse that linked digital technologies with more effective instruction, and one that is more aligned to the "real world", ultimately more suitable to prepare students for the future of work (Cuban, 1986). Such agendas were promoted by different actors, including local initiatives by teachers, parents and students in the 1970s, followed by government efforts of policy reform in the 1980s. In any case, "no matter which historical narrative is invoked, private technology providers play an important role in all accounts (Flury & Geiss, 2023, p. 7)". This historical overview is important as it shows how the procurement, implementation and pedagogical use of edtech has always been the result of multiple negotiations between different educational actors, and it also shows that, behind every effort to promote digital technologies in education, there are always underlying educational, and political agendas operating. As will be clear later on, these two dimensions digitalization are important for this work, and will be teased out empirically in more detail in the pages to come.

Notions like 'digitality' (Stadler, 2018) or 'postdigital' (Jandrić et al., 2018) try to capture the pervasiveness of digital technologies in contemporary life, by emphasizing the impossibility to think of a world where digital technologies are separate to another 'natural', human world. In a similar way, my interest is to show that education is becoming increasingly shaped by digital technologies, and that the digitalization of education is powerful in aligning different

stakeholders together around similar techno social goals and projections. These stakeholders include schools, but also government and market actors, that have aggressively promoted plans for digitalization through public-private alliances with the promise that digital technologies will bring revolutionary improvements for education systems and societies (Caves & Oswald-Egg, 2023; Hogan & Thompson, 2020; Jobér, 2024).

1.2.1. The need for edtech evidence

Recent developments in educational policy have legitimized and promoted the presence of new sources of reliable evidence to guide digitalization plans. Both national governments and International Organizations have advocated for better forms and sources of evidence to inform decisions about procurement and management of edtech in schools (DfE, 2023; European Council, 2024; Flemish Government, 2021; OECD, 2023; UNESCO, 2023). UNESCO's GEM Report (2023) states that 'there is little robust evidence on digital technology's added value in education' (p. 3) and that, from the scant edtech evidence that is available, 'a lot of it comes from those trying to sell their products' (p. 3). As a consequence, decisions around edtech procurement are often made without sufficient evidence of their benefits or their costs (p. 25). In a similar way, the European Council reported that 'only 7% of EdTech tools have rigorous evidence and 11% of education decision-makers consider evidence when making a purchase decision' (2024, p. 1). From the perspective of educators, a recent survey conducted by the English Department of Education identified that school leaders see edtech evidence summaries as one of the main aspects that would help improve teachers' digital practice (DfE, 2023).

Government advocacy for digitalization has, then, begun to acknowledge the importance of new sources of expertise that can provide relevant guidance and evidence to teachers for the use of edtech in schools. An example of such an organization is the *Edtech Genome Project*, a project that started in 2021 with the goal of offering public schools a platform to enable 'decision-makers to access data and analysis about edtech implementations' (Edtech Evidence Exchange, 2021). Composed by a multisector mix including academia (University of Virginia), industry (Khan Academy), policy (Chicago Public Schools) and philanthropy (Chan Zuckerberg Initiative), the Edtech Genome Project was created with the ambition to show schools nationwide 'what edtech works where, and why' (Edtech Evidence Exchange, 2021), aiming at building bridges of collaboration between policy centers, schools, research centers and the edtech industry. In 2023, the Genome Project was acquired by *InnovateEdu*, a nonprofit that seeks to 'accelerate ecosystem development, radically disrupts system challenges and

barriers, and forges uncommon alliances in education through policy, practice, and technology' (InnovateEdu, 2025). *InnovateEdu* is an example of a 'search engine' broker, that will be teased out more in detail in the chapters to come. This example is illustrative of how edtech brokers play a growing role in determining the kinds of research insights considered as valid and pertinent to measure the quality and relevance of edtech products. It also suggests, due to the long-term prospects of organizations like Innovate Edu, that the impact of edtech brokerage is not limited to the present time but is expected to equally last and even intensify in the future to come.

The need for independent evaluative evidence is more pressing given current policy and industry pressures to embed the use of edtech into schools (Hillman, 2022). Indeed, with thousands of edtech products and services available in a multibillion dollar global edtech marketplace, teachers have reported being overwhelmed by the laborious task of making informed decisions among all possible options (Unicef, 2023). On the one hand, many of the world's largest and most successful technology companies, including Google, Microsoft, Apple, Meta, and Amazon, have for years expanded their educational services with the ultimate ambition of becoming infrastructural for schools through provision of hardware (e.g., laptops, tablets, smartboards) and software (e.g., apps, platforms) (Cone & Lai, 2024; Kerssens, 2024; Kerssens et al., 2023; Williamson et al., 2022). On the other hand, edu-businesses and edtech start-ups equally try to gain access to schools, sometimes in direct competition with big tech companies (Decuypere et al., 2024; Williamson et al., 2020).

Big tech companies and local edtech start-ups have reported several differences in both their marketing strategies and business models. Some of the most important differences include the very localized context of product development of start-ups, the uncertain and difficult conditions in which these companies have to operate, and the conjunction between their entrepreneurial drive with their educational or pedagogical principles (Decuypere et al., 2024). On the other hand, big tech companies have been reported to operate through a business model based on gathering, analyzing and monetizing user data (Zuboff, 2019). When this business model is transposed to education, these platform technologies emerge as powerful actors that both mediate and shape educational activity in ways that are informed by market principles, and not necessarily educational ones (Knox, 2021). While this is true, and there are important differences in the business model and pedagogical foundations of big tech and edtech start-ups, it is equally important to mention that edtech start-ups can also develop to become wealthy businesses with global aspirations for profit, incorporating data-extractive sources from profit

and establishing relations of dependency with the schools with whom they operate, therefore not matching with the more 'values-led', contextualized approach of smaller start-ups (Williamson, 2022). As we will see, both types of organizations engage into relations with edtech brokers, each influencing in different ways processes of edtech procurement and adoption in schools.

In summary, national and international policy authorities are optimistic about the potential of edtech to improve education and, in line with this optimism, are advocating for new forms of expertise to guide and curate the digitalization of education (Kurcikova, 2023). In this context, edtech brokers emerge as a response to this call for evidence, positioning themselves as reliable advisors with 'objective', evidence-based authority, connecting schools, industry, government and research centers on the common goal of providing reliable, easy-to-access edtech evidence. Given the relevance of edtech evidence in shaping the procurement and use of edtech at global and local levels, it is necessary to empirically explore how some edtech brokers, through different forms of expertise, practices and methods, create knowledge that can affect schools and markets alike.

1.2.2. Re-professionalization of teachers

Along with the call for evidence and 'what works' knowledge, a number of edtech brokers are actively involved in training teachers and equipping them with the necessary skills and competences for a so-called digital age. A recent policy review indicates that the professional competence of teachers is among the most mentioned topic concerning the digitalization of education (Kirsch, 2025). While digital technologies are often promoted with the promise of alleviating issues such as teacher burnout and overwork (Forsa, 2022), they have equally brought new forms of exhaustion and additional work (Mosleh et al., 2022). Because of their identified benefits and threats, different policy documents stress the importance of preparing teachers with the necessary skills to secure an informed, responsible and efficient use of edtech. As mentioned in the 'Digital Action Plan 2021-2027' issued by the European Commission:

> Digital literacy and skills [for teachers] are essential and should no longer be ignored. These skills should be constantly developed hand-in-hand with the digital infrastructure. This is the only way that investment in technology will prove to be efficient (European Commission, 2020, p. 7).

Brokers play an emerging role in connecting policy and industry plans with the mundane practice of schools by training teachers on the use of edtech. An example of such organization is the broker *iEducando*, 'a group of professionals that are passionate about school innovation

and technology' with presence in Latin America and Spain. With the mission to 'help schools reach their full potential through digital technologies that generate impact', iEducando provides guidance to schools in the procurement of software and hardware, complemented with coaching sessions for the pedagogical use of edtech, working not only with individual schools but also with local administrations to provide tailored consultancy at regional levels (iEducando, 2025). Another example is *Getech Education*, a U.K. based distributor and provider of edtech that is 'committed to providing educational IT solutions for the classroom and beyond' (Getech, 2025). As Google partners for Education, they offer Google hardware and software to schools as well as Google professional development and other forms of coaching packages to teachers. *Gentech Education* is an example of a broker that operates as 'ambassadors' of particular edtech companies, which will be explored more in depth in the upcoming chapters.

As the previous examples indicates, brokers are emerging as nodal actors connecting schools, industry and governments to address the common goal of creating a 'future proof' version of the schoolteacher. Given that large technology organizations like Google are not necessarily involved in the ground-level - or, in this case, school level - usage of their products (Veale et al., 2023), the presence of intermediaries like edtech brokers is necessary to connect global agendas with local contexts, accounting for the specificity of the schools to ensure a ground level realization of expected usage plans. It is then important to examine the different types of workshops and training sessions that brokers provide, the expertise involved in their work, the instances of edtech that brokers promote, the criteria they use to choose edtech, and brokers' normative ideas of what education is and should be.

1.2.3. The role of school actors in edtech brokerage

Despite their potential relevance, it is clear that the plans of edtech brokers can be contested or rejected by local school actors. Teachers, school directors, or ICT coordinators are not passive receivers of wider policy mandates, but have the power to accept, modify or reject plans for education reform (Hartong & Decuypere, 2023; Maguire et al., 2015; Olofsson et al., 2020; Selwyn, 2016). Different studies have indeed shown that school directors, teachers, and students can have conflicting views in regard to the potential benefits or harms of edtech, leading to modifications of pre-established plans of edtech use and implementation according to their own preferences (Garcia et al., 2020; Wikström et al., 2024).

Other studies, however, have shown that not all teachers are reluctant to the use of edtech. Certain groups of teachers are showing willingness to voluntarily adopt and embrace digital

technologies in their practice and have constituted themselves as 'influencers' of edtech platforms, using social media to promote their products and advocate for its implementation in their local schools (Arantes & Buchanan, 2023; Hogan, 2025; Saldaña et al., 2021). Considering the school-level variety of different pedagogical standpoints in regard to edtech usage is crucial for this study on edtech brokers, as brokers equally situate mediate the relationships between schools and industry and policy organizations, ultimately seeking to socialize teachers into edtech habits and aspiring to create long-standing changes in their professional practice.

To recapitulate: By creating and circulating evidence about edtech, and by guiding teachers in the use of edtech, brokers emerge as central actors in current digitalization plans, potentially reworking relations between industry, classroom, policy actors and research centers. The goal of brokers is to situate themselves as actors that make possible plans for digitalization of education, creating a stable consensus about how to digitalize in ways that are cost-effective, safe, pedagogically informed, and lucrative for edtech companies. That is, in ways that are beneficial for each of the actors they connect.

In this context, I empirically explore the main *practices* through which edtech brokers mediate between schools, edtech industry, government, and research centers, as well as the concrete changes in schools, edtech companies, government organizations, and research centers that can be attributed to brokers' practices of mediation. In what follows, I provide a review of how the category of 'broker' organizations has been conceptualized in the academic literature to then propose my definition of edtech brokers as embedded and relational actors, situating my research within the field of critical edtech studies.

1.3. Brokers within and beyond education

To define edtech brokers as embedded and relational, it is important to first provide an overview of how the notion of 'brokers' and 'brokerage' has been conceptualized in the academic literature. Gould & Fernandez (1989) define brokers as organizations or individuals situated in the middle of two or more mutually exclusive sub-groups that make possible the exchange and flow of resources (p. 91). Brokerage, then, is defined as a process through which brokers gain strategic advantage from being in-between two others (Sigler et al., 2023). This conceptualization of brokers attempts to analytically capture a wide range of possible brokers, including organizations, communities, or individuals operating in different spheres such as

political settings, business and work environments, and academia (Brändle et al., 2024; Brown, 2019; MacKillop et al., 2020; Rodway, 2019; Sigler et al., 2023; Turnhout et al., 2013).

In politics, a broker can be a member of one party with access to members in a rival party (Rogers, 1967). In work-related settings, brokers can be social organizations that give relevant information to minority group members, or individuals that connect applicants to social contacts that improve the chances of getting a job (Granovetter, 1995). In academia, brokers are known to bridge the 'knowledge-practice gap', bringing together researchers, practitioners and policy in a variety of ways, (p. 6), for instance by building information architectures for practitioners to access research resources in more digestible ways (Goldacre, 2013; Rycroft-Smith, 2022). Brokers in academia can also be individuals, like native English speakers that help non-native English scholars navigate the politics of academic publication (Lilis & Curry, 2009). More recently, brokers in Policy settings were identified to translate and help interpret algorithmic predictions into ways that are more understandable and applicable to decision makers (Waardenburg et al., 2022). As these examples show, the main characteristic of brokers lies in facilitating transactions between actors that lack access to or trust in one another, thus enabling a relation between actors that would not be possible without their presence (Mardsen, 1982). This in-between position is equally central for my study on edtech brokers as organizations located in between schools, markets, governments, and research centers.

Going more specifically in the field of education, brokers are also referred to as 'intermediaries' or 'boundary spanners' and are mostly conceived in as organizations or individuals focused on the dissemination of information (Neal et al., 2019, 2021). In that context, brokers can be teachers, principals or organizations that disseminate information via knowledge transfer (Gagnon et al., 2019) or by building awareness of, and providing access to, relevant research-based knowledge (Rodway, 2019). In literature adjacent to educational policy and leadership, brokers are circumscribed as context-informed 'knowledge coaches' (Rodway, 2019) that facilitate coalitions across different micro (i.e., schools) and macro (i.e., policymakers) policy settings (DeBray et al., 2014). More recently, and also within the field of education policy, brokers have been highlighted due to their potential to facilitate interdisciplinary collaborations around societal challenges such as educational inequality, racial justice, and the fight against Covid-19 (Neal et al., 2023). Edtech brokers, as organizations that specialize in guiding schools in the use of edtech through connecting them to industry, policy and research circles, equally make possible and facilitate exchanges between different sub-groups of educational stakeholders.

In line with previous definitions of brokers, it is then legitimate to assume that edtech brokers have the potential to facilitate exchanges between industry, schools, policy and research centers, allowing new forms of collaboration and synergies between them. Importantly, brokerage always occurs in a specific context where different forces and interests are at play. As stated by Levin et al., (2011): 'It has for long been acknowledged that brokerage cannot be separated from the influences such as self-interest, political forces, or external decisions' (p. 3). I build on that insight to study edtech brokers embedded and relational, thus nuancing a potential *instrumental* and *atomized* approach to brokerage.

According to an instrumental approach, brokers are transmitters that facilitate the exchange of information or resources, without altering the objectives that either actor had before the exchange took place and ultimately contributing to the attainment of a shared goal. In other words, brokers act as 'instruments' for the connected parties by mobilizing information or resources from point A to point B, ultimately allowing that each party fulfil the goal they had before the exchange took place and creating a shared scenario that is conceived as desirable or beneficial for both sides. Going back to the previous examples, and following an instrumental approach, brokers in school settings would disseminate research insights and 'scientific' examples from academic communities to schools, making research accessible to practitioners and achieving more sustainable change in primary and secondary education (Rechsteiner et al., 2024). Because of the assumption that brokers contribute to attaining inherently desirable goals for each party and for the general field in which they are located, these studies often provide quantitative measures that seek to optimize the efficiency of brokerage in mobilizing resources and improving the flow of knowledge (Brown, 2019; Rechsteiner et al., 2024). As such, an instrumental approach to brokerage mostly studies how brokers can be more efficient in mobilizing resources and knowledge, assuming brokerage is inherently beneficial.

Relatedly, the present study on edtech brokers nuance a potential *atomized* conception of brokerage. That is, conceiving brokerage as a process whereby two or more independent actors are connected through the intervention of another, equally distinct and atomized broker, whose mission is to transmit as transparently as possible the information or resources that are being mobilized. Here, each party involved in a brokerage relationship remains unaltered and indivisible, like an atom, before, during, and after the exchange of knowledge and resources. In the same way, each party independently decides the goals that are most beneficial for them. As one example, English speaking scholars decide independently their preference for supporting the expansion of their research community through their mediation, and non-native scholars

decide independently their goal of having a stronger presence in the academic field of which they are part of. In sum, according to an atomized conception of brokerage, the initial goals and outcomes of brokerage remain unaltered during the exchange and depend largely on the individual agendas of each party, without considering wider social or economic factors or power dynamics involved in the negotiations and tensions between the actors involved in the brokerage.

Both the atomized and the instrumental conception of brokers are used here as a contrast to my understanding of edtech brokers. This nuance has the objective to acknowledge brokerage as non-neutral (Malin et al., 2018), or as an inherently social process that is 'complex, relational, interpretative and affected by issues such as trust, credibility, personal relationships, and power and identity' (Rycroft-Smith, 2022, p. 17). Most of the studies on brokers cited before acknowledging this complexity and, in a similar way but inspired by insights from STS and critical sociology of education (both related with the field of Critical Edtech studies, as I show later), I conceive edtech brokerage as a highly embedded and relational practice through which brokers steer educational agendas in different and unpredictable ways. I am interested in understanding how edtech brokers, informed by economic, pedagogic and political factors, play their part in defining the conditions, goals, and outcomes of the very connections they make possible, transforming and creating changes in the actors they connect.

As I will extensively elaborate on the upcoming chapters, brokers play a role in co-shaping the goals of the industry, schools, governments and research centers, and equally situate themselves as advocating for particular educational futures while foreclosing other possible futures. In what follows, I provide the theoretical foundations of my understanding of edtech brokers, situating my research in the emerging field of Critical Edtech Studies.

1.4. Edtech brokers as embedded and relational

To understand edtech brokers as embedded and relational, it is important to situate my research within the field of critical edtech studies. Critical edtech scholars are interested in studying developments in educational technologies, accounting for their cultural complexity, and their wider socio-political and socio-pedagogical implications (Decuypere et al., 2021; Macgilchrist, 2021; Selwyn, Hillman, et al., 2020; Williamson, 2017a). The criticality of it stems from 'observing emerging technologies, questioning the hype surrounding them and reflecting on their sociopolitical implications' (Macgilchrist, 2021, p. 243). This perspective has led to the exploration of various aspects of digitalization of education from a critical lens, including the

changing nature of didactics and teaching practices (Alirezabeigi et al., 2020b; Fassbender, 2025; Kelly, 2025), the political economy of edtech (R. Hall, 2015; Williamson et al., 2020), the positioning of schools as market actors (Hogan, 2025; Verelst et al., 2025), the role of digital infrastructures in daily school activities (Pangrazio et al., 2023; Richter et al., 2025), the geopolitical dimensions of edtech usage with a focus on the majority world (Gallagher et al, 2023; Ruiz & Gallagher, 2025), and the emergence of new forms of expertise and professionality in education policy and practice (Hartong, 2016; Komljenovic, 2021; Lewis & Hartong, 2022).

If studying brokers from an instrumental and atomized approach would lead us to explore questions such as, 'how can the efficiency of edtech brokers be improved?', or 'how do edtech brokers optimize public-private alliances in education?', studying edtech brokers acknowledging their embeddedness and relationality would lead to questions like 'what are the goals of brokers acknowledging the socio-political context in which they operate?', or 'whose interests are being represented and left behind in edtech brokerage?'. At this point, it is important to say that scholars critically studying the emergence of digital technologies in education have already conceived other kinds of brokers as embedded and agential in a similar way I do in this dissertation. From this perspective, brokers such as think tanks or 'policy brokers' have been conceived in more active terms as organizations or individuals with the power to make specific forms of educational transformation thinkable, intelligible, and, ultimately, practicable (Williamson, 2014). Brokers have been shown to take policy roles by helping governments negotiate tensions between local and global policy demands for education (Grek et al., 2009); lobbying in favor of non-state policy actors and their data-based 'evidence' (Hartong, 2016); pushing forward 'de-statized,' for-profit educational reforms (Ball & Thawer, 2018); shaping policy implementation by advocating for technological expertise of technology companies (Berghmans et al., 2025; Joecks, 2024); and creating new forms of teacher professionality in line with novel technological advancements of schools (Geiss & Röhl, 2024; Grant, 2024). From this perspective, brokers are not only transmitters of knowledge and resources but also, and more importantly, *governors* of knowledge and resources (Bandola-Gill et al., 2022).

While these studies approached brokers in a way that inform my own research, it is important to say once more that they have focused on organizations such as think tanks (Williamson, 2014), knowledge brokers in EU policy centers (Greek, 2009; Bandiolla-Gill et al., 2022), or boundary spanners in educational policy networks (Ball & Thawer, 2018). At the moment, there are hardly any studies that have specifically focused on edtech brokers as separate organizations

playing an increasingly important role in advancing, contesting or reforming novel plans for digitalization connecting schools, markets, governments and research centers (but see, for adjacent work, Berghmans et al., 2025; Joecks, 2024; Kerssens et al., 2023).

I show in this dissertation that edtech brokers are not passive transmitters of governments or industry goals, but rather actors with the power to actively influence and shape the information they are translating as well as the goals and possible outcomes of the parties involved. I now define edtech brokers as embedded by drawing from debates on the privatization, commercialization and marketization in education taken from the field of critical sociology of education, and I define edtech brokers are relational using insights from Science and Technology Studies.

1.4.1. Edtech brokers as embedded

Edtech brokers are embedded in a particular ecosystem composed of different actors, such as public schools, edtech companies, and governments, and act as connective nodes between sectors that have been traditionally conceived as different and separate, thus having the potential to create new synergies and collaborations at local and global levels between them. Their potential and relevance is better understood when considering debates around the marketization, privatization and commercialization of education. *Marketization* of education is defined as 'the introduction of market forces into education' (Ball, 1994), and more recently as 'the creation of a series of policy logics that aim to create quasi-markets in education' (Hogan, 2020). Marketization of education occurs when educational policy and provision is managed according to market rationalities of efficiency, competition, accountability and optimization. This leads to an increasing reliance of public-private partnerships and other forms of strategic alliances and forms of collaboration across sectoral and organizational boundaries (Ball, 2012). The long history of marketization of education systems has acquired new dimensions due to the interest of investors and venture capitalists to profit from the billions of dollars spent annually on public schools through an increased use of edtech (Cohen, 2024). Informed by these debates, I enquire about the role of edtech brokers as a new actor that can play a role advancing or contesting policies supporting the procurement and adoption of edtech in schools, making decisions in favor or against particular actors or goals.

Privatization is closely tied to the marketisation of education, and refers to the shift of responsibility for managing, funding, and owning educational institutions from the public sector (government) to the private sector (businesses, non-profits, etc.) (Verger et al., 2016).

Privatization of education can be endogenous of exogenous (Ball & Youdell, 2008). Endogenous privatization occurs when ideas, techniques and practices are imported from the private sector to the public sector (i.e. privatization *in* education) (ibid). Exogenous privatization occurs when public services are opened to private sector participation where the private sector designs, manages or delivers aspects of public education (i.e. privatization *of* education) (Hogan, 2020). It has been noted that privatization in education is seen as both 'inevitable' and 'desirable' by governments, who adopt various paths towards privatization (Verger et al., 2016, p.177). Importantly for our case, edtech has been conceived as 'a paradigmatic illustration of the exponential growth of business interest in education as an investment opportunity characterized by a dramatic increase in the volume and speed of transactions' (Santori, Ball & Junemann, 2016, p. 193). Documented paths towards privatization include the many cases of (post) pandemic ed-tech provision in different countries through the mediation of big tech companies like Google and Microsoft (Cone & Lai, 2024; Kerssens, 2024), as well as new local-global connections between the global market and local school systems made possible by intermediaries like edtech brokers (explored in this dissertation). Consequently, one of the main interests of my present work is to better understand how edtech brokers create new forms of relationships between the private and the public, and the extent to which they play a role at redefining the (already contested) meaning of public schooling (Gerrard et al., 2017; Hogan & Thompson, 2020).

Lastly, the *commercialization* of education, defined as the creation, marketing and sale of education goods and services for commercial gain (Hogan, 2020), accounts for what happens when different actors profit, or seek to profit, from the 'commodification' of education. Here, school systems are conceived as markets, both potentially profitable but also particularly difficult to access (Decuypere et al., 2024). Past estimates of the value of the education market suggest numbers around $4.9 trillion in 2015 (Verger, Steiner-Khamsi, et al., 2017), while more recent ones suggest an estimate of $7.6 trillion, out of which governments contribute to 60-70% of total expenditure (HolonIQ, 2025). Such estimates not only give an idea of the amount of capital that is at play in the digital transformation of education, but also of the role that public governments play as the main investor that enables and sustains these markets. While there are many types of commercial activities involved in digitalizing education, the most common are those directed at teaching and learning, assessment, digital and computational technologies, professional learning, and a variety of services designed to support schools administrators (Hogan, Thompson, Sellar & Lingard, 2018). Digital technologies then offer an important case

of commercialization of education (Hogan & Thompson, 2020), due to the potential of edtech companies to produce fundamental changes in the nature and purpose of schooling (Williamson, 2017a). This begs the questions of how exactly edtech brokers operate and how they navigate possible tensions within the goals of school and market actors, given the alleged influence of the latter in the former.

Debates around the marketization, privatization, and commercialization of education have been, for a long time, of prime interest for critical scholars in education. What is at stake in these discussions is 'both a rearticulation of a publicness, and a new social contract, based on a smoothing of the distinction between public and private' (Hogan, 2020). I bring these debates to the surface to acknowledge that edtech brokers are embedded within an edtech ecosystem where different interests, paths and agendas for digitalization are at play. I enquire about the role of edtech brokers in producing concrete changes in educational systems, and the potential ways in which they entrench or nuance previously identified trends in education related to the influence of private and market actors in education. I do so by focusing on the concrete ways in which brokers connect schools, industry, policy and research spheres, and how, by doing so, they affect their boundaries and create new synergies or tensions between them. When I conceive brokers as embedded, I call into question their inherent neutrality (i.e. an instrumental approach to brokerage), and open the door to explore their operations, interests and alliances from within an environment of disputed agendas and political debates.

When analyzing phenomena related to the privatization, commercialization, and marketization of education, different actors have been studied in function of the friction that they can remove or add to such agendas within a wider network of diverse interests and objectives. While some actors have been reported to remove friction of potential public-private alliances (e.g., Ball, 2008), there are different cases across the recent history of digital education where acts of friction were also reported. One example is provided by students and faculty at Stanford University in the 1970s, protesting against developing artificial intelligence technologies under the direction of the Department of Defense. Their protest was motivated by "a repudiation of the efficiencies that automated algorithmic education falsely promises" (Dobson, 2023). In a similar way than the Stanford students, some authors like Miriam Rasch in her book *Frictie* (Dutch for *Friction*) has called for a reappraisal of the data-intensive mechanisms of digital technologies and the need to "fight for emancipation or resist the demand for transparency and constant communication" (Rasch, 2020), given that, according to her, ethical dilemmas surrounding the adoption of digital technologies in daily life have the tendency to often being

reduced to issues of privacy and regulation, without exploring wider socio-political dimensions. Without claiming in advance that edtech brokers have a particular power to influence agendas of commercialization, privatization or marketization of education, this debate on friction relates to my work, as I will explore more in depth the degree to which edtech brokers add or remove friction to different educational agendas, exploring the concrete ways in which they modulate the uptake of digital technologies in schools.

The study of the influence of brokers also has to consider how education policy and practice has become more networked and distributed. While in the next section I will elaborate extensively on the relational approach of this study, which states that the practices and influence of brokers have to be understood based on their relationships with the constellation of actors they interact with, it is important to acknowledge how previous studies emphasize on how philanthropy, business and the governments, just to name a few, are coming together to create new networks and sites of policy outside of the framework of the nation state (Ball, 2012). Crucially, a networked understanding of education policy challenges a hierarchical understanding of policy processes as a downstream of mandates from government institutions to schools, and stresses the importance of studying new and underexplored actors and practices, which more specifically referring to digital education governance, can include edtech brokers, centers of calculation or data infrastructures, all of them bearing the potential to anticipate and pre-empt educational futures in different ways (Williamson, 2016). While I do not pursue a study in line with the methodological framework of a network analysis, the image of the digital education policy as a networked landscape of different actors, including both established and emerging actors that mutually influence each other and, is one that resonates with my relational understanding of brokers, to be explained in the next section.

Lastly, it is important to acknowledge, however, that private providers (and private sensibilities) are and have been working *with and within* public schools to support schooling processes for a long time, in many cases providing the necessary conditions for students to receive education (Hogan & Thompson, 2020). For example, without private sector involvement many millions of students worldwide may have lost access to education altogether during the pandemic (Williamson & Hogan, 2020). In a related manner, the goal of this project is not to evaluate edtech brokerage in moral coordinates in function of their alliances with private or public sectors, or to understand brokers as mere catalyzers of the privatization, commercialization, or marketization of education. Rather, the goal is to empirically explore how brokers fill in a gap in connecting several actors involved in the digitalization of education and what concrete

changes they bring about. This empirical lens, or this preference for the empirical, is explained in the next section to define brokers as relational, and it is essential to see how brokers confirm *or* call into question existing sociological diagnoses in education.

1.4.1. Edtech brokers as relational

To understand how I define edtech brokers as relational, it is important to first clarify how I draw from insights of the field of Science and Technology studies (STS) to build such definition. STS as an academic field is the result of the intersection of work by sociologists, historians, philosophers, anthropologists, and others studying the processes and outcomes of science, including medical science, and technology (Jasanoff et al., 1995). STS focuses on empirically studying how different aspects of individual and social life are mutually shaped by, and constantly evolving through, advancements in science and technology. It can be argued that its relevance and importance lie in extending the research programs of the social sciences beyond the former realm of what was considered until now as the 'social' (Law, 1984). Following Latour (2000), before STS:

> If a cyclist falls off his bicycle because it has hit a rock, social scientists confess they have nothing to say. It is only if a policeman, a lover, an insurance agent or the good Samaritan enter the scene that a social science becomes possible, because we are now faced, not only with a causal sequence of occurrences, but also with a string of socially meaningful events (p. 2).

By contrast, STS practitioners

> Deem sociologically interesting and empirically analyzable, the very mechanisms of the bicycle (Bijker 1995), the paving of roads, the geology of rocks, the physiology of wounds and so on, without taking the boundary between matter and society as a division of labor between the natural and the social sciences (p. 2).

A crucial consequence of extending the scope of social sciences in a way that includes both the social *and* the material is that "agency" is not anymore a characteristic of one particular (human) actor nor explained by looking at one singular actor or factor, but rather is understood as distributed and located within the webs of relations within which each actor is located (Decuypere & Simons, 2016). In the case of the fallen cyclist, there are traces of individual and social agency in the design of the bike, the shape of the rock, and the characteristics of the road, as much as there are in the interaction that the cyclist can have with the cop, the insurance agent, or the good Samaritan.

Although it's important to state from the beginning that this dissertation does not pretend to be an STS dissertation, I certainly take inspiration on this insight of conceiving agency as relational and distributed to explain how edtech brokers are relationally composed and how they ultimately exert influence and power. From a relational standpoint (the main inspiration I take from STS), all things are what they are in relation to other things (Law, 2009; Gad & Bruun Jensen, 2010). This shifts the emphasis to the practices of actors rather than in an intrinsic 'essence' that precedes such practices. Indeed, STS 'take the semiotic insight that all entities are produced in relations and applies this ruthlessly to all materials, not simply those that are linguistic' (Law, 1999, p. 4). In a similar way, I conceive edtech brokers as relational, or as constituted by the relationships they uphold with the actors they connect. If before I claimed that edtech brokers are embedded within an edtech ecosystem where they play a distinct role, now I claim that their role and agency is to be understood always in function to the relationships they uphold with schools, markets, governments and research centers. Rather than brokers acting as atomized entities that operate independently from other actors, I will show how edtech brokers create concrete changes to the actors they connect and, simultaneously, these actors interpret, translate and rework the aims of brokers. Focusing on the two-way street of edtech brokerage allows to unpack the concrete changes that emerge when brokers connect different educational stakeholders, acknowledging that brokers don't simply impose their will in a deterministic fashion, but act through relations that are more or less consistent with their aims and desires.

This relational lens has been at the center of other studies in educational research preoccupied with the role of digital technologies in education. Following Decuypere (2019), one could state that educational research drawing on STS aims to trace, disentangle and subsequently show how relationality is one of the prime characteristics of each and every educational practice (p. 137). For this reason, STS has been referred to as a "sensitizing device" rather than as a conceptual dogma. In a similar way, when explaining how ANT and other STS-related approaches can be used in education, Tara Fenwick (2011) claims that "it is more like a sensibility, a way to sense and draw (nearer to) a phenomenon (p. 3)". Such sensibility is key to trace how different human and nonhuman entities come to be assembled, to associate and exercise force, and to persist or decline over time. These studies allow to show how educational practices (e.g. education policies; a classroom) or some specific actor(s) populating these practices (e.g. policy documents; teachers; pupils) are continuously in the making by and through the relations present within a particular practice or assemblage. (p. 6).

I then apply this STS sensitivity by changing the focus from educational apps (or other concrete technological artifacts) to organizations (i.e. edtech brokers) that nonetheless mediate debates around the procurement, pedagogical use, and-evidence making of edtech. An example of this change of focus can be found in the first chapter of this dissertation, where I define edtech brokers as "mediators" rather than "intermediaries" based on the work of Latour (1994, 2007). Although in the referenced texts of Latour, he uses the notion of mediation to disentangle the agency of concrete objects (e.g., a gun), many landmark studies of the STS tradition have equally explored organizations and even more "abstract" institutions beyond concrete, material individual objects through a similar lens. Examples are Latour's study on the *Aramis* train system (1996), Latour's study on the fields of Law and jurisprudence (2009), and John Law's study on the Portuguese transoceanic expansion (1987). These studies all try to capture the interplay between the material and the social, and to demonstrate how they are relationally constituted. For studies on this vein, "nothing is given or anterior, including 'the human', 'the social', 'subjectivity', 'mind', 'the local', 'structures' and other categories common in educational analyses" (Fenwick & Edwards, 2011). Fenwick & Edwards provide an example of a playground, that is useful to understand that an "actor", from a relational framework, does not need to equate to an individual person or object:

> A 'Playground', for example, represents a continuous collaboration of bats and balls, swing installations, fences, grassy hills, sand pits, children's bodies and their capacities, game discourses, supervisory gazes, safety rules, and so on.

Making a similar point, Law and Singleton (2005) explain that whether an actor is more or less abstract (e.g., a teacher, a laptop, an education policy, a broker organization) is less the point, because the key feature are that such object is identifiable, has material effects, and that it operates in particular networks of historical, cultural, behavioral relations that make it visible. All of this to say that brokers, as the actors that are at the center of this dissertation, represent such an object of enquiry, where the focus lies on faithfully tracing their practices, negotiations, and effects in education policy and practice. The goal of this dissertation is then to disentangle the performative effects of such an entity, and to unravel its complexity and component dimensions as faithfully and richly as possible.

A constant theme that is held throughout STS studies within and beyond education, and that equally informs this research to define brokers as relational, is that every element of a given phenomenon is placed in the same position as others, rejecting any hierarchy or any presupposed importance of one element over the other. In the case of brokers, this equates to

reject any a-priori hierarchization of, for example, industry or policy actors, over other actors such as schools or research centers. At each of the connections that brokers mediate, one entity has worked upon another to translate or change it to become part of a network of coordinated things and actions. 'Entity' is a loose way to refer to various things that can be human and nonhuman, including different kinds of material objects and immaterial (conceptual, moral, virtual) objects and actions, that are not pre-given, essentialized and defined. This possibility to study the influence of different material, discursive, and social elements provided by such a relational framework is precisely what I adopt for my study, as edtech brokers will conceptually and methodologically acquire their meaning and significance through the unpacking of their interactions with the actors they connect. Indeed, when talking about "edtech brokers", I refer at the same time to the intersection between their different forms of professional expertise, the software and hardware that they promote, their marketing techniques, their social media presence, etc. As it will be clear later on and given their situatedness and increasing relevance within the edtech ecosystem, brokers are conceived as organizations that can advance particular ideas of what education is and should be, rather than merely serving as passive transmitters of other actors' goals.

Another consequence of a relational sensitivity that is important for this project is that the macro or global does not exist 'above' or 'beyond' the local (Latour, 2005). This relational lens allows to destabilize more structuralist understandings of social phenomena according to which the global or the macro (understood as bigger and more complex) contains and explains the micro or the local (understood as smaller and less complex). An example of this understanding would be to assume that more powerful actors like governments or big tech companies fully determine the possibilities and conditions of edtech use in schools. By contrast, from a relational gaze, subjects and social formations cannot be accounted for by reference to the external circumstances of their existence, and therefore there is a refusal to draw on 'context' as an explanatory or descriptive tool (Woolgar & Lezaun, 2013, p. 323).

This point is crucial for the understanding of the context of edtech brokers. I understand the context of edtech brokerage, not as an explanatory resource, but as something that is built (see also Piattoeva et al., 2018). That is, as an emergent property of the interaction between actors involved in edtech brokerage. Attending to the enacted contexts of brokers does not immediately imply to disregard the common 'macro' characteristics of educational systems. It does imply, however, to overcome the tendency to conceive geographical specificities, such as nation states (and their respective educational systems), or 'macro' sociological categories as

coherent and reliable units of study and comparison (Wimmer & Schiller, 2003). Brokers' agency or power is thus the destination of an empirical undertaking rather than an analytic starting point. The interest here lies in approaching edtech brokerage focusing on their relations and associations with the actors they connect, opening up the possibilities for empirical insights that can enter into productive dialogue with debates around educational policy and practice in relation to the use of digital technologies.

To sum up, I conceive edtech brokers as embedded and relational, situating my research in the field of critical edtech studies. I take from critical sociology of education an acknowledgment of previously explored social tensions in education that are at potentially at stake in edtech brokerage, such as the commercialization, privatization and marketization of education. Informed by STS, I focus on disentangling brokers' practices when mediating between actors as a way to explore how these mediations give rise to new alliances, tensions, and educational realities at policy and practice levels.

1.5. Methodological Framework

To explore edtech brokers' practices, capture their intricacies, and remain faithful to their internal logics, I now present a methodological framework that is designed to study brokers from the local settings in which they operate and to caputre the relationships they uphold with markets, governments, schools, and research centers. This methodological preference is closely tied with my theoretical framework, particularly with the relational dimension of edtech brokers. It also resonates with previous research that has stressed the importance of approaching processes of digitalization from their local dimensions (Ferreira & Lemgruber, 2019; Gallagher & Knox, 2019; Hartong & Nikolai, 2017).

1.5.1. Methodological entry points

Throughout this dissertation, I adopt four forms of data collection, or methodological entry points, to scrutinize the multifacetedness of edtech brokers: (i) Policy analysis, (ii) website analysis, (iii) semi-structured interviews, and (iv) observations. Here, I am inspired by Decuypere's (2021) (topological) account of data practices and his IUDE toolbox. This methodological framework is designed to empirically study socio-technical practices in education, and to disentangle the different levels involved in the policy-making, adoption and use of educational technologies in schools. Importantly, this approach is not so much interested in considered with tracing some sort of essence, but rather focuses on the performative effects of such practices; that is, on what these practices *do* (p. 69). Consequently, I focused on

disentangling brokers' *practices* of mediation, that is, the practices through which edtech brokers connect actors and shape relations across the education sector, ultimately materializing a set of possibilities, conditions, and constraints for edtech usage in schools. These methods work in tandem to unravel such practices, considering the different methodological entry points involved in edtech brokerage.

Policy documents are used to explore the wider ecology in which edtech brokerage takes place. By ecology I mean the broader environment in which brokers' practices take place (Decuypere, 2020, p. 79). Analyzing policy documents (see table 1 for overview of documents) provide historical and organizational information of the rise of intermediary expertise in educational policy and practice, which can be foregrounded and triangulated with other methods to provide a richer picture of the forces at play in edtech brokerage. Through a critical analysis of such documents (Peters et al., 2009), I disentangle the governmental rationales that implicitly or explicitly specify the role of edtech broker organizations as necessary or desirable for the enactment of policy imaginaries promoting the adoption of digital technologies in education. More specifically, I extract and analyze the particular visions of social futures that policy documents promote in association with the use of digital technologies (Rahm, 2021), and I tease out how the new professionality of brokers is discursively aligned with such vision and framed as a response to the current needs of digitalization agendas.

Consequently, I show how broker organizations have been rationalized, justified and promoted (chapter 1), as well as the new forms of evidence that are envisaged and promoted (chapter 2) and the new forms of professionality that are advocated in policy texts (chapters 3 and 4). Importantly, and in line with my relational framework, the analysis of policy texts not only shows how brokers are framed according to policy actors, but also how brokers are generative of new ecologies (i.e. how they *create* new ecologies and topological or relational spaces) and how their presence, at least in terms of their alleged relevance, can expand beyond their geographical boundaries (Decuypere, 2021). An example of this can be how brokers located in Europe are promoted by policy documents advocating for the need of edtech evidence in the global south. As it will be clear in the upcoming chapters, the double dimension of brokers as global *and* local actors is a constant theme throughout the whole dissertation.

Brokers' interface (consisting of brokers' websites, social media communications, and company reports) are used to explore the digital organizational portrayal produced by edtech brokers. With interface I mean everything that happens on and materializes through brokers'

digital environments, including text, pictures, videos, hyperlinks, etc. (Decuypere, 2020, p. 75). This included regular consultations of their websites, but also their social media presence, including their twitter and LinkedIn posts. As pointed out by previous research (Baroutsis & Lingard, 2022), this information is particularly useful to understand brokers' transformation of narratives and how they portray themselves to a wider audience over time. During the four years of this project, I could see not only what brokers did and said in specific times and places, but also how their organizational composition, discourse, and reach changed over time. The transformation of brokers over time, which gives indication about their authority in the current educational landscape, will be addressed more extensively in the conclusions.

When analyzing the interfaces, I focus on better understanding the technical aspects of the work of brokers, including the products and services that brokers provide to schools, their organizational composition, their partners, and their reach. Interfaces equally materialize particular statements and particular visibilities for actors (Dieter et al., 2018) and are useful to understand the normative ideas for education brokers promote through their practices. Consequently, the data available in brokers' interfaces were used to provide a detailed analysis of the specific educational imaginaries produced by brokers (chapter 1), and their normative views on worthwhile sorts of pedagogies, teaching and learning in a digital age (chapters 3 and 4). I also unpack brokers' business models, the main partners they work with, and the different ways brokers generate value for the edtech corporations they 'represent' (chapter 2). Depending on the case, I also conduct a more limited interface analysis of the edtech platforms that brokers promote. The focus here lies on teasing out the business models of such edtech products and their relationship - via interoperability - with big tech companies of the like of Google and Microsoft (for research done on particular platforms see Decuypere & Landri, 2021; Helgetun & Decuypere, 2024; Tierens et al., 2024; Williamson, 2017c).

Semi-structured interviews were used to explore the people and ideas in charge of the design of brokers' services and products. Interviews allow me to better understand 'the myriad operations that take place when designing a data practice, and that are hence largely hidden when taking (only) interface and user topologies into account' (p. 78). This methodological entry point refers to all the work that happens *behind* what is visible in brokers' interfaces. As such, interviews allowed to capture elements of brokers' practices and educational imaginaries that are not possible to grasp from analyzing their produced documents (Ravitch & Carl, 2021). The process of coding the interviews included a first moment of precoding, namely the process of reading the questioning the data before I formally began the process of coding (Van den Hoonaard &

Van den Hoonaard, 2008). In concrete terms, this engaged in practices like circling, color coding and underlining key words or phrases that stand out, writing notes in the margins, and noting specific terminology. After the process of precoding, I engaged in *axial coding*, also called thematic clustering coding or pattern coding (Ravitch & Carl, 2021), going from the initial chunks of data analyzed in the precoding stage to proposing coding categories or in relation with the constructs or concepts that were central to the design of the studies, including information on the professionality of brokers, the instruments and techniques utilized for knowledge making, and visions for education of brokers.

This provided me with knowledge to understand the amount of work needed to support brokerage, the particular forms of professionality involved in edtech brokerage, and the history of each organization. Interviewees included CEO´s, project managers, researchers, and coaches (see table 1). The interview protocols were designed to allow a 'customized replication', that is, for individualizing follow-up questions and probes for each interviewee, conceiving edtech brokerage was conceived as an encompassing phenomenon across all cases, but attending to the particular specificities of each case (Ravitch & Carl, 2021). Ultimately, interviews were crucial to understand the specific ways in which edtech broker organizations operate between national policy contexts, edtech corporations and schools (chapters 1 to 4), how exactly the edtech evidence of brokers is produced, articulated and mobilized (chapter 2), and what sort of professionality do they convey (chapters 3 and 4). It is important to say that the interviews were designed in such a way that participants would feel free to talk about their experience as emerging authorities in the educational landscape, and that my main goal was to capture their expertise and perspective. Indeed, the interview items were crafted in a way that could respect the exploratory spirit of this research. For instance, regarding the imaginary of workload reduction identified in the first study, interview questions are closer to "How has your daily routine changed since you use 'x' edtech/platform promoted by brokers?" instead of "In which ways has your workload been reduced thanks to the adoption of 'x' edtech/platform promoted by brokers?". This seemingly obvious remark aims to point out that this study is crucial in discovering if, and to what extent, brokers' operations and discourses actually have the power to catalyze changes in concrete school practices and routines.

This attitude also speaks of the wider ethical dimensions of this project, where I had to balance out the gathering of self-reported data with a rigorous and critical lens to the research phenomenon. I tried to approach ethics from a relational and not merely procedural way, accounting for the relationship I built with participants before, during and after the moments of

data collection, and keeping them informed about the results of the work. From that point of view, the self-reported data of participants is a finding in itself, as there is not literature about edtech brokers, let alone of their perspectives on education and technology from an "insider" perspective. Still, this data was triangulated with other sources of data, such as webpage analysis and observations, and was analyzed in the light of the theoretical underpinning of the project (see 1.4), in order to find balance and rigor at the moment of reporting the findings.

Lastly, *observations and semi-structured interviews* were used to capture the perspective of the school actors that received training sessions and coaching by brokers, and to the extent to which schools modified their practices and routine in their daily life. This dimension of the practices of brokers allows to understand how users *actually* interact with brokers or how they 'navigate, chart, roam, deploy and *become with* their practices more broadly in real time' (Decuypere, 2020, p. 76). In this case, I conducted interviews with school directors, teachers, and ICT coordinators, to understand how school actors can react, contest or simply ignore the initial digitalization plans of brokers (chapter 4). Three in-person and two online observations were conducted to investigate how key school decision makers navigate issues of edtech procurement and adoption through the guidance of edtech broker organizations (chapter 4), and the new forms of expertise or professionality that edtech brokerage demand from school actors as 'beneficiaries' of their practices (chapter 3).

Table 1: Overview of collected data (documents, interviews, observations).

Policy documents and reports	Analysis of 10 Policy and reports: • Department for Education UK (2019; 2022; 2023) • European Commission (2017; 2020) • Flemish Government (2020) • UNESCO (2023) • OECD (2023) • European Edtech Alliance (2022; 2024)
Walkthrough of brokers interfaces	• 4 brokers' website walkthroughs • Longitudinal observations of social media communications of 4 brokers (LinkedIn, Twitter[1])
Interviews with brokers staff	10 interviews with brokers staff • Two CEOs • One program manager • Two heads of education • Three researchers • Two coaches

[1] The observations ended when "Twitter" changed to "X", as I deleted my account.

Interviews with school actors	8 interviews with school actors • 4 interviews with teachers • 2 interviews with school directors • 2 interviews with ICT coordinators
Observations	5 observations of brokers • Three in-person observations of training sessions • Two online observations of training sessions 1 observation of an edtech fair where brokers attended

1.5.2. Case studies

I made sense of edtech brokers through a selection of *case studies*, where each of them allowed a deeper understanding of the heterogeneity of brokers' practices, as well as the context in which they operate (Law, 2004). For the selection of each case, I used the *purposeful sampling* method (Ravitch & Carl, 2021), namely the act of choosing the organizations specifically based on their composition and internal characteristics, trying to achieve a diverse set of brokers in terms of their funding sources, operating staff, reach, and educational discourse.

To identify which possible cases where compatible with the goals of my research, I conducted an extensive mapping through a systematic online web search of grey literature including market reports (HolonIQ, 2021), working papers (Hillman, 2022; Kurcikova, 2024; Markowitsch & Hefler, 2019), governmental documents (DfE, 2019; Flemish Govnerment, 2019), evaluations produced by governments (DfE, 2022), and evaluations produced by NGOs, and non-for-profit organizations (e.g., European Edtech Alliance, 2023). I focused both on the transnational context (e.g. UNESCO, European Commission) as well as on context of the European Countries in which I conducted the fieldwork. For this mapping, I used the initial working definition of edtech brokers as intermediary actors that mediate relationships between schools, academia, governments and industry, to identify cases of organizations that, without being traditional policy and school actors, were increasingly prominent in discussions about edtech procurement and guidance. Examples of brokers resulting from this mapping are depicted the annexes, as well as some useful graphic representations of the graph.

Aware of potential challenges in securing the participation of brokers organizations, the guiding question for recruiting participants was: How to secure participants and data that can show to the greatest extent possible the richness and complexity of edtech brokerage, considering their multiple dimensions and practices? With this in mind, I ended up securing the participation of

four edtech broker organizations that have remained anonymized for the publications according to the standards of the KU Leuven Ethical committee. The process of securing participants took place during the first 18 months of the PhD, and it was the results of several meetings and attempts to collaborate with different broker organizations operating in Europe. In what follows, I provide an overview of these organizations, stressing the variety of their composition, business model and sources of funding, forms of expertise, and reach.

The first organization is the broker Arrow, a publicly-funded, multi-sector project that aims to enhance digital personalized learning at a national levels. As a flagship policy initiative of its ministry of education, *Arrow* promotes the adoption of digital personalized learning through a digital portal that allows teachers to create learning paths for students. These learning paths are also informed and potentially modified by the processing of students' data. The edtech repository that make up the learning paths is composed of more than 50 different edtech, as was previously curated by Arrow's team. The organization is currently working with 500+ schools and is composed of different professionals, including project managers, researchers (both qualitatively and quantitatively oriented), a didactical team (working closely with teachers and establishing the educational criteria for filtering edtech) and a technical team (providing maintenance of the platform).

The second case, *Next*, is a private, for-profit broker that works as an independent review platform for education technology products. For reviewing edtech, Next developed an assessment framework that considers criteria such as user experience, pedagogy, compliance, safety and learning impact. It awards certificates and badges to approved edtech products and provides visualizations comparing edtech products based on the result of assessment and user reviews. Currently, Next is composed of the CEO, CTO, UX Designers, sales, and marketing professionals, and collaborates closely with different partners and consultants to assess products in terms of data compliance and safety, effectiveness and pedagogy.

The third case, *Umbrella*, is a company specialized in selling edtech and providing pedagogical training. It is composed of a team of teaching and learning, marketing, communication, and international outreach, plus a larger number of associated consultants and trainers. Although the great majority of their customers are based in its country of operation, they also work with schools in other European, African and Asian countries. In the same way, they design online courses on Google workspace that are sold around the globe. Umbrella is a not-for-profit company. This particular organizational composition makes them subject to a legal requirement of reinvesting every profit into the company's goal, which is to 'improve teaching and learning

through digital technologies' (CEO Umbrella). Despite being Google Partner for Education, they equally collaborate and promote other edtech products like Canva and Monday.

The fourth case, *Rocket*, originated in 2019 as a Google Education Partner. The core team varies depending on the number of schools they are working with, but it is composed of 'around 15 people' working on marketing, sales, accounting and other administrative tasks. Most of the team has an educational background, including the associate trainers that are not working full time for Rocket. After the covid pandemic, the company grew significantly and had the opportunity to work with more than two thousand schools nationwide. Currently, they have plans to expand their operation to other European countries. Besides their partnership with Google, they are also Microsoft partners, and, like Umbrella, they equally promote local edtech solutions that they consider more suited for the contextual needs of the schools.

These cases provide a varied selection that allow to me to disentangle what edtech brokers are and what they do in relation to different educational actors, accounting for their similarities and cross-sectional differences (Williamson et al., 2020; Zembylas, 2023).

1.6. Overview of the chapters

Based on the main research questions of the study, the theoretical framework, the selected cases, and the methodological entry points, this dissertation is composed of four interrelated studies that were designed to provide a comprehensive understanding of edtech brokerage (Image 2).

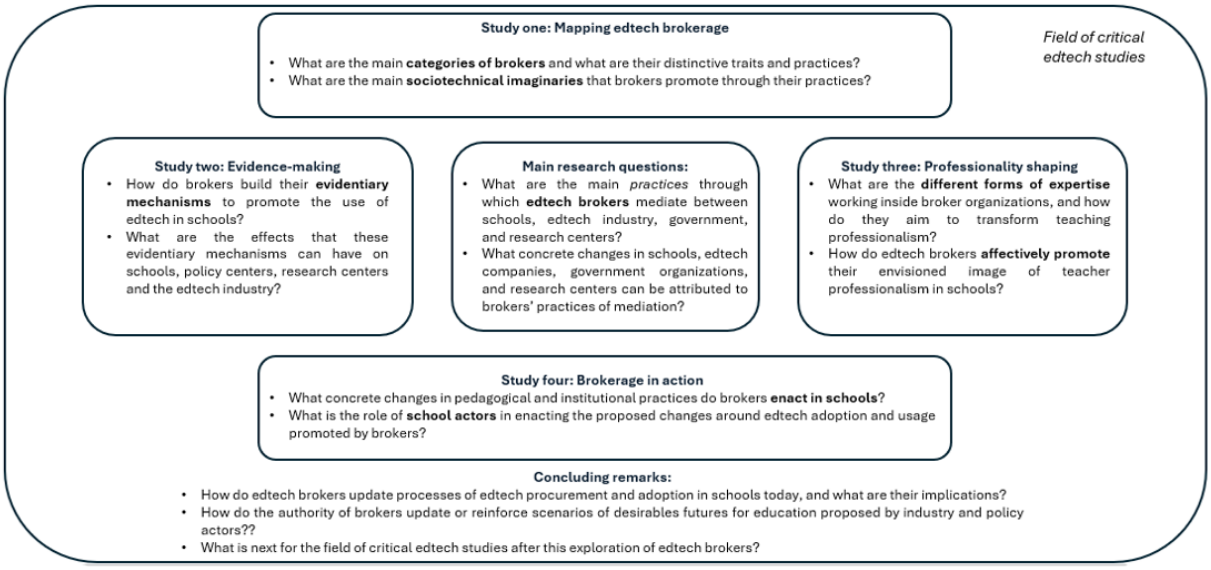


IMAGE 2: OVERVIEW OF THE STRUCTURE OF THE DISSERTATION

The first study sets out to (i) identify different categories of edtech brokers, (ii) disentangle their main practices of mediation, and (iii) unpack their educational imaginaries that are embedded

in their practices. This study focused both on the transnational context (e.g., European Commission, UNESCO) as well as the countries of interest. It draws primarily from the analysis of brokers' websites, their social media communications, and company reports. Such data were triangulated with different sorts of grey literature (reports, governmental documents, and evaluations produced by governments, NOGs, civil society, non- and for-profit organizations, and consultants). The analysis of the data was informed by the STS notions of *mediators* (Latour, 1994, 2007), as well as the notion of *sociotechnical imaginaries* (Jasanoff & Kim, 2015). The specific research questions for this study were:

- What are the main categories of brokers and what are their distinctive traits and practices?
- What are the main sociotechnical imaginaries that brokers promote through these mediations?

The *second study* explores how edtech brokers' build edtech evidence, examining the technical operations, political negotiations, and pedagogical values that are involved in the practice of evidence-making. For this study, I conducted interviews conducted with staff working at broker organizations, including project managers, and researchers, and these data was triangulated with documents produced by brokers in their webpages, social media communications and reports. I used the notion of *assemblage* (Savage, 2020) to show how evidence is always the result of different negotiations between heterogenous actors, materials, discourses, institutions and ways of knowing (Müller and Schurr 2016; Tampio 2009). Dealing with debates on how school systems are governed by evidence of 'what works' (Lewis, 2017), the main research questions of this study were:

- How do brokers build their evidentiary mechanisms to promote the use of edtech in schools?
- What are the effects that these evidentiary mechanisms can have on schools, policy centers, research centers and the edtech industry?

The *third study* explores the influence of edtech brokers on defining an envisioned professionality of the teacher in a digital age. Through interviews with executives and coaches of broker organizations, and observations of the coaching sessions, I studied which edtech products do brokers favor in their training sessions, what type of services do they offer to schools, the main characteristics of their training sessions and the prevailing discourses of what education is and should be in a digital age. I dialogue with affect theory (Wetherell, 2012), and

focusing on the affective atmospheres that brokers construct when trying to embed edtech into schools (Anderson, 2009; Berlant & Greenwald, 2012). The main research questions of this study were:

- What are the different forms of expertise working inside broker organizations, and how do they aim to transform teaching professionalism?
- How do edtech brokers affectively promote their envisioned image of teacher professionalism in schools?

The *fourth paper* explores the interaction between brokers and schools. Having examined the projections, market strategies and educational imaginaries of brokers, this study specifically ask for how all these projections and discourses 'land' (or not) in schools, and the degree to which they were effectively embedded into practice, creating concrete consequences in the emerging shape of schools in a digital age. Because of the scope of this project, I do not aim to conduct an in-depth examination of the concrete changes in schools brought about by digital technologies in general, as this would require a separate study that focuses much more strongly on the target audience of schools (see, for example, Hills, 2025). Engaging in debates on how the 'publicness' of education is disputed by the increasing influence of the edtech industry in school settings (Hogan, 2025; Jobér, 2024), and using the STS notions of *enactment* (Woolgar & Lezaun, 2013) and translation (Freeman, 2009), the focus lies rather on exploring how brokers enact particular changes in the school. The main research questions of this study were:

- What concrete changes in pedagogical and institutional practices do brokers enact in schools?
- What is the role of school actors in enacting the proposed changes around edtech adoption and usage promoted by brokers?

In its entirety, this research tries to engage with questions and debates that are of public concern for any educator and educational researcher that studies the ongoing digitalization of education. By providing a conceptual definition of edtech brokers that emerge from diverse empirical explorations, the findings of this study can be equally seen as an entry point to make sense of the wider transformations, possibilities, and limitations of increasingly digitalized educational systems. Assuming that these transformations are not entirely explicable by existing analytical categories, this study tries to contribute to the articulation of the emerging actors and practices that are currently shaping schools and school systems today.

Chapter 1

Setting the stage: Mapping edtech brokerage[2]

School digitization has intensified during the past decade, raising new challenges for how schools manage educational technology (edtech) procurement and use (Hillman, 2022). Reports have stressed that the vast edtech market often confuses teachers and makes it difficult for them to decide what technologies fit their practices best (e.g., Edtech Evidence Exchange, 2021). This conflicts with policy-level pressures to maximize the use of digital technologies to improve educational quality and outcomes (e.g., DfE, 2019; European Commission, 2020). Such demands increased during the Covid-19 pandemic, as schools were forced to rely on digital technologies to continue education and prevent 'catastrophic' learning losses (Save Our Future, 2020). With the pandemic acting as a catalyzer of wider changes that nonetheless were taking place several years ago (Hartong, 2016), school systems in many countries focused on advancing a 'digital transformation' that can respond to, and preferably outlast, the emergency situation.

In this context, a novel kind of intermediary organization has emerged to shape digital transformation in schools. 'Edtech brokers', as we conceptualize them in this article, perform roles such as guiding local schools in procurement, adoption, and pedagogical use of edtech, including both hardware (e.g., laptops, tablets, smartboards) and software (e.g., apps, platforms), and have the mission to support teachers and school authorities to modernize in safe, reliable, and cost-effective manners. Edtech brokers also shape what 'evidence' is taken to count and introduce metrics of 'impact' and 'what works', according to different educational imaginaries that advocate for the digitization of schooling practices. Being neither directly school actors, edtech developers, or government organizations, edtech brokers seem to be positioned in a strategic *in-between,* with the power to facilitate and regulate exchanges between schools and industry, but also academia and government. This mediating position would allow them to support schools in the task of deciding what, among all possible edtech options, is most appropriate for their particular situation.

---

[2] This chapter is an adapted version of the following publication: Ortegón, C., Decuypere, M., & Williamson, B. (2024). Mediating educational technologies: Edtech brokering between schools, academia, governance, and industry. *Research in Education*. https://doi.org/10.1177/00345237241242990

Besides having the potential of impacting schools, edtech brokers can equally be powerful catalyzers of the edtech market. As expenditure in edtech from governments, companies, and consumers has increased in the past decade and as the edtech industry continues to open new market opportunities (Holon IQ, 2021), edtech brokers play a role by connecting technical products to the specific social and political contingencies of different local settings. Concrete examples are companies such as *Fourcast* in Belgium, *Aspire2be* in the U.K., or *iEducando* in Spain and Latin America. All of them are Google-certified companies offering Google-related products and training to schools that simultaneously comply with local policy and curriculum requirements. As will become clear, brokers' influence in education does not only lie in increasing the adoption and use of edtech in schools or enhancing value for industry, but equally in 'filtering' available options for schools, based on different forms of evidence and expertise, potentially shaping edtech market dynamics (e.g., Edtech Evidence Exchange; 2021; Edtech hub, 2023).

The potential of edtech brokers to influence education technology markets, shape decision-making and purchasing practices in schools makes them highly significant yet scarcely conceptualized actors in education. In the context of the Covid pandemic, Williamson & Hogan (2020) raised attention to the emergence of new intermediary organizations specialized on 'impact' and 'evidence' assessment in the U.K, and Kerssens & van Dijck (2021) explored the role that Google for Education Partners play in the platformization of education in the Netherlands. However, to the best of our knowledge, no study has yet systematically researched edtech brokers as distinctive new actors in highly-digitalized education systems or examined their concrete effects in local educational settings. As such, this article aims to start addressing this research gap by offering a typology of three different types of edtech brokers (ambassadors, search engines, and data brokers) and analytically disentangling their concrete practices, operations, and potential consequences.

Analytically, we define edtech brokers as *mediators* (Latour, 1994; 2007), stressing the agency of brokers as being more than transmissive actors of the goals of other actors (e.g., Glasgow & Emmons, 2007). We explore brokers as organizations with their own specific sets of professional expertise and practices that cannot be reduced solely to the agendas of other established actors, such as policy organizations or edtech companies. In the same way, we explore brokers' normative ideas for education, and the extent to which they accept or modify wider circulating imaginaries regarding technology in education. Inspired by this theoretical

lens, we explore the following research questions: What are edtech brokers' main practices of mediation? And what are the main sociotechnical imaginaries that brokers promote through these mediations? We propose three main practices by which brokers potentially shape pedagogical and organizational practices around edtech procurement and use, namely (i) updating the digital infrastructure of schools; (ii) building novel tools to access and interpret evidence of edtech effectiveness; and (iii) promoting a specific understanding of the professionality of teachers. These practices of mediation are neither mutually exclusive nor independent from each other. On the contrary, most types of edtech brokers usually aim to have an impact in more than one of these categories.

Since edtech brokerage has international dimensions, we explore and analyze three different broker organizations currently operating in Belgium (Flanders) or the U.K to explore cross-national symmetries and differences in their operations and practices. As it will be clear, our methodological lens focuses on empirically presenting the underlying characteristics of edtech brokerage as a distinct phenomenon, while acknowledging and providing insights about the specificity of each different case. The three cases exemplifies, each of them, a different type of edtech broker (ambassador, search engine, and data brokers), demonstrating the potential of these organizations to mediate and reshape the boundaries between state education, the edtech market and policy authorities, and adding to ongoing research about the increasing role of different in-between actors in education policy and practice (e.g., Gulson & Witzenberger, 2022; Hartong, 2016; Player-Koro et al., 2018).

Edtech brokers as mediators

In recent years, 'brokers', as a general category, have appeared in different fields including medicine, social services, and the environment, often depicted as addressing the recurring problem of lack of evidence-based research in practice (Glasgow & Emmons, 2007; Malouf & Taymans, 2016). In education, brokers – sometimes referred to as 'intermediaries' or 'boundary spanners'– have been conceptualized as organizations engaged in the dissemination of knowledge, either through knowledge transfer or by building awareness of, and providing access to, relevant research-based knowledge (Gagnon et al., 2019; Rodway, 2019). Educational brokers have been mostly characterized as bridging the 'research-practice gap', creating new channels through which evidence can flow between researchers, practitioners, and/or policy communities, and whose overall aim is to improve educational efficiency (Neal et al., 2019; Neal et al., 2021).

While most of this work is interested in the role of brokers in improving educational outcomes, critical research, on the other hand, studies brokerage as a highly agential practice and is interested also in how brokers might steer educational agendas in particular ways. If, according to the first understanding, brokers focus on transmitting information from point A to point B, hence contributing to attaining targets that both parties had before the exchange took place (e.g., by disseminating 'scientific' examples of successful practices), the second one emphasizes how brokers, informed by wider economic and political forces, play a part in defining the conditions, goals, and outcomes of the very mediations they make possible. From this perspective, brokers have been conceived in more active terms as organizations or individuals with the power to make specific forms of educational transformation thinkable, intelligible, and, ultimately, practicable (Williamson, 2014) For instance, brokers have been shown to take policy roles by helping governments negotiate tensions between local and global policy demands for education (Grek et al., 2009), lobbying in favor of non-state policy actors and their data-based 'evidence' (Hartong, 2016), or pushing forward 'de-statized', for-profit educational reforms (Ball & Thawer, 2018). From this perspective, brokers are not only *producers* of knowledge but also, and more importantly, can become *knowledge governors* (Bandola-Gill, Grek & Tichenor, 2022, p. 145). Informed by the latter understanding of brokers and brokerage, we also situate ourselves within a tradition that claims that edtech is not only 'brought into' schools, but rather has the potential to conjointly transform schools in several (un)intended ways (Macgilchrist, 2021).

We use the notion of mediator to analyze and disentangle brokers' practices of mediation; that is, the practices and operations that aim to materialize a set of possibilities, conditions, and constraints, for edtech usage in schools (Decuypere, 2021). Latour uses the notion of mediator in contrast to that of intermediary, and define the later as a device, individual or organization that 'transports meaning or force without transformation' (Latour, 2007, p. 39). By contrast, mediators 'transform, translate, distort and modify the meaning of the elements they are supposed to carry' (ibid.). Mediators, unlike intermediaries, create a link that 'did not exist before and that to some degree modifies the two elements or agents' (Latour, 1994, p. 32). Even when Latour proposes the concept of mediators to fully grasp the agency of non-human actors that have been traditionally conceived as instrumental objects, this distinction is particularly relevant to edtech brokers, as they might be doing more than just 'implementing' edtech, but rather actively influencing the way edtech is used according to specific educational values and visions. As such, we here use the notion to focus on disentangling the organizational

representation of brokers. Every distinctive brokering practice aimed at, for instance, bringing a new laptop, educational platform, or data managing system into schools, as well as the pedagogical guidance that is offered along with them is here seen as an active 'carrier of will' (Latour, 1994, p. 31). It has been widely studied how these mediations, due to the inherently transformative potential of digital technologies, have to potential to recondition the way schools are governed (Ozga, 2009; Selwyn, 2015), reconfigure the role of the teacher (Jarke & Macgilchrist, 2021), and, more broadly, disrupt traditionally distinctive forms of educational time and space (Decuypere et al., 2022; Knox et al., 2020).

While our theoretical framing of brokers opens the door to explore their agency, it does not assume on beforehand the extent of their reach. Concretely, we conceive brokers as neither passive intermediaries nor determining agents. As passive intermediaries, brokers facilitate exchanges without altering previously established goals. As determining agents, they radically disrupt the way markets and schools relate to each other, rendering them instrumental to brokers' particular goals. The category of mediators as here understood establishes a distance from both sides of equally deterministic understandings, and stresses a relational understanding of edtech brokerage, whereby it is a product of the different actors that influence and co-shape each other, thus creating something new and hybrid in nature (Latour, 2007).

As emerging organizations influencing edtech procurement and adoption, edtech brokers also push forward 'sociotechnical imaginaries' of educational futures. Sociotechnical imaginaries are defined as:

> Collectively held, institutionally stabilized, and publicly performed visions of desirable futures, animated by shared understandings of forms of social life and social order attainable through, and supportive of, advances in science and technology (Jasanoff, 2015, p. 4).

This notion explores the embeddedness of technological developments with practices of future-making and goes beyond discursively pointing towards scenarios of desirable futures. Sociotechnical imaginaries have the capacity to materially bring such realities into being by mediating relations between different constituents, creating consensus, and catalyzing the development of specific technical systems (Flichy, 2007). This is central to explore the extent to which edtech brokers, as distinct educational actors, can materialize, through concrete mediating practices around technology, certain normative visions of educational futures while rendering alternative options unlikely or impossible. We build on previous research that has shown how digital technologies infuse normative visions for the school, embedding particular

political agendas (Forsman et al., 2023; Rahm, 2021) and specific learning regimes (Ideland, 2021; Means, 2018) through edtech.

The imaginaries promoted by brokers take place within a moment of wider acceptance and a 'resolutely looking-forward' view to edtech (Selwyn, Pangrazio, et al., 2020), where different sorts of hopes for education are placed around the 'revolutionary' innovations of technology in education (Watters, 2021). In that sense, brokers are not the first or only organizations promoting specific sets of technologically optimistic educational imaginaries. However, their novelty emerges from embedding global discourses to local contexts and by being an articulating voice capable of creating consensus and common alignment between industry, schools and policy. As we will show, they promote the adoption of imaginaries around improved learning efficiency, reduction of teacher workload, control of uncertainty and minimization of risk. These are often explicitly contrasted with undesirable futures of uncertainty, teacher overwork, digital risk, and inefficiency. For this, brokers capitalize on their local expertise to make imaginaries operational in their particular contexts in which they operate. As signaled before, these imaginaries have the particularity of easily being easily supported by different and seemingly opposing actors, including those pursuing profit through the promotion of technology, and those whose priority is the attainment of social goals (Nachtwey & Seidl, 2023).

Types of brokers and case studies

To disentangle brokers' practices of mediation, we present three distinct types of edtech brokers. This categorization is the result of an extensive mapping of the edtech field through different market and policy reports (e.g., Holon IQ, 2021; DfE, 2019; 2022). Based on that mapping, we propose three types of edtech brokers based on their composition and services, and we purposefully select exemplary organizations to disentangle their concrete practices and educational imaginaries. The first category, *ambassador brokers*, represent either a single technology provider (e.g., Google, Microsoft) or a sample of the edtech industry. The main goal of ambassador brokers is to act as a representative (or ambassador) of the edtech brands they promote, encouraging the procurement of their products and advocating for their educational potential. Ambassador brokers are a global phenomenon, as the growing number of Google and Microsoft specialized organization partners across different countries makes clear (Google, 2023; Microsoft, 2023).

The second category, *search engine brokers*, work as search portals that focus on 'delivering evidence' about what works in edtech procurement and usage (Edtech Hub, 2022). In contrast with ambassador brokers, search engine brokers have a strong emphasis on providing 'bias-free advice' and 'evidence-based recommendations' that can prevent problems of over-expenditure (Edtech evidence exchange, 2021) or inefficient procurement practice. From that perspective, search engine brokers commonly work in tandem with research centers and universities in designing evidence-building mechanisms. For example, the U.S. broker Edtech Evidence Exchange is composed by a multisector mix including academia (University of Virginia), industry (Khan Academy), policy (Chicago Public Schools) and philanthropy (Chan Zuckerberg Initiative). Most search engine brokers seem to operate in the 'Global North' (e.g., Edtech Impact; Edtech Evidence Exchange), with some exceptions focusing on the 'Global South' (e.g., Edtech Hub).

The last category is *data brokers*, which support schools in managing, regulating, and analyzing their digital data. While the term has been used before to study the marketplaces of data produced by teachers (Arantes, 2023), we conceive of data brokers more broadly as the gatekeepers of the data produced by schools when using edtech. As such, the core activity of these brokers is securing a safe and efficient data flow between schools and vendors. Data brokers offer distinct tools for schools to analyze their data, facilitating school-level educational decisions. They can be found in the U.S.A. (Global Grid for Learning, 2022), the U.K., Australia, and India (Wonde, 2022). These examples are not the only ones that fit into the proposed categories. However, they were purposefully chosen because of the match between the material they provided to be analyzed and the guiding questions of the study (Ravitch & Carl, 2021). The documentary sources they produced, paired with their increasingly visible presence in social media or policy reports, allow us to disentangle their practices and imaginaries in a more nuanced way. In what follows, we analyze three organizations that are prototypical examples of each type of edtech broker (though they are not necessarily bound to one specific practice alone). We explore brokers' influence at the level of (i) infrastructure building, (ii) evidence building, and (iii) professionality shaping.

Infrastructure building

The first practice of mediation examines how edtech brokers contribute to building the digital infrastructure of the school. An example of the type of digital infrastructure mediated by edtech brokers is a school classroom with pre-set laptops, pre-installed educational platforms, and

single sign-on access that students and teachers use to connect with their accounts, communicate with each other and monitor the learning progress. Digital infrastructures, as the networked systems on which educational practices take place, set the very 'conditions of possibility' of education, pre-defining the possible actions inside the classroom through the strategic presence of 'backstage' elements (Star, 1999) that do not have to be constantly reinvented or reassembled by the teachers or students. Infrastructure offers stability to educational practices, but substantial effort by different actors and organizations is required for its maintenance and proper functioning (Sellar, 2017). Edtech brokers are such organizations, as demonstrated by two exemplary cases: the ambassador broker *Fourcast* and the data broker *Wonde*. In their process of promoting and enacting imaginaries of digital safety and easiness, brokers both *update* the infrastructure of the school and *synchronize* it with broader digital ecosystems of big companies like Google.

Fourcast, previously known as Fourcast for Education, was founded in 2017 and has had a close link to Google since its inception. Fourcast is one of the few 'Google Specialized Partner for Education' in the Benelux area, and offers sales, training, deployment, and technology solutions related to Google products, including Chromebooks, Chrome Education Upgrade, and Google Workspace for Education (Fourcast, 2023). At present, Fourcast has worked with more than 750 Flemish schools in 'developing a sustainable ICT policy' (Fourcast, 2023a). Fourcast's mission is to 'improve learning with technology that works' (Fourcast, 2023a), meaning the software and hardware that, in some cases, is either produced by Google or by local edtech supported by Google. At the hardware level, Fourcast offers schools more than fifteen different types of Chromebooks. Advertised as 'cheap, fast, and easy to use, meeting all the needs of education' (Fourcast for Education, 2022), Chromebooks seem to be a good answer to increasing policy pressures to renew schools' digital inventory. In the Flemish context, the 2020 Policy document *Digisprong* (Flemish Government, 2020) (in English: *DigiJump*) call for measures including providing a personal computer to every secondary student in Flanders (p. 3). In this case, brokers align with wider policy trends that promote and accelerate school digitization at a system level.

Along with the hardware, Fourcast also promotes Google's software. Hardware and software are closely linked, because the advantages of the Chromebook are not tangible unless it is simultaneously plugged into Google's digital ecosystem. This is where brokers construct the digital along with the physical infrastructure of the school. Right after the pandemic, Fourcast encouraged the double purchasing through their 'pedagogical budget': a 5€ bonus per purchased

laptop to buy a Chrome license or any other product of their pedagogical offer (Fourcast for Education, 2022). This amount can be significant for schools buying hundreds or thousands of licenses, especially during moments of significant expenditure like the Covid crisis. These Chromebooks embed into the locality of school management the sociotechnical imaginary that digital transformation is possible in botth high-quality and low-cost ways, thus removing any friction between digitization ambitions and their possible financial shortcomings.

The software offered by Fourcast is not limited to Google for Education apps (Classroom, Calendar, Meet, Drive, etc.). It equally includes third-party apps from which schools can choose with Fourcast's guidance. One case of such local edtech is the Flemish *Bookwidgets*, an interactive learning platform that allows teachers to create their own interactive exercises and to automatically grade tests. Similar to other edtech platforms, this one also works best 'right inside a familiar Google Classroom environment' (Bookwidgets, 2023). This example shows that ambassador brokers can be a major force of Google expansion, indicating equally how local edtech adoption often thrives when supported by big edtech (Decuypere, 2021), while locally produced software, rather than opposing or offering an alternative to big edtech, tends to further extend its presence and dominance.

The digital infrastructure mediated by brokers also extends to the back-end of platforms, as exemplified by data broker Wonde, which plays an active role in brokering infrastructure solutions for ensuring the flow of data between schools and edtech providers. With headquarters in the U.K. and Australia, Wonde is described as a 'powerful, easy-to-use digital solution to transform how to manage school data' (Wonde, 2023). Since 2015, Wonde assists schools in managing school data sharing with over 400 third party apps. Its expertise 'is built on years of collaborative relationships within the education sector' (Wonde, 2023a), and it currently work with more than 25,000 schools in over 60 countries, managing 35 million individuals' data (Wonde, 2023). They operate mainly through a 'data sync platform' where 'schools can quickly and securely maintain and manage their data while controlling how it is shared with third-party applications' (Wonde, 2023a). Schools working with them are assured to 'save time, money and valuable resources' in managing edtech. Arguably, the main added value of Wonde is that it facilitates interoperability; that is, it creates the infrastructural conditions for seamless connectivity and usage of different digital environments, creating new routes for the free-flowing circulation of data from one environment to the other.

At both ends of the data exchange, Wonde's promise is to safeguard the data of schools. The result of this mediation practice is that 'end users at both sides avoid friction, errors, and confusion' (Wonde, 2023a). The importance of avoiding errors is greater when considering all the possible risks to which teachers and students are exposed to in digital environments. To deal with such threats, Wonde guarantees schools that 'new apps can only request the exact data they need' (Wonde, 2023b). For the data sharing to be possible, teachers must authorize the flow of data to make use of Wonde's services. Wonde's case equally depicts how brokers' practices not only influence schools, but equally the edtech sector. Companies benefit from their mediation by having access to schools' data through Wonde's 'simple, API-powered solution' (Wonde, 2023c). According to their website, apps can gain access to over 25,000 schools already connected with Wonde. Gaining a 'maintained and monitored access to school data' (Wonde, 2023c) arguably contributes to accelerating edtech companies' upscaling in the market. By creating new and more agile streams of data between vendors and schools, edtech developers 'can concentrate of the important stuff', namely, creating products that can 'innovate and excite the school sector' (Wonde, 2023c). From the side of schools, besides benefiting from saving time, Wonde makes sure these developers are complying to international standards for data sharing.

The mediation practices of Fourcast and Wonde build a digital infrastructure that is composed of new technical, but also political and economic elements. More than merely offering technical products and support, these practices shape the digital architecture of the school through the promotion of a rapid, easy, and safe processes of transformation. When advancing these imaginaries, brokers have the potential to create new -or enhance already existing- possibilities of interaction between teachers, students, and edtech companies. In both studied cases, the invitation to digitize the infrastructure of the school arrives at a moment of urgency and is rendered as an imperative more than as a suggestion. Schools are invited to 'jump on' the digital train before it is too late (Fourcast for Education, 2022), and through this invitation brokers position themselves as indispensable sources of expertise that, not only help attaining desirable goals, but also prevent undesirable scenarios in an increasingly risky digital world (Gerhold & Brandes, 2021). When schools accept the invitation to work with them, they potentiate the presence of big (and some local) edtech and reinforce an accelerated rhythm on the digitization processes of schools.

Evidence building

Edtech brokers use different evidentiary mechanisms to guide the adoption and usage of edtech into schools, ultimately mediating and shaping the production of 'what works' evidence and its circulation into school decision-making sites. This mediating practice is supported by the powerful imaginary of a scientifically reliable transformation (Smallman, 2020) that immunizes schools against inefficient edtech. Different reports suggest teachers do not always consider 'scientific' evidence when choosing educational technologies (e.g., Edtech Evidence Exchange, 2021). Moreover, some teachers claim there are not enough resources to guide their decisions about the usage and procurement of edtech (DfE, 2022). In response, search engine brokers position themselves as reliable advisors with 'objective', evidence-based authority. Their advice is framed as 'easy to understand, with academic rigor' (Edtech Impact, 2023), and with the capacity to show 'which edtech works where, and why' (Edtech Evidence Exchange, 201).

This practice of evidence building is exemplified by the UK search engine broker *Edtech Impact* (EI), 'an independent review platform for Edtech, designed to help educators find the best products and push companies to up their game' (Edtech Impact, 2022). It was founded in 2019 by the same creators of *Innovate My School*, an online learning portal for teachers founded in 2010. In 2022, EI had more than 50,000 subscribers and participated in the development of an edtech adoption strategy by the Department of Education in England (Innovate my School, 2019; DfE, 2019). The issue of lack of available information about edtech is expressed by EI's CEO and Co-founder:

> Whether you're buying a new phone, booking a trip, or ordering the Friday night takeaway, you have a wealth of reliable data at your fingertips. When it comes to Edtech, this data doesn't exist. (Edtech evidence group, 2022)

To solve this problem, EI aims to 'provide the largest database of EdTech products globally' so that teachers around the globe can find advice about efficient edtech (Edtech Impact, 2023a). The mechanisms through which EI ranks and recommends edtech are based on both quantitative and qualitative indicators (Edtech Impact, 2023a), that are not further specified on their website. What is known, however, is that one of the most important sources of data for building evidence are teachers' reviews. More precisely, EI builds a notion of 'what works' that heavily relies on the 'social proof' produced by local practitioners:

> Will it actually improve learning? Is my data safe? Can parents use it? EdTech Impact will give you the information you need, from the people you trust the most **- *your peers*.** (Edtech Impact, 2023a. Emphasis in original)

The notion of social proof works as a proxy for representing the judgement and expertise of teachers. It is built upon '10,000+ independently vetted reviews by front-line educators' (Edtech Impact, 2023). When providing their input, teachers are framed as a 'community of heroes' (Edtech Impact, 2023a), central in pushing forward an evidence-based digital transformation. Whoever wants to participate in the reviewing process must comply with certain rules, such as reviewing products that the teacher has actually used, or only reviewing products that have been used in the last 12 months (Edtech Impact, 2023b). Nonetheless, the following clause is included: 'These are just our guiding principles, we have the final say with regard to the interpretation and application of these guidelines and can update them at any time' (Edtech Impact, 2023b). Teachers' reviews, in turn, are processed according to five different criteria that EI uses for assessing impact, namely: Building student knowledge, reducing teacher workload, improving teacher efficiency, providing school data, and improving attainment (Edtech Impact, 2023c). These criteria of EI align with some of the imaginaries of brokers mentioned above, such as reducing the workload of teachers, improving educational efficiency through edtech, and promoting the use data-driven insights to support educational decisions. The evidence is then built based on the input of a specific population of teachers, and along with EI's set of conditions, rules, and evaluation criteria, this knowledge has the potential to redefine what counts as reliable evidence to inform practices around edtech.

The mediation practices of EI are equally helpful to understanding the envisioned place that the edtech market occupies in the discursive landscape of brokers. For instance, EI's main goal is to help schools *and* push the industry forward (Edtech Impact, 2023a). This suggests that the digital transformation of schools should align with and boost industry, and that a scenario where schools can achieve digital maturity is one where they can, and should, grow symbiotically with the edtech industry. This portrayed symbiotic movement of markets' and schools' co-dependency is emblematic of wider political visions that encourage private interventions in traditionally publicly managed sectors, such as education, for the sake of improving their quality and productivity (van Dijck et al., 2018). It is worth mentioning that the mediation here at the level of industry and practice seems to, again, be aligned with (this time British) policy mandates, as EI materializes the goal of fostering 'a vibrant and competitive market for EdTech products, with opportunities for buyers to meet sellers, and to test and iterate their ideas' (DfE, 2019). In this scenario, the relation between improving education and promoting the growth of (a selection of) the edtech market is intended to become as frictionless as possible.

The ways in which EI engineers their evidence building mechanisms is but one example of how search engine brokers mediate between schools, industry and policy via the production of knowledge. Different cases of search engine brokers aim to produce more stable school routines around edtech and evidence, hence having a stronger and more concrete influence in practice settings (e,g, Edtech Evidence Exchange, 2021). What is important here, is that novel forms of evidence production are bringing to the fore new actors, insights, and techniques of evidence-making. In particular, brokers' ways of building evidence give a new role to the situated knowledge of local practitioners in prescribing what works in education. Additionally, they present and, to some extent, govern new definitions of 'local practitioners' knowledge', through different evaluation frameworks and incentive mechanisms. If taken at face value, these new mechanisms appear to answer to the most frequent criticisms of the discourse of 'what works', namely, its lack of proper answers to questions of contextual situatedness and specificity (Lewis, 2017). By incorporating teachers into their evidence-building mechanisms, edtech brokers mediate a new space in which local schools co-create the contextual evidence of what works, securing more 'reliable' classroom practices whilst, at the same time, contributing to an even more accelerated growth of the edtech industry.

Professionality shaping

The third practice of mediation focuses on how brokers promote a particular imaginary and normative vision of teachers' professionality. This practice of mediation, which includes teacher training and school coaching, directly impacts student-teacher interactions and their possible outcomes. By mediating between edtech vendors and pedagogic practice, brokers aim to transform teachers into knowledgeable edtech users, and extend edtech vendors' reach into everyday professional routines. An example is provided again by the ambassador broker Fourcast. Besides the promotion of hardware and software, they also provide pedagogical training and guidance. It can be argued that this service is the most important one:

> We would like to focus mostly on the pedagogic aspect and not so much on the device. We especially want schools to be able to use the purchased devices in a good way. (Fourcast for Education, 2023b)

Fourcast offers different types of workshops, of varying length and intensity, which aim to 'inspire teachers to want to change and make clear why change is necessary' (Fourcast for Education, 2023c). The idea of a necessary change speaks of the 'adapt of perish' environment in which the imaginaries of a rapidly adaptative schools are infused and confirm the imperative tone of the invitations around school digitization in which brokers emerge. The core

pedagogical values of Fourcast, such as creativity, engagement, and critical thinking, are pursued in terms of 'how to choose the right tools in the right moment' (Fourcast for Education, 2023c) for promoting such skills. Topics that have always been central to the teacher profession – e.g., how to promote creativity and critical thinking in the classroom, how to engage students with the subject matter –now include a digital component, and moreover, the digital component should ideally consist of tools that brokers promote.

The most extensive training, the 'Digi-journey', starts from mapping the school's initial situation according to the 'competences of the teachers' (Fourcast for Education, 2023d), and, depending on each case, Fourcast design a personalized plan for every teacher. In turn, levels of teacher proficiency are assessed using *European Framework for the Digital Competence of Educators* (DigCompEdu), an initiative of the European Commission (2017). Again, edtech brokers' legitimacy is supported by policy mandates characterized by similar sociotechnical imaginaries of schooling. DigCompEdu aims to show teachers how to 'face rapidly changing demands' with a 'scientifically sound background framework' (p. 4). By mediating this competency framework into schools, FE positions itself as an active catalyzer of policy regulations, translating abstract policy discourse into professional practice. The envisioned outcome is that teachers become 'a source of inspiration inside and outside the school' (Fourcast, 2023d). That is, not only competent digital professionals but embodied agents of digital transformation and propellers of change among other colleagues.

Fourcast enact ideas of transformative, highly adaptable, teaching professionality by different means. One example is by promoting the Dutch learning platform *SchoolUpdate*, where teachers 'learn everything about ICT and media' (Fourcast, 2023e). From the assumption that 'teachers don't want to stand still, but keep learning', the trainings of SchoolUpdate give them an opportunity to learn 'where and when they want' (Fourcast, 2023e). This suggests that the role of the teacher does not have to necessarily be confined to schooling hours and constructs a more flexible understanding of the times and places where teachers are expected to be teachers. In the case of brokers' mediations, they promise teachers to release time of unnecessary administrative tasks, but equally offers new ways to make use of this time, even outside the school. Different studies have questioned the interplay between professionalization and de-professionalization of teachers in regard to the digitization of education (Hartong & Decuypere, 2023). Digital technologies, and related calls for enhancing teachers' autonomy, might lead to undesired practices of monitoring, controlling and work intensification (Selwyn

et al., 2017) or, conversely, to improve teachers' practices when accompanied by the right techno-pedagogical skills (Kerssens & van Dijck, 2021). While it is impossible within the scope of this article to analyze how Fourcast's practices of mediation impact the actual teaching practices at the school level, it seems clear that new ways of fostering teacher autonomy are brought forward by brokers, along with an invitation to reinvent the teaching profession, close to disruptive, 'start-up' ideals of constant self-actualization and flexibility.

Conclusion

In this article, we have provided an initial categorization of edtech brokers, a new type of actor that has increasingly emerged in the edtech sector and that has hitherto not been extensively explored. Casted as potentially agential mediators rather than only transmissive intermediaries, our analysis contributes to empirically understanding how brokers modify the composition and distinctive practices of both schools and the edtech industry in at least three ways. First, they update the digital infrastructure of the school, promoting local solutions but equally relying on the support of big edtech, thus reinforcing their pervasive influence in supporting the daily activities of the school (Kerssens & van Dijck, 2021).This mediating practice restructures options for procurement around preferred vendors, particularly those represented by ambassador brokers or rated and ranked by search engine brokers. Second, they create new forms of evidence-building to guide edtech adoption at a local level. Their evidentiary practices seemingly challenge more traditional, top-down approaches of edtech recommendations, and has the potential to situate teachers as evidence suppliers and schools as evidence-based decision-making institutions. Finally, through the combination of pedagogical advice and technical training, they promote a particular image of the professionality of the teacher - innovative, entrepreneurial, informed by evidence-, advancing normative claims about what a good teacher is in a digital age (Ideland, 2021; Means, 2018) and showing the potential of digital technologies to redefine the role of educational actors (Hartong & Manolev, 2023).

From an analytical perspective, this study contributes to understanding the role of new intermediaries involved in the digital transformation of education. As it has been shown over the past years (Ball & Junemann, 2012; Rowe, 2022; Verger, Fontdevila, et al., 2017) decision-making around edtech is being re-distributed across different actors that are becoming more relevant in steering, modifying, or even contesting the decision-making power of more established actors like edtech companies, governments, and schools. In that sense, the emerging presence of brokers adds to question 'classical' binaries (private/public, national/global, big

edtech/local edtech) to understand current processes of edtech procurement and use (Ball & Thawer, 2018; Decuypere et al., 2022). Arguably, the practices and goals of brokers around edtech are not entirely new. However, it seems clear that one of their biggest roles and prospects for the future lies in being a catalyst for locally adapting and materializing wider hopes around edtech that circulate as common currency across wider governmental and industry circles (Swist & Gulson, 2023). As stated before, innovations around technology, often conceived as unproblematic and inherently beneficial, have the power to bring different stakeholders together in working towards desirable futures (Jassanoff, 2015). Yet, for bringing these ideations of future-making into reality, large technology organizations are not necessarily involved in its ground-level realization (Gorwa & Veale, 2023). This is where brokers, propelled by the imaginaries around risk aversion, scientific certainty, time efficiency, and professional self-actualization, discursively create *and* materially contribute to the digital transformation of education. They do so through a complex interplay of sometimes replicating, modifying, or even challenging wider imaginaries. Through positioning themselves as sources of 'expert knowledge', brokers provide strategic advice that was assumed to be lacking in more 'traditional' educational actors, and it is precisely this combination between the local and the global what allows brokers to align in new ways industry, policy, and education sectors towards shared aims.

The concrete ways in which brokers remove or add friction to the relation between the actors they connect is to be explored empirically. Our initial typology serves as an initial base for such explorations. Even when it explores relevant cases that will probably have a resonance beyond their immediate context (e.g., Ferrante et al., 2023), it is important to acknowledge that the geo-political situatedness of our explored cases (Europe-U.K.), as well as the data to which we had access (publicly accessible documentary sources), mark some limitations to our findings. For future studies, it is particularly relevant to bear in mind that processes of edtech use and adoption are highly context-dependent, and hence the practices of brokers are expected to land and unfold differently depending on wider context in which they take place (Grohmann, 2022). Bearing this in mind, this study offers the first analytical steps as well as a roadmap to further disentangle how edtech brokerage is occurring in and impacting the educational field.

Chapter 2

How do edtech brokers build evidence?[3]

Introduction

Evidence making is a central governing technique in educational policy and practice (Bandola-Gill et al., 2022). Controlling 'the field of judgement' (Ball, 2003) by valorizing actors, practices, or technologies though the lens of 'scientific' standards, grants actors involved in knowledge-making practices the power to steer educational realities according to particular judgments and normativity. International Organizations (IOs) like the OECD have been central in the production of evidence for decades (Grek, 2009; Gorur, 2016), thereby influencing the present and future of education (Robertson & Beech, 2023). Over the past years, however, their authority over the construction and dissemination of knowledge has been increasingly re-distributed between a wider range of intermediary actors including think-tanks, research centers, investors and philanthropies (Geiss & Röhl, 2024; Joecks, 2024; Williamson, 2014). As a result, evidence-making has become a product of different public-private alliances between established and emerging actors, creating new synergies between the methods, cultures, and ethical values of the public and private sector (Ball, 2012).

Novel evidence-making practices are now emerging as a result of the proliferation of digital technologies in education systems globally, a trend largely driven by financial and governmental interests in educational modernization and reform (Komljenovic et al., 2023; Nemorin, 2024). However, in most cases schools report not to be supported by reliable, independent evidence (Kucirkova, 2024). In this context, this article foregrounds how edtech evidence is being produced by an emerging type of intermediary organization, here referred to as *edtech brokers*. Edtech brokers are defined as organizations that mediate between edtech vendors, government institutions and school authorities, generating evidence to guide local schools in procurement, adoption, and pedagogical use of edtech (Ortegón, Decuypere & Williamson, 2024). In the past years, different instances of edtech brokering have emerged,

[3] This chapter is an adapted version of the following publication: Ortegón, C., Williamson, B., & Decuypere, M. (2024). Edtech brokers and evidence governance: knowledge intermediaries in the education technology market. *Globalisation, Societies and Education*, 1–12. https://doi.org/10.1080/14767724.2024.2439419

with identified cases in Europe, North and South America, India, and Australia, making it a globalizing phenomenon (ibid). Brokers have the mission to support teachers and school authorities to 'modernize' schools in reliable and cost-effective manners, while at the same time supporting governments' agendas of digitalization and market growth projections. Through the production of evidence on effects and impact of edtech, edtech brokers have the potential of affecting school practices while also shaping policy agendas and the market prospects of edtech vendors. The goal of this contribution is to explore and analyze the practices involved in brokers' creation of evidence, as well as its influence on the actors that interact with it, including schools, policy organizations, research centers, and edtech vendors.

Debates around edtech evidence have acquired renewed salience since the post-pandemic market decline has created an unstable atmosphere for edtech companies, making it increasingly necessary to proving their value, efficacy, and effectiveness to customers (HolonIQ, 2023; Lindroos Cermakova & Havinga, 2024). Still, much evidence available to schools stems from in-house reports from edtech companies with clear marketing purposes (Hillman, 2022). Teachers report lacking clarity about how to use edtech in daily practice (DfE, 2022) amid growing concerns about edtech's security as well as related privacy implications (Day et al., 2022). Despite the lack of evidence, policy reports continue to show almost unequivocal agreement about the potential of edtech to improve learning (e.g., DfE, 2023; European Commission, 2020)[4]. Calls for digitalizing schools are echoed by market actors such as edtech investors, persistently promoting edtech growth despite evidence paucity (Komljenovic et al., 2023). Markets, policy, and school sectors have aligned around the expectation that edtech can fulfil many educational promises, including improvement of teaching and learning, reducing teachers' workload, and providing access to disadvantaged students. But while transformative discourses are shared widely, there is no equivalent consensus about the most effective, pedagogically valuable, and trusted tools for achieving these goals (Lindroos Cermakova & Havinga, 2024). Edtech brokers are currently seeking to address this gap by producing specific forms of edtech evidence. This evidence is a product of the alignments they mediate and sustain between edtech vendors, policy organizations, schools, and research centers. Importantly, we argue that this knowledge presents itself as a solution to the problem of how to digitize schools

[4] But see UNESCO (2023) for an account of the unintended (and undesired) consequences of embedding digital technologies in education during the covid emergency.

in safe, cost-effective, and teacher-friendly ways, and aligns the disparate interests of multiple actors across public and private sectors, at local and global scales.

Through in-depth interviews with executives and professionals working for broker organizations, and document analyses of brokers' reports and communications, we present two case studies of brokers operating in Europe. We adopt a relational framework to understand edtech brokerage as a knowledge-assembling practice in which heterogenous actors come together, in combination with forms of expertise and instruments of evaluation, to shape knowledge about edtech effects and impacts. Since knowledge governs the realities it claims to represent in particular ways (Lewis, 2021), this study contributes to wider debates around knowledge governance (Ozga, 2021) and the role of 'knowledge governors' in shaping evidence practices in education (Bandola-Gill et al., 2022). The main claim of this paper is that edtech brokers, beyond being simple knowledge disseminators, can be understood as *edtech knowledge governors*. They position themselves as governors by re-working the prevalent critiques of evidence making in education and, simultaneously, reproducing and strengthening long-standing expectations and imaginaries around the digital transformation of education.

Assembling edtech knowledge

During the 'evidence-based' revolution in education of the last three decades, scientific knowledge of 'what works' has become central to policy reform (Biesta, 2007). Various forms of quantification and comparison are integral to achieving such 'quality' improvements. The resulting insights are usually presented to schools and other stakeholders in the form of metrics, statistics, and numerical data (Grek, 2009; Williamson & Piattoeva, 2019). Because of its alleged objectivity, this form of evidence is sometimes referred to as 'hard evidence'. A known example of hard evidence in education is PISA's rankings of the 'best' educational systems, derived from large scale assessments conducted by the OECD (Gorur, 2016). The alleged objectivity of numerical knowledge has also expanded to 'softer', more qualitative forms of knowledge. An example of this form of evidence are examples of good practice (Lewis, 2017; Simons, 2015). Unlike their numerical counterparts, softer assessments appear to address the contexts of educational practice, being directly applicable for practitioners (at least potentially). In both numeric and discursive forms, this evidence is performative in causing diverse reactions among the actors and institutions who are measured (Williamson & Piattoeva, 2019).

Precisely because of their performativity, practices of evidence production are often understood as *governance issues* (Lingard, 2013). While evidence used in governance is routinely presented

as neutral, independent of values, and objective, it is always informed by contextual factors and the agendas of those involved in its creation (Ozga, 2021). For instance, 'evidence' always necessarily creates highly distinct images of what it means to be a good school system, a good student, or a good teacher, according to specific understandings of education and its role on society (Gorur, 2016; Lewis, 2017). These reports of 'what works', understood as political devices, have concrete effects in schools and school systems, such as subordinating educational values to economic priorities (Sellar & Lingard, 2014), or incentivizing policy borrowing across contexts in a way that implicitly legitimizes decontextualized comparisons across school systems (Gorur, 2016; Lewis, 2017), ultimately steering possible actions in classrooms, policy centers and markets, favoring some outcomes while rendering others unlikely (Ball, 2003).

From a relational perspective, evidence is always the result of different negotiations between heterogenous actors, materials, discourses, institutions, and ways of knowing (Müller & Schurr, 2016; Tampio, 2009). Far from being produced through a unidirectional process, edtech evidence is the result of converging interests, ideas, and techniques of actors such as schools, policy organizations, research centers, edtech vendors, and investors (Komljenovic et al., 2023), which collectively determine, through agreements and tensions, what is ultimately conceived as 'good' edtech. For our analysis, we emphasize the role brokers develop to mediate these relations between stakeholders. Such emphasis on intermediary actors is often overlooked in studies about knowledge governance. Indeed, by emphasizing the alleged relevance of well-known actors, 'we risk overlooking influential actors, actions and impacts simply because they are not where we have traditionally found them, nor where we might think to look in the first place' (Lewis, 2021, p. 8). Congruent with recent research on intermediary actors in education governance and practice (Hartong et al., 2024), we claim that it would not be possible to understand current processes of edtech evidence making without acknowledging brokers' role in forming alliances and navigating tensions between actors.

We show how the power to determine what counts as good edtech is not implicitly attached to actors considered as traditionally powerful, but is rather the result of particular practices that emerge in the relations between actors (Decuypere & Simons, 2016). In other words, we explore *how* exactly evidence is produced, what instruments and techniques are deployed and prioritized, what technical and financial criteria are considered, and what discourses guide the assessments. Our claim is that edtech brokers *govern* edtech evidence by acting as mediators that align stakeholders' interests, alleviate possible tensions, and create consensual agreements. We propose three categories of practices to show how exactly this happens: (i) participatory

evidence making, (ii) political navigations, (iii) and market curation. These practices make it possible for relations to form across schools, policy and industry settings, enabling evidence to flow across sectors and create an emerging consensus that renders all actors fit to participate in a common goal (Murray Li, 2007). Even when this consensus is necessarily contingent and subject to change over time (Savage, 2020), it nonetheless creates a type of knowledge that is crucial to advance a common imaginary in which digital technologies are conceived as the solution, and sometimes even the only alternative, to many pressing educational problems.

Cases of search engine brokers

Edtech brokerage is a globalizing phenomenon, though broker organizations take varied forms and produce evidence using different methods and techniques. To account for the various ways edtech brokers assemble evidence, we purposefully selected and anonymized two edtech broker organizations that significantly differ in their characteristics and composition while sharing the goal of creating consensus around the 'best' educational technologies for their particular contexts. Consequently, they both evaluate, select, and recommend edtech based on different criteria of quality assessment. Their assessments, in both cases, have concrete effects on schools and markets, determining which products may be part of digitization processes and which may not.

The first organization is the broker *Arrow*, a publicly-funded, multi-sector project that aims to enhance digital personalized learning at a national level. It promotes digital personalized learning through a digital portal that allows teachers to create learning paths for students. These learning paths are also informed and potentially modified by processing the data produced the student. The edtech repository supporting the learning paths was previously curated by Arrow. The organization is currently working with 500+ schools and is composed by different professionals, including project managers, researchers (both qualitatively and quantitatively oriented), a didactical team (working closely with teachers and establishing the educational criteria for filtering edtech), and a technical team (providing maintenance of the platform).

The second case, *Next*, is a private, for-profit broker that works as an independent review platform for education technology products. For reviewing edtech, Next developed an assessment framework that considers criteria such as user experience, pedagogy, compliance, safety, and learning impact. It awards certificates and badges to approved edtech products, and provides visualizations comparing edtech products based on the result of assessment and user reviews. Currently, Next is composed of the CEO, CTO, UX Designers, sales, and marketing

professionals, and collaborates closely with different partners and consultants to assess products in terms of data compliance and safety, effectiveness, and pedagogy.

The origins, history, and composition of both organizations differ significantly, as well as their potential relations with policy and market actors. However, they both represent an emerging source of expertise about 'what works' in edtech based on different pedagogical, but also technical, financial, and political criteria. We conducted 7 in-depth interviews with relevant organizational actors. In the case of Arrow, this includes the program manager, the head of education, and both qualitative and quantitative researchers within the project. In the case of Next, this includes the CEO, and associated consultants working in the departments of data safety and pedagogy. All the interviews were semi-structured in nature and lasted between 60 and 90 minutes. After a process of precoding, a number of code sets were created following axial coding (Ravitch & Carl, 2021). These data were triangulated with documents and reports produced by the organizations, including white papers produced by the brokers and a compilation of their social media communications from September 2021 until July 2024. The analysis of these datasets was done according to the codes that emerged from the interviews. In what follows, we explore the three main ways through which brokers create knowledge around edtech: participatory evidence making, political negotiations, and market curation.

Participatory evidence making

Brokers mediate between different actors to create knowledge through what we call participatory evidence-making. By placing teachers as sources of expertise in assessing edtech, brokers re-work many of the prevalent critiques of processes of evidence making in education. When reporting 'what works', actors such as IOs decide - often in decontextualized ways - both the diagnoses and the solutions for the problems of local schools (Lewis, 2017). Despite increasing awareness of the danger of 'one size fits all' approaches to evidence making, there is still a tendency to favor 'global best practices' that risk ignoring the particular needs and requirements of the school, its stakeholders, and its local community (ibid.). Brokers aim to overcome this issue through evidence-making practices that claim to be sensitive to the particularities of the contexts in which they operate.

When brokers claim to take teachers into account, they largely refer to teachers whose professional goals are aligned with their operational goals. Asked about the process for teacher recruitment, Arrow's Pedagogic lead said they were looking for:

> Obviously, someone who is an idealist and had a lot of affection for educational technology (…), and someone who would not just stay with 'you know, the things are what they are' and just sit there, but someone who would enthusiastically try to make a change.

Arrow offers teachers the opportunity to build more entrepreneurial careers in a context of increasing pressure to stand out as an innovative professional. The teachers maintain full-time teaching jobs in addition to their side-work with this particular broker. The same goes for Next: since its inception, teachers were incentivized to participate with the potential to improve their careers, as its CEO describes:

> We never paid them. Instead, the exchange was very much 'we'll give you a lot of exposure, we'll make a big deal of you', and they could go on to talk at events and charge money, so that's great.

Previous research has identified the growing phenomenon of teachers acting as 'ambassadors' for particular platforms of companies, receiving in exchange some form of compensation for the endorsement of a product (Arantes & Buchanan, 2023). In a similar way, teachers that are described as idealists or ambitious find a way to advance their careers through collaborating in brokers' evidence-making processes, either by charging for their services or enhancing their CV. As a result, when brokers take into account the experience of teachers to provide a 'trusted' review of edtech, they actively solicit a very specific sub-set of teachers that already share a techno-optimistic attitude towards edtech.

It is with the information provided by this sample of teachers that brokers deploy multiple methods for crafting the evidence. In the case of Arrow, teachers were enrolled from the beginning in defining Arrow's notion of Digital Personalized Learning (DPL) through large teacher surveys, observations and interviews (Arrow Project Manager). The data provided by teachers, along with its subsequent analysis, served as a basis for the pedagogical experts to pre-select 500 edtech tools, which were invited to apply for the project. The companies that applied were evaluated again by teachers. Arrow also co-designed the online platform, including the learning track, in collaboration with teachers. As explained by one researcher of Arrow, 'this was a design-based research study in which we work together with teachers to really build something that they like and that they can use' (Arrow Researcher # 1). Researchers described how 'every little detail' (Arrow Project Manager) of the platform was discussed with teachers since, again, the focus of the project was more on the operationalization of their notion of DPL, rather than on more 'classic' studies of measuring effectiveness through established methods like RCTs, commonly considered 'the gold standard' for educational evidence (Parra & Edwards, 2024).

Our data clearly indicate that brokers seek to redefine what counts as evidence, particularly by decoupling it from conventional 'effectiveness' measures. According to the pedagogical lead of Arrow:

> The effectiveness question is a very difficult one to answer, of course, because it can take on so many different forms… Even just creating more time efficiency would provide teachers with a luxury of spending more one-on-one time with students. (Arrow Pedagogic Lead)

These words are remarkably similar to those of the CEO of Next. When asked how they assessed the evidence, the CEO said: 'Evidence is so broad, you know. What do you mean by evidence? Is it pedagogical? Is it impact? Is it user experience? Is it compliance and safety?'. Their own answer was: 'I believe that reviews can count as evidence. It just depends on what framework or what scale you're measuring that'. Indeed, reviews by teachers are a central source of Next's assessments. Whoever wants to participate in the reviewing process must comply with certain rules, such as reviewing products that teachers have actually used, or only reviewing products that have been used in the last 12 months. Teachers' reviews, in turn, are processed according to different criteria, for instance advancing student knowledge, reducing teacher workload, or improving teacher efficiency.

However, while Next works with teachers' reviews as the main source for assessing, they equally take other factors into account, such as the pedagogical quality of the solution, compliance and safety regulations, and a more traditional assessment of impact. For the latter, it was described as the 'set up of a mini RCT and scientific study, essentially' (Next CEO). While relying mostly on the reviews of teachers as users, Next combined new and old methods of evidence production. Their preference for teachers' reviews is also a statement about what valid knowledge is, and who can be considered as an authority for answering that question:

> You know, if you ask for what's evidence from academia, I think typically you get the answer like 'Oh well, it needs to be randomized controlled trial'. The gold standard RCT, which only the top companies can afford because it takes so much time.
>
> We don't want it to just be another thing that only the big companies can afford because generally that's what we've seen so far when it comes to evidence. (Next CEO)

Brokers' evidence-making practice is in line with a 'participatory turn' in educational evidence creation (Bandola-Gill et al., 2022; Grek, 2024), in which the production of knowledge is expected to account for 'local' politics and context specific needs. Incorporating as much stakeholder participation as possible in one common project, this new type of evidence is

focused not only on technical accountability (how rigorous the knowledge is) but is now also subject to political accountability (how much different stakeholders can agree with it). Enrolling teachers is a strategic move for creating evidence that can be more easily accepted by other teachers, who are ultimately those who will execute (or not) envisioned changes with regards to edtech usage.

Indeed, getting more teachers on board with digitalization was a recurrent problem that brokers sought to tackle. Several staff of both organizations argued that teachers can be reluctant to implement the guidance offered in their own pedagogic practices. Questions raised by teachers included: 'Do we really have to talk about this, or do we really have to use it in the classroom? Uh, it's something that will change in a month or two?' (Arrow Researcher # 2). The strategy of brokers to listen to teachers' preferences, and craft a particular type of teacher's voice when reviewing edtech products, had the goal giving them another 'push' for them to adopt edtech. Ultimately, a particular type of evidence is created and rendered operational to define what counts as good and bad edtech today. This evidence is co-created through relations with a selective sample of mission-aligned teachers and results from both traditional and novel evaluative methods.

Political negotiations

Brokers also govern edtech evidence-making through political negotiations. These political negotiations include alleviating tensions, achieving consensus, and creating agreements with government actors that steer processes of edtech procurement at policy levels. The analyzed brokers sometimes supported the enactment of policy agendas in the local contexts of schools, without necessarily having any links of affiliation with policy organizations beyond their affinity in pursuing the same goal of pushing forward the 'evidence-based' usage of edtech products. Governments need concrete, easily shared 'deliverables' that can be operationalized by teachers (DfE, 2022; European Commission, 2020). Such deliverables are produced by brokers, and through them, schools have at hand 'reliable', 'scientific' knowledge to trust (or not) a number of edtech recommended solutions. To make this possible, brokers mediate between different actors that sometimes have to compromise in their original goals (Murray Li, 2007).

In the case of Arrow, the whole project was described from the outset as a 'very political project' (Arrow Project Manager). Because it is publicly funded, Arrow is closely linked with policy actors, having 'around 20' policymakers sitting in the steering committee, monitoring

and approving all the decisions of the project along with the other stakeholders. The voice of policy actors was reported to be more significant than others:

> If you were to map all these stakeholders on a power by interest matrix, the power of the schools, the pupils, and the teachers is very low and it's all these other parties that are the really powerful ones. (Arrow Project Manager)

Arrow was conceived as one of the flagship programs of both the ministry of Education[5] *and* the ministry responsible for Science and Innovation:

> They [the ministry responsible for Science and Innovation] wanted a project on personalized digital education, and they wanted a solution, but they didn't want just the tools. They also wanted the training for the teachers. So basically, the idea was to develop something that would boost the digital transformation and the use of digital tools in school.

This is a case in which policy authorities act as gatekeepers of edtech products to schools, adding several legal criteria for the process of contracting with edtech companies. As the pedagogical lead of Arrow mentioned: 'we were of course obliged to follow the rules that applied to us, well, we were a governmentally funded project'. The political control, however, was conceived as a burden for the advancement of the project. 'It's a lot easier when it's all within one company and its private sector and everything is set up to support a project manager to do their job here' (Arrow Project Manager). The whole process of public tendering was described as a 'quite a complex procedure' that sometimes took away power from other stakeholders to decide the final form of evidence aimed to guide teachers. More concretely, it took power away from the didactical team: 'We couldn't, as a digital team, just say "OK, we need this and that application". It was less of a luxury than what we wanted, but it turned out to be fine' (Arrow Pedagogic Lead).

Thus, the public funding of the project imposed constraints on Arrow's evidence production efforts. These constrains, characteristic of publicly funded projects, were not present for Next as a private sector organization, which negotiated a different relationship with policy authorities:

> This was 2017 I think, and the Ministry of Education had no edtech team for years, about eight years or something, and they just hired 3 people to form this edtech team in like a dusty corner of the of the office or something.
>
> The themes that kept bubbling up were lack of transparency and lack of knowledge around what edtech products exist. So, there's lots of discussions around lack of transparency of what works,

[5] For anonymity purposes, the governmental departments in both countries in change of education will be referred to as "Ministry of Education".

> lack of evidence, lack of trust, and somebody surely needed to just go ahead and set this up. And everyone [in the government] kept looking at me like: 'Why don't you do it?' And I was like, well, I'm starting to think maybe it's a good idea. (Next CEO)

While Arrow operated in a context where policy authorities exerted stronger control over the procurement process, Next operated in a context where policy authorities relied more strongly on private actors for policy execution. Policy actors delegated to Next as qualified experts to guide schools in their process of digitalization, while Next capitalized on that endorsement to secure customers and revenue stream. Indeed, the relationship between Next and the Ministry of Education was a two-way street. On the one hand, Next received a green light from the Ministry of Education to act as a field expert via internal meetings. On the other hand, Next assisted the Ministry of Education assessing and attending the most pressing needs of the education sectors around edtech. Here, we can see a mutual interplay between brokers being leveraged by policy makers and policy makers being leveraged by brokers.

When looking at the relations between brokers and policy authorities, it is clear that both brokers have significantly different models of funding and decision-making, and the role played in both cases by ministries and other policy authorities equally differed. Still, there were some significant similarities in the role of policy authorities for both brokers. More concretely, Arrow and Next emerge as politically motivated actors, through which national governments advance more global agendas of school digitization into the locality of schools, showing how edtech knowledge is also the result of policy ambitions in which schools are persuaded to increase their edtech engagement.

Market curation

The third practice of evidence-making consists of assessing edtech products through criteria that shape the market prospects of edtech companies. This practice makes visible how brokers' creation of evidence also interacts with the edtech industry, whose concerns and needs determined the way evidence was assembled. The ministries of education where both brokers operate emphasized symbiotic benefits for schools and markets, and expressed ambitions to become global actors in procuring edtech solutions in different countries. In order to achieve consensus with government *and* markets, brokers included criteria that evaluated different products based on their market potential. In the case of Arrow, the criteria included the product's potential for interoperability (the possibility of the product to seamlessly share data with other environments), whether it was a cloud solution, and its potential for adaptivity. In general, Arrow describes what they were looking for as follows:

> Our model is more like a pay-per-view thing, where you have different vendors and you can buy your film from one vendor, others from another one. You know, it's more going in that direction. (Arrow Project Manager)

Following the footsteps of the edtech investment industry, Arrow preferred flexible, adaptive, interoperable solutions based on a platform business model characterized by collecting subscriptions and extracting data as dual income stream (Narayan, 2022). The focus on interoperability contributes greatly to securing that the digital infrastructure of the school largely becomes dependent on big tech companies. To schools, interoperability is mostly promoted as a major step forward towards the reduction of teachers' workload and classroom optimization. As articulated in the interviews, they solve 'a very practical issue for teachers when a platform allows a teacher and students with single sign on access to different tools' (Arrow Pedagogic Lead).

These market criteria were taken into account because, as stated by the Project lead of Arrow, 'there had to be a clear gain for companies'. It was the same for Next, whose vision is to help schools *while* supporting the national edtech industry, and to bridge the gap between the two as much as possible. The interviews revealed that the platform model, interoperability, and potential for adaptivity were not only effective in including certain edtech solutions in the brokers' list, but excluded others. A clear example were publishing houses that tried to participate in digital markets by digitizing their schoolbooks. In their case, the business model remained unchanged, namely, to sell books (but now in a digital form). As explained in the interviews, 'publishing houses have not generally adopted their business models to a more digital one' (Arrow Project Manager). For them, 'it was like a big monolith solution. You either get this (the whole book) or you get nothing' (ibid.). Because of this, Arrow had 'an ambivalent relation' with publishers. This example illustrates how brokers create both flow *and* friction for companies, not only including certain edtech vendors, but also making it difficult for others to maximize their market prospects.

Owing to its less direct relation with official policy authorities, Next decided the industry requirements for inclusion in a more independent way, scripting criteria such as user satisfaction, vendor responsiveness, training and support and pricing value. Unlike the more technical requirements of Arrow, Next used the more pragmatic question of how satisfied other similar users are with the product. Still, these criteria equally led to a competitive advantage for specific types of products that were positively assessed by them. As explained in the interviews when talking about the certificates provided to edtech companies:

> In the beginning, the certificate wasn't well known and not that many companies had it, but right now, we've been existing for quite many years, so companies also like to display the certificate and can show that there is a stamp that they can use in their material, and then link back to their profile on Next. (Next Pedagogic Consultant)

The market-making power of brokers' recommendations is exemplified in the following case:

> We recently had quite many approaches from Hungary and that's because one of our clients received certification there. So, when the competitors and other people in the scene see it, they are curious to know what it (the certification) is, how they can get it, and how they? can get assessed. (Next Pedagogic Consultant)

In both cases, there were legal and technical experts ensuring the products they recommended comply with policy regulations of GDPR and protect student's data footprint from students. However, due to the ways big data solutions work, it is impossible to assess exactly where the data goes, or what is done with it, as noted in one interview with staff from Arrow:

> For the adaptive tools we couldn't even check, we didn't check, what kind of algorithms were behind this adaptivity. See, we just don't know. As you know, it generally is a black box. (Arrow researcher # 1)

This clearly shows the limits of evidence-making and how, even when going through an extensive assessment evaluating data safety and protection, some elements of the platforms, including the way data is potentially monetized or how the algorithms work, necessarily remained black boxed for brokers themselves.

The third practice of market curation shows that brokers produce knowledge that shapes markets because their assessment marks the difference between a legitimate, trustworthy solution and one that is not. This occurs in an environment where schools have constantly stated they do not have the adequate tools to assess the quality of edtech (Hillman, 2022). Next boosts solutions through credentials and badges after a successful assessment. Arrow, beyond recommending or evaluating, directly plays a role in funding companies, blurring the lines between brokering for and investing in edtech companies. In both cases, this practice of market curation, which affects the market prospects of different edtech companies, involves forms of evidence that provide legitimation (or not) to the companies they assess. This legitimation can, in many cases, determine 'who makes and who breaks' in the competitive sector of edtech, characterized by increasing difficulties in getting funders and investors, and long periods of bureaucratic processes when contracting with the public sector (Decuypere et al., 2024).

Conclusions

In this article, we showed how edtech brokers mediate relations with schools, market, and policy domains, ultimately governing how edtech evidence is produced and circulated. They do so by (i) shaping the participatory mechanisms though which (selected samples of) teachers co-produce the evidence; (ii) reconciling policy agendas of school digitization with the views of other stakeholders (such as technical and didactic experts); and (iii) including specific technical criteria in their assessments that heavily influence the prospects of edtech products to thrive in a competitive market. These findings contribute to the field in theoretical, empirical, and methodological ways. Empirically, we show not only that edtech brokers create and make possible emerging multisector alliances, but we showed concretely *how* these alliances are formed and sustained over time. Sometimes brokers mediate relations between the triad of schools, markets, and governments, and sometimes they mediate between a wider, four-dimensional constellation including academic research centers. Moreover, depending on the case, there are always different levels of influence of each actor, and in the same way, the level of connection between brokers and each actor varies. Our case studies showed, for instance, that Arrow simultaneously played the role of edtech broker *and* funder, while Next did not have any role of funder at all and, by contrast, built a business model based on the creation and circulation of edtech evidence regardless of the way each product is funded. This variety among type of brokers shows the need for further empirical work disentangling how exactly edtech brokers are composed, creating new multisector alliances in their national contexts, and changing and evolving over time.

At a more theoretical level, we advanced a relational conceptualization of edtech brokers and brokerage as it continues to unfold as a globalizing phenomenon. In that regard, this article has shown that it is not possible to understand how global agendas of school digitalization are rendered concrete at local levels, and according to which specific practices and discourses, without taking newly emerging intermediary actors and their relations into account (Hartong et al., 2024). We argued that, in a context of evidence paucity and policy pressures for increasing digitization, brokers situate themselves in a strategic intermediate position, framing themselves as an emerging authority capable of producing ‘reliable’ knowledge about what is to be considered good edtech for use in schools. This is precisely why we argue that edtech brokers should be understood as knowledge governors: by mediating relations between stakeholders and shaping what evidence counts in the evaluation of edtech, brokers actively define what is

counted as ‘good’ edtech today. This exerts effects on school practices, as well as affecting markets and governments. Our findings suggest that brokers have the power to catalyze relational synergies among schools, industry, policy, and academia, ultimately accelerating the pace of digitization processes and immunizing such agenda against possible critiques. Methodologically, the relational framework of this study allowed us to capture the operations and practices of often overlooked actors that operate in between more extensively studied actors, such as policy organizations, research centers, schools, and markets (Lewis, 2021). Because of our emphasis on the mutual dependency between brokers and the actors they connect, we showed how both the practices and the outcomes of edtech brokerage are always a product of a relation between involved actors, placing emphasis on the importance on the context as a determining factor.

As mentioned during the interviews, the alliances forged by brokers are ‘unique’ and ‘unseen’. Their novelty lies in the way brokers removed friction and created new steams of collaboration between actors that ‘historically don’t align well’ (Arrow Project Manager) in the education sector. Indeed, brokers align discourses, goals, and actors that before did not have such a privileged space to coincide around a common goal. Since these discourses and goals related to what education is and should be do not only reflect reality but construct it (Nemorin, 2024; Robertson & Beech, 2023), further research needs to be done to disentangle the actual practices of edtech brokerage as they happen in, and potentially transform, the digital life of schools.

Chapter 3

How edtech brokers influence teacher professionality?[6]

Introduction

The professional role of the teacher is the subject of contemporary debate, as education systems and schools have come under renewed pressure to adopt digital technologies (Kure et al., 2025; Lohr et al., 2024). Traditionally, the teaching profession has been characterized by the challenge of adapting practice to the changing circumstances of the classroom, implying a high degree of autonomy from the teacher and requiring a deep cognitive and emotional engagement (Mifsud, 2023; Palmer, 1998). Both the cognitive and the emotional elements are key for developing a distinct sense of *teacher professionality*, understood as 'an ideologically, attitudinally, and epistemologically based stance on the part of the teacher that influences his/her professional practice' (Evans, 2002, p. 6). The notion of teacher professionality includes the teacher's ability to exert educational judgement (Frelin, 2013) and involves their subjective understanding about the purposes and goals of education (Kelchtermans, 2009).

The social context and working conditions of teachers create several boundaries for developing a sense of professionality. It is clear that nowadays teachers have to face a myriad of new challenges when grappling with a pervasive digital school infrastructure (Hartong & Decuypere, 2023; Perrotta, 2023). While such infrastructure is promoted with the promise of alleviating issues such as teacher burnout and overwork (Forsa, 2022), it has equally brought new forms of exhaustion and additional work (Mosleh et al., 2022). Because this digital infrastructure alters the core routines and practices of teaching and learning in substantial ways, teachers are called to constantly cope with these changes and are expected to be up to date with the latest technological advancements (Decuypere, 2021). From a different angle, a number of teachers is also eager to willingly adopt digital technologies in their practice, partly due to the (post) pandemic shift to remote learning (Winter et al., 2021). In this scenario, edtech is often portrayed as a promising solution to the most pressing issues of teaching (Ideland, 2021), moving both public and private actors to invest heavily in promoting and materializing an

[6] This chapter is an adapted version of the following publication: Ortegón, C., Decuypere, M., & Williamson, B. (2025). 'Enthuse and inspire': edtech brokers and the affective construction of teacher innovation. *International Studies in Sociology of Education*, 1–17. https://doi.org/10.1080/09620214.2025.2501123

envisioned, sometimes self-proclaimed 'revolution' for education, whereby edtech will become an integral element of the teaching job (e.g., DfE, 2022; European Commission, 2020; HolonIQ, 2023).

This article focuses on the role of edtech brokers in reshaping teacher professionality. We understand edtech brokers as intermediary actors that guide schools in their process of edtech procurement, usage and adoption. Brokers mediate between schools, industry, research and government, guiding schools in deciding which forms of hardware (e.g., laptops, tablets, smartboards) and software (e.g., apps, platforms) are most convenient for them (Ortegón, Decuypere and Williamson, 2024). They have the mission to support teachers and school authorities to modernize schools in reliable and cost-effective manners, while at the same time supporting, directly or indirectly, government agendas of digitalization and market growth projections. With a documented presence in several countries of Europe, America, and Oceania, brokers often act as 'ambassadors' of big tech companies like Google and Microsoft and are approached by schools interested on acquiring their products and services, along with different workshop and training sessions. They are thus involved in the 'ground-level' realization of wider projections for technological change (Gorwa & Veale, 2023; Ortegón, Williamson and Decuypere, 2024). From a strategic intermediary position, located between – and connecting – the domains of industry, schools, research, and policy, edtech brokers seek to equip teachers with the necessary knowledge to secure the uptake of digital technologies in classrooms. While being potentially relevant in educational policy and practice, the concrete ways in which they affect schools remains largely understudied (but see, for instance, (Joecks, 2024)).

This article is in line with research streams that understand edtech not only as transformative solutions, but pay attention to both their potential *and* risks, considering the various intended and unintended effects edtech can have at pedagogical, economic and political levels (Costa et al., 2023; Macgilchrist, 2021). Our goal is to explore the role of brokers in reshaping and reconfiguring teacher professionality, connecting global agendas of digitalization with local school contexts, and providing training to teachers with the goal to update their professional skills. We do so by taking into account ongoing debates on how digital technologies can contribute to the professionalization and de-professionalization of the teacher (Hartong & Decuypere, 2023).

Through interviews, observations and document analysis of two organizations operating in Europe, we aim to disentangle precisely how brokers train teachers in the use of edtech.

Importantly, we focus on how brokers *affectively* encourage and motivate teachers in an overall climate of perceived uncertainty, overwork and professional stagnation (Means, 2018). As our analysis will show, brokers aim to create an 'affective atmosphere' (Anderson, 2009) designed to - as states in one of the observed training sessions – 'enthuse teachers and inspire them to change'. They do so through three affective strategies: (i) trust building, or building rapport through a 'teacher friendly' approach to edtech usage; (ii) edtech habituation, or synchronizing teachers' professional desires to technological features and functionalities; and (iii) re-professionalization of teaching, or making the desired professionality of brokers a reference model for teachers. Ultimately, brokers promote change in the ways that teachers enact their professional and personal values, entrenching the understanding of digital technologies as a crucial element of contemporary ways of being a teacher. They also create new types of synergies and alliances between private and public interests, contributing to a shift in the political economy of edtech in which big tech companies advance in their role of infrastructural support for public education (Cone & Lai, 2024; Kerssens, 2024).

The affective dimension of techno-optimist imaginaries

One of the most salient challenges of the well-worn 'digital revolution' in education relates to deciding what are the most important skills for teachers to have in an increasingly digitalized classroom (Selwyn, 2019). Diverse and sometimes conflicting voices, including markets, tech companies, governments, and school unions, have particular expectations in this regard, and end up collectively constructing, through fragmented processes of tensions and negotiations, a more or less 'stable' vision of how teaching practice should look when using digital technologies (Ortegón, Williamson & Decuypere, 2024). Often, these debates are led by international organizations like UNESCO, OECD, and the European Union, who all have created competency frameworks for teachers (e.g., European Union, 2017). While national contexts play a significant role in how such frameworks are adopted and modified (Hartong & Decuypere, 2023), these visions seem to establish a high degree of commonality between Countries, at least in Europe, steering teaching practices according to particular priorities, for instance student testing and accountability (McGarr et al., 2021). Displayed in policy reports designed to guide schools but also enmeshed in the advertisements and projections of edtech products (Williamson & Komljenovic, 2023), these collective visions and imaginaries for the teaching profession act like value judgements with governing power over teaching practices, as they 'connect the individual's subjective self-understanding to a shared social or moral order' (Jasanoff, 2015, p. 4).

Relevant examples of educational imaginaries include ‘the digitized student’ or the ‘smart teacher’, and both have been significant in influencing practice (Lee & Lee, 2024; Rahm, 2021). In both cases, these educational imaginaries align wider technocratic ideas and methods with the traditionally public domain of education. In particular, expectations around the coupling of technology and education tend to be supported by an underlying techno-optimism regarding the potential of technologies to improve teaching and learning (Nachtwey & Seidl, 2024; Rahm, 2023). Broadly speaking, techno-optimism defends the position that technology, through its codes, algorithms and infrastructures can offer reliable solutions to complex social problems (Morozov, 2013). This drive towards efficiency, when unexamined, risks obliterating other avenues for approaching and solving social problems, leading to an increased decision power of tech companies in determining the shape of the future, sometimes bypassing other forms of social and political institutions (Granja, 2021). Equally, techno-optimism can provide an image of digital technologies as neutral or only potentially beneficial, ignoring in turn predative business models or the fact that they are designed to promote particular actions, behaviors, and habits among teachers and students (Decuypere, 2019; Zuboff, 2019). However, not all techno-optimist positions imply a straightforward and naïve understanding of technologies and their associated potentials and risks. On the contrary, techno-optimism can encapsulate different degrees of nuance and reflexivity, ultimately finding a common ground in conceiving technology as an ally to improve different educational processes (Danaher, 2022).

As outlined before, techno-optimist ideals of digitalized teaching include saving teacher’s time, improve the outcomes of teaching and learning, making communication easier, and increasing the well-being of students (Lee & Lee, 2024). While these promises have been criticized for depoliticizing a complex social topic and ignoring wider social, political, and economic dimensions (Means, 2021), belief in them is fueled by an overall impatience of policy and market actors towards what is perceived as an outdated and inefficient education system (Žmavc & Bezlaj, 2024). In that sense, imaginaries fueling a tech-intensive teacher professionality not only aim at modifying the present conditions in which teaching takes place, but also at establishing a particular relation with the past and the future. Interventions in the present are legitimized by the promise of an often-utopian future as well as the possibility to escape from a deficient past (Decuypere & Simons, 2020).

Imaginaries require laborious work from individuals and collectives that strive to enroll others into their vision. This includes not only material and discursive work but, crucial for our

argument, it also implies *affective* work. While previous studies have focused on the discursive elements of imaginaries (Jasanoff & Kim, 2015), and have shown how emotions play a role in connecting the individual subjective self-understanding to a shared social or moral order (Jasanoff, 2015), we focus here on the affective dimension of educational imaginaries and how they make possible concrete, material change (Sellar, 2020). More precisely, we focus on the affective dimension of brokers' practices to show how these emerging organizations, by strongly appealing to the emotional dimension of teaching, aim to play a crucial role in the present formation of the teacher professionality.

Affects have been defined as emotional dispositions beyond individual emotions, which are determined by an ongoing cognitive an emotional map as well as context-specific dimensions (Sellar, 2015). As such, affective experiences have been described as transpersonal or pre-personal, in the sense that they occur beyond, around, and alongside the formation of subjectivity (Anderson, 2009). We focus on the affective practices of brokers, and how, through these practices[7], they aim to advance change in the professionality of the teachers, in particular regarding their attitude towards edtech. By affective practices we refer to the concrete ways in which brokers create a particular space and time in their training sessions, by an assembling of discourses, technologies, images, sounds, and symbols, all with an emotional charge designed to enthuse and inspire teachers to adopt edtech in their practice. We show how techno-optimist positions in education are not necessarily related with an unreflective seek for profit and can coexist with educational goals and values that are made operational through particular technologies. The affective practices of brokers happen simultaneously and thus are not neatly delineated or separate from each other. However, in our analysis we propose a more sequential interpretation of them, portraying them as a coherent set of strategies that build on each other to create long-lasting effects on teachers' behaviors and collective understanding of what it means to be a good teacher today.

To analyze the affective practices of brokers, we pay particular attention to moments in our data where emotionally charged words and utterances are displayed (Hughes, 2024; Wetherell et al., 2015). Such emotional displays are key to understanding how brokers aim to move or affect teachers towards a desired future of teaching. We reflect in the conclusions the extent to which these desired futures promoted by brokers can tackle some of teachers' most pressing issues, as

[7] It's important to state that not all practices of brokers are (just) affective. Clearly, they often appeal to arguments that refer to more technical aspects of edtech use, although they are not our focus for this analysis.

well as point out important paths for pedagogical, political and economic debates around procurement and usage of edtech, in which edtech brokers play an increasingly relevant role.

Cases of ambassador brokers

To examine the practices of brokers, we purposefully selected and anonymized two organizations currently working in Europe. Both are examples of 'ambassador brokers' (Ortegón, Decuypere & Williamson, 2024) for big tech companies like Google and Microsoft. They significantly differ in their composition, reach, and business model. However, their discourse (including how they understand edtech's potential) and training practices bear important similarities that will be made clear during the analysis. The first organization, Umbrella, is a company specialized in selling edtech and providing pedagogical training. It is composed by a team of teaching and learning, marketing, communication, and international outreach, plus a larger number of associated consultants and trainers. Although the great majority of their customers are based in its country of operation, they also work with schools in other European, African and Asian countries. In the same way, they design online courses on Google workspace that are sold around the globe. Importantly, Umbrella is a not-for-profit company. This particular organizational composition makes them subject to a legal requirement of reinvesting every profit into the company's goal, which is to 'improve teaching and learning through digital technologies' (CEO Umbrella). Despite being Google Partner for Education, they equally collaborate and promote other edtech products like *Canva* and *Monday*.

The second organization, Rocket, originated in 2019 as a Google Education Partner. The core team varies depending on the number of schools they are working with, but it is composed of 'around 15 people' working on marketing, sales, accounting and other administrative tasks. Most of the team has an educational background, including the associate trainers that are not working full time for Rocket. After the covid pandemic, the company grew significantly and had the opportunity to work with more than two thousand schools nationwide. Currently, they have plans to expand their operation to other European countries. Besides their partnership with Google, they are also Microsoft partners, and, like Umbrella, they equally promote local edtech solutions that they consider more suited for the contextual needs of the schools.

In both organizations, we conducted interviews and observations to teacher training events (in person training in the case of Umbrella, online training for Rocket). This data was complemented with an analysis of brokers' documents, including web pages, visual media, promotional materials, and newsletters. In what follows, we present three affective practices in

which brokers manage to bring together different stakeholders around a desired future for the teaching profession and materialize new conditions for bringing such future into reality.

Trust building

The first affective practice of brokers consists of creating bonds of trust with teachers. Before, during and after training sessions with teachers, brokers seek to create relationships marked by trust with schools administrators and teachers by emphasizing, on the one hand, coaches and staff of brokers' own teaching background and, on the other hand, their not-for-profit dimension. This trust is an important component of creating an atmosphere with enough *force* to move the actions and emotions of teachers (Ingraham, 2023). Brokers make clear before and during the workshops that their staff has an educational background and that most of them have had teaching experience prior to their current jobs as edtech coaches. On their webpage, Rocket described itself as being developed 'by teachers and for teachers', and the case is similar with Umbrella. As expressed by its CEO when describing the rest of the staff:

> Everyone else is similar to me… They were all in the classroom, they all worked in schools that were using technology, and they all exemplify that sort that model of using technology in the classroom (CEO Rocket).

Brokers' attempts to establish trust with teachers takes place in a moment where edtech options are becoming increasingly available in the market, making it more difficult for schools to have a full view of 'who the good vendors and products are' on the market (Hillman, 2022, p. 13). In this context, the idea of coaches-as-educators (or, more precisely, tech-savvy educators), aims to bring on board and convince teachers and school administrators of edtech's reliability and potential for teaching. Indeed, brokers claim to provide hands-on training coming from experience tailored to what schools actually need (Webpage Rocket). This experience of knowing 'what schools need' seeks to explicitly distance brokers from other tech vendors that work independently from school contexts and that, for that reason, may not familiar with the complexity of school life. As mentioned in the interviews, schools 'often want to hear from someone who has worked in the [school] context' (Head of Education, Umbrella). This inside knowledge of the school context is what allow brokers to profile themselves as the ideal partners to 'navigate the ever-evolving landscape of education technology' and 'enhance teaching and learning practices' (Webpage Umbrella).

In a similar way, our two analyzed brokers contrast their image against more typical for-profit, private companies. Due to the (post) pandemic market rise of the edtech sector, the number of uncertified products wanting to gain way into schools has boomed (UNESCO, 2023). Because of this, there is a perceived danger that 'schools and families worldwide will collectively spend huge sums of money on ineffective apps' (Kucirkova, 2024). Cognizant of the wariness of schools to work along edtech suppliers that are only after revenue, brokers emphasize, in different ways, their not-for-profit nature. In the case of Umbrella, they differentiate themselves from more traditional for-profit companies by being a not-for-profit organization that, because of their legal identity, are forced to reinvest all their assets in a goal that is 'for the benefit of the community' instead on the revenue of private shareholders. Such goal is, in their words, is 'to use technology to improve teaching and learning' (CEO Umbrella). Being this specific type of social enterprise make them:

> Very rare in our space … We are selling Google workspace licenses but doing it as a different sort of business that's very different in the Google partner ecosystem. We are unique in our setup (CEO Umbrella).

Their detachment from a traditional for-profit model represents a competitive advantage against companies providing similar brokering and consultancy services. For schools, 'it matters in an enormous amount' that Umbrella is not-for-profit. According to the head of Teaching and Learning:

> If I'm talking to a head teacher, he would emphasize we're not for profit, we're not here to try and sell your school and take your budget. We're here to help and I think this leads the senior leaders (of schools) to trust us that we have the best interests (Head of Teaching and Learning, Umbrella).

Unlike Umbrella, Rocket is a for-profit company. Nonetheless, in order to build affective relationality with schools and distance themselves from more 'just for profit' companies, they emphasize the alliances they have with the local government, leading to a potential relationship of trust with schools. As a part of the digitalization strategy of its country of operation, the government provides workshops that are free for schools (yet paid for by the government) and provided by Rocket. For this reason, their relationship with schools is not dependent on the school's own budget:

> Schools don't need to pay for the bootcamps. It's free. it's financed by the government (…). After the bootcamps, most of the schools, they are really grateful, and they see that it worked and that their teachers want to try things and that they are inspired and so they find it really good (CEO Rocket).

As noted by Hughes (2024), affects usually coexist in a more complex way than static, essentialist binaries such as fear-trust, or desire-aversion. In this case, brokers build affective relationships with schools acknowledging that they can be enthused by the potential of edtech, yet at the same time they can be wary of big companies that only want to profit, sometimes at the expense of pedagogical quality and data safety (Hillman, 2022). For this reason, bonds of trust can be reinforced or blurred depending on the priorities of the schools and the particular relationships they develop with brokers. In any case, the mission of brokers is to move teachers away from possible reasons not to use edtech and draw them into a collective atmosphere of edtech optimism with long-standing effects on their teaching practices (see later).

Edtech habituation

After the initial strategy of building trust with schools, brokers build on that expected trust to create habits on teachers, aspiring to turn them into 'friendly' users of the edtech products they promote. 'Making the user friendly' (Gorur and Dey, 2021) means exhorting users to engage with certain platforms and technologies in ways that are 'expected' by their designers or those interested on promoting their use (sometimes for financial reasons, see (Striphas, 2015). There can be different actors involved in the process of edtech habituation, ranging from school directors and ICT coordinators interested in embedding edtech into teacher practices, teachers looking to improve their own practice, or even teachers looking to influence other colleagues acting as 'ambassadors' or particular platforms (Arantes & Buchanan, 2023). Brokers thus enter into this ongoing process of negotiation, performing specific habituation strategies on the side of the user to make sure that such technologies will be embedded into practice. Notably, brokers create bottom-up, deliberative processes with teachers to guide them towards the use of the edtech. During the interviews, brokers emphasized the importance of this collaborative approach in which teachers, and not brokers, decide what edtech works best for them. In the words of a coach of Rocket:

> During the workshops, we try to give every teacher the opportunity to choose one tool that she wants to explore. Usually, each teacher does something different. Some teachers make an exam with Bookwidgets, others make sheets with Canva, and others make QR codes to scan for the little ones. They do all something different, something that they want to use in their classes. (Coach, Rocket).

As to how exactly the process goes, she went on to explain:

> At first, we give some theoretical background and then the next part is the workshops. So, we go to the school, and we coach the teachers, we give them tutorials, we give them examples and we try to coach them in the moment to see that they are getting started with the thing that they want to do.

> This lasts about 3 hours for each teacher. They are in a in a group -sometimes it's five teachers, sometimes it's 25-and in that group there are, uh, maybe 10 different tools that they are exploring at the same time and then they need to go on with the tool and to actually use it in the class and to make them better.
>
> Then, after a few months, I go back to the school and then they perform the thing that they tried to do. So, they show it to each other, again in a group, they show what they made, what they tried and how it was in the classroom (Coach, Rocket).

As is clear from the extensive time frame and the collaborative approach of the workshops, the ultimate goal is not only to teach teachers how to use edtech, but to create the necessary attachment for edtech to become embedded in practice. The goal is to create habits that bring about a long-standing effect in the professionality of teachers. For that to happen, brokers need to affectively motivate teachers:

> Our goal is not to check if they can use a tool, but to ask: 'Did you try it? Did you make something with it? Was it something good or not? Would you also use it in the future?'
>
> Teachers, *they need to want to do it themselves*…Sometimes you feel that they don't want to have the training and then you know it will not work. I can give them a lot of examples and tools and help them as much as I can, but if they don't want to try it in their classes, then it will not work. (Coach, Rocket, our emphasis).

As these excerpts show, the goal is not only to show teachers *how* to use edtech, but to make sure they *want* to use edtech. The intervention is not merely at technical but affective levels. To encourage this desire, allusions to 'transform', 'update', 'innovate', or 'disrupt' - all in line with the overall goal of enthusing and inspiring - are common in their communications. All these words, that in different ways suggest an underlying urgency to modify the current state of affairs, promote the vision that, to 'make tomorrow's education work today' (Website Umbrella), edtech must be engrained as habitual components of teaching practices. This envisioned educational change is in line with a deep-rooted tendency to link technological solutions with forms of educational progress (Ideland, 2021). The interview excerpts also suggest that the intended change is expected to affect every teacher. As noted by Finn, when teachers are not attuned with the expected affective response to particular interventions, they cause an undesired upheaval that renders them subjects to intervention (Finn, 2016).

To habituate teachers, brokers do not disregard the previous practices of teachers but rather build on them. However, brokers also nudge teachers towards particular edtech options. This was clear during a moment in the observations where a coach from Rocket departed from the preferences of teachers to eventually intervening in them, ultimately steering teachers towards particular technologies. During the first of a series of government-sponsored workshops

provided with a school aimed at enhancing the overall digital skills of all the teaching staff, the coach was starting a session with showing teachers introductory skills, such as creating an online spreadsheet within the Google ecosystem. Teachers were excited and open to learn, and at some point of the explanation, one teacher said out loud: 'Oh, this is very similar to just making an excel sheet!'. At that moment, the coach said to the teacher in a jokingly-yet-serious way: 'Not exactly… this is a Google sheet, not an Excel sheet. We prefer to use Google'.

While this moment is particular and unique, it is also representative of other moments where similar issues were at play (Bloom-Christen & Grunow, 2022). More specifically, it shows how these habituation strategies align with the overall institutional 'brand' of brokers, and how they promote tech companies, in this case Google, into schools. If the interviews and documents of brokers suggested that brokers were promoting Google, the episode witnessed during the observation provides an example of *how* this exactly happens. It shows how, because of the trust that brokers have gained with school authorities, big tech companies can advance in positioning themselves, through brokers' practices, as central educational providers.

In general, both Umbrella's and Rocket's partnership with Google is not something that undermines schools' trust in them, but rather the opposite. As mentioned in the interviews, schools often find Umbrella 'through the Google partner directory' whenever they have identified challenges they want to tackle through technology. The case of Rocket is similar, since schools equally regularly find them through the directory of Google partners. It can be argued that, by means of the initial trust of schools on brokers, brokers portray Google products as desirable for goals such as saving time and improving learning, and it is promoted not against, but in accordance to teachers' previous practices and subjective conceptions of education. If the first strategy invites teachers to be *edtech-ready*, this strategy invites them to be *edtech-accustomed*, and to give a step forward to synchronize their teaching habits to particular edtech products.

Re-professionalization of teaching

Once rapport is built between teachers and brokers, and the agency of teachers is incentivized into new habits around their use of edtech, the third affective practice of brokers involves a re-professionalization of teaching, or a series of attempts to make teachers resemble entrepreneurial and innovative professionalities, akin to that of edtech brokers themselves. The strategies of re-professionalization start from the moment brokers recruit their staff. This staff, as it will be clear, acts as a professional reference for teachers. In both broker organizations the

coaches or consultants are like-minded teachers that enroll in the coaching job precisely because of a shared level of enthusiasm over edtech. As explained by the CEO of Umbrella regarding the recruitment process:

> They approached us, and that's because they've been on a course with us. They've seen the work that we do, or they know us from the industry. So, we don't ever really advertise or… I think our website does say: 'If you want to find that more fill in this form', but we don't actually go out and recruit consultants. They all just approach us with the idea that they would like to do some work [for us]. (CEO Umbrella)

While we have emphasized how brokers create an affective atmosphere that seeks to 'drag in' teachers into the use of edtech, in here we see how coaches want to 'drag themselves inside' brokers' affective atmosphere. These like-minded coaches/teachers are the ones in charge of coaching schoolteachers. For both organizations, most coaches are certified by companies like Google, Microsoft, or Apple as learning specialists. Some of these coaches maintain their full-time jobs as schoolteachers. In that sense, coaching for brokers is, rather than a different job, another way in which teacher-coaches can embrace and develop their teacher professionality. This suggests that the reasons for enrolling as a coach can also be affective, and not necessarily motivated by further financial rewards. Through brokers, coaches consolidate as experts of using edtech for pedagogical purposes in their respective area of study. As for an extra financial reward, sometimes 'the consultant doesn't get anything particularly out of it' (CEO Umbrella), and the payment is made to the school where the teacher works. This equally speaks of wider trends in the increasing flexibilization of the teaching profession. While previous research has studied these shifts particularly in relation to processes of marketization (e.g., Hall et al., 2024; Magni, 2024), our findings show that market incentives for teacher flexibilization also are at interplay with affective incentives.

Once recruited thanks to techno-optimist affinities, the role of the coach/teacher is to promote a future for teaching in which, in words of the CEO of Rocket, 'technology is invisible'. This does not mean a future where technology is irrelevant, but rather readily available to be seamlessly integrated into teaching practice. This tackles an important factor driving the desire of edtech adoption from teachers, namely the promise of time saving. In the words of the head of Teaching and Learning of Umbrella, also a former schoolteacher:

> For me, it's about speeding things up for teachers and showing them how they can do assessment and reporting to parents and things that they're doing on pencil and paper and taking ages. I'm really, really passionate about trying to help teachers to just reduce a crazy workload… It's crazy in our country, I think it's crazy in other countries too, but in our country, over the last 15 years,

> the administrative tasks on teachers have become huge (Head of Teaching and Learning, Umbrella).

The promise of 'making technology invisible' is posed as a renewed opportunity for teachers to spend time 'on what really matters'. Thus, the promise of edtech goes beyond merely providing teachers new skills, as it extends to their wider goals and ambitions at personal and professional levels. This promise of time saving, while having big affective force over schools, can be very easily coopted by a handful of edtech products that promise a myriad of advantages but whose efficiency or quality is still unclear (Hillman, 2022). To deal with that possible shortcoming (also discussed before), brokers portray themselves not just as resellers of whatever edtech solutions best serve their financial interests. In both cases, and despite their clear relationship with big tech companies, brokers also promote local edtech and, in both cases, they call themselves 'platform agnostic'. This agnosticism, which contributes to the trust they build with schools, refers to not having a particular preference for any product, and mostly letting the schools decide what is better for them. In words of the CEO of Rocket:

> If they decide on a platform, whether it's Google or Apple or Microsoft or Moodle or whatever, they need to have their own reasoning and logic behind it, and then we can help them implement it throughout their organization all the way into the classroom. (CEO Rocket)

The head of Teaching and Learning of Umbrella used similar words:

> We call ourselves platform agnostic. So, the school approaches us, and if they don't actually use Google much and they want a session on creativity or literacy, then we will deploy various tools and we have lots and lots of partnerships with smaller companies (Head of Teaching and Learning, Umbrella).

The idea of teachers and schools being free to choose is an important one to understand the affective practices of brokers. Although they end up favoring a number of edtech products, brokers also strive to create an environment in which teachers can decide for themselves what technologies they want in the classroom, clearly contributing to the affective force they can have on teachers and schools. Indeed, freedom to schools and the 'platform agnosticism' is an essential component of the identity they portray to schools. Their role, at least of our two explored cases, is not so much in pushing one edtech option over another, as much as creating the conditions of possibility for seamless edtech usage in a broader sense and to create a long-lasting effect on teaching practices. Far from taking the freedom away from the teacher, brokers' strategies of re-professionalization seek to build upon what teachers have been doing, ultimately capitalizing on the freedom of the teacher to influence, through different types of edtech products, their teaching practices.

Mirroring the entrepreneurial spirit of the coaches, the envisioned teacher is not only one that is eager to improve their practice with digital technologies, but also one that would want to influence others. Just in the same way that some teachers become coaches, they expect that affected schoolteachers can inspire colleagues to use edtech. This is clear in the targets of edtech proficiency used by Rocket, in which the highest level is one where 'participants share new developments and ideas with each other', and where 'they are prepared to be sources of inspiration inside and outside the school'. This ideal resonates with entrepreneurial approaches of teaching that, again, contribute to a wider process of re-professionalization (Schroeder et al., 2024). In affective terms, brokers seek to re-professionalize teachers by an interplay of appealing their agency while simultaneously pushing them to change (Finn, 2016). The change, that started from establishing an initial trust, is ambitious in its expected effect, ultimately seeking to make of teachers long-lasting and convinced techno-optimist users of edtech.

Conclusions

This paper showed how edtech brokers, through particular affective practices, aim to enthuse and inspire teachers towards the use of particular instances of edtech as a mean to update their teacher professionality. Previous studies have claimed that digitalization of education is being aggressively promoted by different factions of the public and the private sector, potentially compromising the public dimension of education and giving increasing power to the financial interests of tech companies (Facer & Selwyn, 2021; Kerssens & van Dijck, 2021; Sriprakash et al., 2024; Williamson, 2021). This study contributes to showing how these agendas actually reach schools through emerging intermediary actors and, in particular, how such actors inform teaching practices and the ways teachers constitute themselves as professionals. Studying the practices of brokers through an affective lens allowed us to understand how current changes in education policy and practice strongly rely on particular emotive aspects (Sellar, 2015; Wetherel, 2021). As it was consistently shown, practices of brokers are not based on mere for-profit selling of edtech products, but also on affectively charged ideals for education in which technologies are expected to play a key role in teacher and school development. In our cases, this happened by building trust with teachers, promoting a 'user friendly' approach to certain edtech products, and encouraging them to adopt a long-term, entrepreneurial attitude towards edtech. Brokers ultimately advance techno-political agendas onto education and contribute to reshape what it means to be a good teacher today. These findings are in line with our previous research that showed how brokers are effective in simultaneously advancing goals of tech companies, schools and governments, helping big and small edtech actors to make their way to

schools, while providing schools the support needed for professional development. They also play an important role in the 'return on investment' on plans for digital transformation of governments.

The ongoing re-professionalization of teachers is not only due to the work of edtech brokers. In fact, plenty of edtech has arrived in (and by now has even disappeared from) the classroom in the past years, particularly due to the covid pandemic, and this without the need of an intermediary organization like brokers (Williamson et al., 2020). This established a new normality in which digital technologies became more pervasive and its procurement depends, among other factors, on the flow, rhythms and expectations of the edtech market, as well as policy desires for improving educational quality as means for societal and economic growth. Within this complex constellation, brokers emerge as relevant actors playing a key role in legitimizing (some of) those broader agendas and making them 'land' and 'stick' into local school contexts. We showed how they modulate the emotional register of teachers, particularly in regard to how they ought to feel about the disruption of edtech into schools. In other words, along with the component of technical training, brokers provide an 'affective pedagogy' to teachers (Berlant & Greenwald, 2012). In order to advance socio-technical change, brokers create affective links between the technologies they promote and the possibilities to develop teachers' professional, and hence personal, life. Ultimately, the work of brokers as emerging authorities in the educational landscape can be understood as advocating for (specific types of) edtech as an answer to the question of how to be a good teacher today.

We also emphasized the role that big companies like Google are currently playing as enablers of policy desires of digitalization. It is important, for further research, to disentangle how this and other platforms promoted by brokers and used by teachers bring about changes in teaching practices, and to empirically explore the pedagogical practices they make (im)possible, the extent to which they open up new possibilities, or how they homogenize and enclose teaching practices (Tierens, Decuypere, & Hartong, 2024). A broader understanding on this regard will provide insight into the extent in which the increasing presence of tech companies in schools alters or even threatens the distinctive characteristics of teaching and learning. In a similar way, further research is needed to understand the different organizational composition of broker organizations at global scales. Our two case studies reported significant similarities in regard to their educational values, their composition, and their explicit and implicit (depending on the case) not-for-profit dimensions. However, there are reasons to expect that not all broker organizations share these similarities. For instance, there are brokers that are exclusively

‘branded’ by one particular sort of educational technology provider (Ortegón, Decuypere & Williamson, 2024). Since the ways in which such organizations promote edtech and eventually influence teaching practices can be significantly different from the cases explored in this paper, it is important to continue the empirical explorations to understand how edtech is promoted in local settings. Adding to the understanding of edtech brokerage will provide more insight into how schools and teachers are currently updating their practices through digital technologies, and how they are using them to navigate the broader contemporary challenge of not missing the boat and finding no chance of readmission in a more digitally intensive and accelerated society.

Finally, it is important to note that teachers’ reactions towards the practices of brokers were not the focus of this paper. However, examining the ways in which teachers accept, react to, or simply ignore the coaching of brokers, is an important next research step. This dimension of edtech brokerage is part of our ongoing research agenda to disentangle how brokerage unfolds from a variety of empirical entry points.

Chapter 4

What happens when edtech brokerage lands in schools?[8]

Introduction

Efforts by digital technology businesses to expand their presence in public schools are being supported by the emergence of novel intermediary actors that connect industry aims to classroom practices. The present article explores how educational technology brokers mediate between global agendas of digital transformation and the local interests and concerns of schools, shaping decisions related to the procurement and pedagogical use of edtech. The increasing relevance of edtech brokerage in schools takes place in a context where different industry actors, ranging from 'big tech' corporations (e.g. Google, Microsoft and Apple) to incumbent 'edu-businesses' and edtech startups, are deploying strategies to align their commercial interests to a wide range of school tasks, functions and responsibilities, including developing a vision for the use of digital technologies or creating pathways for educational innovation (Cone & Lai, 2024; Decuypere et al., 2024; Kerssens, 2024). These market strategies are motivated by financial claims that global spending on education is worth more than 7 trillion annually (HolonIQ, 2025), creating promising profit opportunities for edtech commercial providers.

Edtech brokers are defined as organizations that mediate between industry and schools, but also between government and research centers, providing guidance to schools in processes of edtech procurement, adoption and pedagogical use (Ortegón, Decuypere, and Williamson, 2024). As intermediaries between industry, schools, governance and research sites, brokers have carved out an important niche in the education sector, from which they can significantly impact processes of digitalization in schools. They provide guidance through assessments and 'what works' evaluations of edtech platforms, and through pedagogical training in the use of particular edtech products and brands for which brokers often act as 'ambassadors'. They can also mediate the flow of data between companies and schools, offering safety standards to the latter and marketing insights to the former.

[8] An adapted version of this chapter is under review in the journal Learning, Media and Technology

Brokers vary in composition, organizational nature and reach. While some brokers are for-profit, private companies akin to edtech startups, others are the product of publicly-funded projects for education reform. They can also be funded by philanthropies that, through public-private alliances, seek to provide schools with reliable 'evidence-based' tools (Edtech Evidence Exchange, 2021). Edtech brokers all have in common the potential to simultaneously transform schools, advance or contest policy initiatives, and translate into local contexts more global goals of embedding digital technologies in education. Brokers often work in partnership with big, global edtech firms *and* small, local edtech companies alike, thus locating themselves as both global and local actors, and acting as 'contextual experts' for the schools with which they work (Kerssens et al., 2023).

For this study, we focus on edtech brokers that operate as 'ambassadors' of edtech companies in schools, and we address the gap of a lack of empirical evidence on how edtech brokering occurs, particularly with regards to practice and in relation to schools. We are interested in exploring how the market plans and projections of brokers 'land' in schools, and how they are implemented -or not- when facing the expertise and judgement of local school actors. The mission of ambassador edtech brokers - our main research interest in this paper - is to promote the purchase and use of particular edtech products and to guide teachers on their use. An example of ambassador brokers are the multiple organizations that are 'Google' or 'Microsoft' partners for education, and that support schools in the procurement and use of said brands. They can offer online and in-person training courses ranging from one-day coaching sessions to intensive, tailored consultancy that can take several months to improve schools' overall level of digital competence.

This study on edtech brokers contributes empirically and conceptually to scholarship developing a networked understanding of the digitalization of education, which pays attention to a range of in-between actors and intermediaries that often remain unexplored (Hartong et al., 2024). Such intermediaries can be situated between schools and tech companies, such as edtech consultants (Joecks, 2024; Kerssens & van Dijck, 2021); schools and policy organizations, like edtech incubators (Ramiel, 2019); or between local and global contexts of governance, for example national edtech alliances (Decuypere & Vanermen, forthcoming). In these cases, which are often interrelated, intermediaries have been found to promote a vision where technology-enhanced solutions are conceived as a powerful means for tackling educational problems (Hartong et al., 2024). Edtech brokers too are distinctive intermediaries that mediate

between industry, schools, government and research, shaping the imaginaries, assumptions and evidence claims that inform, influence and shape edtech adoption and practices in education. Their significance lies in translating these imaginaries, assumptions and knowledge claims into shared agendas that are presented as beneficial for the industry and school sector alike, ultimately shaping how edtech is enacted in schools (Ortegón, Williamson, and Decuypere, 2024)

For the analysis, we situate ourselves in debates around public-private relations in schools and shifting understandings of the 'publicness' of education (Gerrard et al., 2017; Hogan & Thompson, 2020; Williamson & Hogan, 2020). Specifically, we mobilize concepts of translation (Freeman, 2009) and enactment (Woolgar & Lezaun, 2013) to explore the concrete ways in which brokers mediate between schools and industry, and how they provoke the enactment of particular edtech practices in public schools. Brokers translate the goals of public schools and the edtech industry into common objectives, catalyzing alliances between them through a distinct set of professional expertise and discursive strategies. Through these translations, they forge alignments between interests of the private industry, governments, and school actors (Williamson, 2016). As a consequence, they blur the lines between traditionally distinctive actors on the public/private spectrum, specifically between schools and the edtech industry, by strategically constructing new relations and alignments in interests and objectives. In what follows, we show how edtech brokers construct novel industry and school relations by (i) building a hybrid digital infrastructure for schools, and through (ii) the continuous professionalization of 'edtech ready' teachers. We also surface (iii) instances of 'mis-translation' and 'non-enactment', highlighting how teachers and school actors also contest or modify educational reform objectives (Ball et al., 2011), complicating the intended translations and enactments that brokers aim to provoke.

Edtech enactment through the translation of edtech brokers

The current educational landscape in which edtech brokers continue to position themselves as key industry players is not characterized by clear boundaries between the public and private. Typically, the 'publicness' of education is presumed to have a number of foundational characteristics: Public schools are secular, they are fully funded by the state, they have a comprehensive enrolment, and their management is delivered through democratic means (Hogan & Thompson, 2020). However, straightforward definitions of the 'public' as a binary

opposite to processes of privatization do not fully capture the complex relations through which the governance of public education has been enacted in recent decades (Gerrard et al., 2017).

Instead, a multitude of private initiatives and impulses intertwine, collaborate, and make possible the provision of so-called public education (Hogan, 2025). Google, for instance, is creating 'infrastructural dependencies' in public welfare education through new instances of public-private partnerships (Cone & Lai, 2024). The dependency on big tech is also made possible by local partners who are mobilizing million-dollar, public-private contracts, through which edtech companies gain control of the digital infrastructure and even the pedagogical design of schools (Kerssens, 2024). In a similar way, Rowe (2020) has shown that schools that are nominally public are conducted, or conduct themselves, in ways that contradict their designation as public schools. These transformations are a global phenomenon (Cobo & Rivas, 2023), denoting that the notion of 'publicness', commonly ascribed to state education, fails to describe the complexity of public-private relations through which schools are and have been managed (Rowe, 2020).

Given that straightforward distinctions between private and public appear problematic, especially considering the growing influence of industry actors in supporting public initiatives (Paakkari & Siippainen, 2025), our goal is here is focused on providing empirical insight into the complex negotiations that take place between the edtech industry and state schools through the mediating practices of edtech brokers. We show the concrete instances during which brokers connect actors traditionally conceived as opposite in the public/private dichotomy, specifically edtech companies and state schools, and in turn enact particular educational realities through the translation of each actor's goals into a common agenda. The concept of 'translation' in studies of policy and governance refers to the practices involved in 'reconciling the different meanings of a given phenomenon held by actors in different social worlds' (Freeman, 2009, p. 431), and is thus a political act of reshaping differences into shared interests and aspirations, and indeed of transforming the very things that have been brought into these proximal relations. Edtech brokers facilitate translations between the governmental goals of policy actors, the market interests of the edtech industry, and schools' concerns with safe, evidence-based and efficient use of edtech. When different values and practices are translated into shared goals and courses of action through seemingly technical, non-political actors, new alliances are forged, and concrete realities emerge (Williamson, 2016).

We take a relational orientation to mobilize the concepts of translation and enactment in order to demonstrate that the way brokers advance edtech in schools highly depends on their interactions with the actors they connect. In previous studies, we have shown that brokers are not passive transmitters of the interests of the actors they connect, but rather organizations with their own specific sets of professional expertise that cannot be reduced to the agendas of other established actors, such as policy organizations or edtech companies. As such, brokers actively mediate and reconfigure pre-established plans for digitalization through their translation of the goals of schools and industry (Ortegón, Williamson & Decuypere, 2024). To show this process of mutual influence between brokers and the actors they connect, we place special emphasis on the brokers/school interplay, describing the concrete realities that emerge when brokers try to influence schools while, at the same time, schools (teachers, directors, ICT coordinators) react to the plans of brokers.

Indeed, School actors are not passive receivers of educational interventions, but have the power to accept, modify or reject plans for education reform (Hartong & Decuypere, 2023; Maguire et al., 2015; Olofsson et al., 2020; Selwyn, 2016). Their subjective and institutional beliefs can create tensions towards pre-established plans of edtech use and steer them into directions that are more aligned with their own standpoints and preferences (Garcia et al., 2020; Wikström et al., 2024). As such, ongoing plans for embedding edtech into schools are then not only done *to* teachers and schools, but are also done *by* them, making them both subjects to and objects of intervention (Ball et al, 2011). Our research focus then lie on the concrete, mundane practices of 'school making' and 'edtech making' that are enacted through the translational practices of brokers, rather than in more 'traditional' sociological approaches where structural understandings of power and agency are used as explanatory devices (e.g., the power of the private industry over public schools) (Latour, 2007). In what follows, we present two ways in which edtech brokers translate the goals of both industry and school actors: (i) the creation of hybrid digital infrastructures, and (ii) the continuous training to 'edtech ready' teachers. We also surface (iii) episodes of 'miss-translation' or 'non-enactments', which demonstrate the contingency and fragility of brokers' translational practices.

Cases for studying brokers-school interactions

The main focus of this study are two European edtech brokers that operate as 'ambassadors' of Google for Education, providing hardware, software, and training related to Google for Education products. For anonymity purposes, the companies will be henceforth referred to as *Rocket* and *Umbrella*. Schools can find them through a Google directory when looking for a

partner to purchase new products and services, upgrade the digital infrastructure of the school or when they want to migrate to a Google Ecosystem. While the partnership with Google is visible and highlighted in their webpages and communications, neither *Rocket* or *Umbrella* are tied exclusively to Google. They are also partners with local edtech startup companies, enabling them to account for the contextual needs of schools, including by promoting local edtech platforms for administration, language learning, and test grading, among others.

Both companies are composed of an executive board (e.g., CEO, CTO), other forms of professional expertise (e.g., head of marketing, head of partnership development, head of international education), and by coaches or consultants that provide training sessions for schools. As will be teased out in detail, these coaches are typically certified schoolteachers that provide coaching for brokers additionally to their jobs. The data collected for this study include five interviews with professionals working for broker organizations (e.g., CEOs, CTOs, heads of education, coaches), five observations of training sessions, seven interviews with school actors (teachers, school directors, and ICT coordinators that participated in brokers' sessions), and analysis of brokers' webpages and social media communications.

While the focus of the website analysis was to gain understanding of the catalogue of products and services that brokers offer to schools, the interviews with brokers' staff strived to understand the organizational and educational principles that operate behind the crafting of such products and services, as well as the professional expertise needed for brokers to operate in schools. Observations and interviews with teachers were used to gain a deeper understanding of the experiences of teachers receiving the training sessions of brokers, their perceived needs in regards to the adoption of digital technologies, and how the influence of brokers was received and adopted in their practice. In what follows, we examine how brokers translate the goals of the industry, governments, and schools, enacting concrete plans of action for the enactment of digital technologies in schools.

Enactment of hybrid digital infrastructures

When working together with schools, edtech brokers build a hybrid digital infrastructure composed of a mix between big tech and small edtech companies. Both instances of digital technologies are different and even opposite, in the sense that the latter is often conceived as an alternative to the market monopolies advanced by global big tech firms and perceived to be more aligned with the contextual needs of schools (van Dijck, 2020). The digital infrastructure of a school limits the possibilities and imposes constraints regarding the technical systems that

are used by default in schools. They consequently define, to a great extent, the range of actions of the teachers and students who make use of them on a daily basis (Williamson, 2025). In previous work, we have explored how brokers seek to update the infrastructure on the school and synchronize it with it with broader digital ecosystems of big companies like Google (Ortegón, Decuypere & Williamson, 2024) Now, focusing on how that infrastructure is enacted through brokers' translation of the school preferences and beyond their initial plans, it is clear that this infrastructure is made by a 'patchwork of platforms' (Pangrazio et al., 2023), highlighting the multidirectional ways in which edtech brokers advance the presence of different segments of the industry and highly mediated by the needs of the schools.

Brokers take two main factors into account that are commonly voiced by school actors: affordability and pedagogical relevance. One school director, for instance, recalls her experience buying Chromebooks through the mediation of brokers, and explains why they switched from Apple Macbooks to Google Chromebooks for both teachers and students. This interview illustrates how, through the guidance of brokers, schools navigate among different big tech options to procure the devices:

> At this moment, teachers don't have Chromebooks, they all have MacBooks provided by the school, in a lease plan. A new one (MacBook) now costs about €1400, and a good Chromebook, a level higher than the ones of the students, is about €800. So, it's a very big difference. This decision has also a political basis because the ministry decided to give all schools a big amount of money a few years ago, but we don't know if we will have any money in the future. We just don't know yet, but now all that money is gone…
>
> But of course, the Chromebooks will stay good for three years, four years perhaps, but not longer. And we don't know yet if we can receive new money from the government, so if we stayed with the very expensive Apple laptops, we won't be able to replace them. We have chosen this kind of future because we believe that without support from the government and extra money, we can't pay for them. That's the reason.

When brokers promote Chromebooks, as it was the case in the example above, they frame them to schools as 'cheap, fast, and easy to use, meeting all the needs of education'. According to the webpage of Star, the broker that guided this particular school in its procurement process, they have sold over one million laptops to schools across Europe and the UK, providing schools the hardware and technical support needed to 'ensure that everything runs smoothly' when using Chromebooks. In many cases, the guidance of brokers was well received by school actors. This ICT coordinator, for instance, explains why brokers' preference for Google aligns with his personal preference and the preference of his colleagues:

> I find that for the majority of teachers, the Google approach is much more practical and much more easily implemented in the classroom. So, their approach [Google ambassador brokers] tends to be to make sure that teachers are able to empower learners by having the skills, not only to pass on to individual pupils, but to support them.

The discourse of brokers builds upon the market efforts of Google invested in advertising their products as tackling some of the most pressing needs of schools, and their translations are key to decide which companies can be embedded in school life and which companies cannot. During an interview, one teacher recounts his experience after receiving a coaching session by a Microsoft 'ambassador' broker:

> Microsoft [ambassador brokers] does have a similar approach [to google ambassador brokers], but they've got more reporting approach, so if you apply to be a Microsoft Innovator educator, what you got to do basically is write what I would say a series of five minute essay questions, and then a little survey. Now, that's all very fine, but it doesn't necessarily offer the most practical approach… We're honestly moving more towards Google simply because it's a more friendly user interface for the kids.

Brokers thus build on the preferences of schools to enact digital infrastructures where big tech companies become central in the school operation. They act as the connective agent holding together the goals and priorities of teachers with certain products and technical systems, in this case produced by Google. When this infrastructure is enacted through the guidance of brokers, it demands a significant investment from schools in the present *and* the future, as was clear in the first interview excerpt. Certain platforms and apps promoted by brokers work through renewable subscriptions that create long term commitments in schools, not only because of the initial spending, but also because of the 'rentiership', subscription-based model that is typically behind these platforms (Komljenovic, 2021). Here, brokers clearly translate the financial goals of the edtech industry by establishing longer commercial relationships with schools. As mentioned by the CEO of Star:

> We try to minimize churn, and we try to maximize renewal rates of subscriptions or rebuy.

In business jargon, 'churn' makes reference to the rate at which customers stop doing business with a company over a specific period (it can be also referred to as 'attrition'). The previous interview fragment shows that brokers also translate the business model of rent-seeking into the procurement practices of schools, seeking to become beneficial to schools and the industry in one and the same practice.

However, and as mentioned before, brokers do not only mediate between big tech companies and schools. Besides promoting the presence of big tech in the infrastructure of schools, brokers

also promote local edtech option in the hope of accounting better for the contextual complexities of the school systems in which they operate. In fact, one of the main characteristics of brokers, that was visible across our two case studies, and that is key to understand how they are 'fluent' in both industry and classroom languages, is their self-framing as 'platform agnostic'. This means that brokers claim they do not have a preference for any particular brand, and they mostly enable schools to decide what is better for them (Ortegón, Decuypere, and Williamson, 2025). Here, brokers translate the pedagogical concerns of teachers and schools by building an infrastructure in which 'small' edtech is present, shaping the procurement options for the schools they work with. One example of local edtech embedded in the infrastructure of the school is a platform that helps teachers create interactive and auto-graded exercises. The platform is used nationwide and is created and managed by local experts in education, instruction, and technology. This platform, despite being independently designed, 'works better within a Google ecosystem', as stated in their webpage. The nudge to use this local platform from within Google ecosystems is repeated in other local platforms that brokers promote. In that sense, and because these digital platforms are interoperable with Google, they do not counter the expansion of big tech and therefore do not provide an alternative to previously identified infrastructural dependencies (Cone & Lai, 2024).

Small edtech start-ups, as shown by a recent study of Decuypere et al. (2024) focused on the European context, showed that the sector is characterized by a lot of precarity, fundamentally uncertain conditions, and a constant struggle with 'big tech' firms that threaten them to make them obsolete (p. 16). Also, because of the central role that local educational experts tend to have in its design and because of its model of local governance, small edtech is promoted as a potentially more sustainable way to enact digitalization of education (van Dijck, 2020)

The digital infrastructure of the schools continues to grow as the catalog of available edtech becomes wider (Nichols & Garcia, 2022). Edtech brokers play a key role in guiding schools in the construction of such infrastructure, curating all possible options and enacting in return a hybrid infrastructure composed of the edtech options that make more sense financially for schools as well as those that are aligned with their educational priorities of time saving and ease of use. Sometimes it is composed of local options that respond more directly to the contextual needs of the schools, and sometimes by big tech options that promise time saving through affordable products. Ultimately, brokers advance the industry goals of big and small companies by aligning them to the financial and educational concerns of the school. Brokers, edtech start-ups and big tech companies co-create scenarios that privileges certain edtech products, leaves

others outside, and position companies like Google as a necessary, or indeed infrastructural providers of public education. This infrastructural dependency at the interface level is strengthened by the use of local edtech that is interoperable with Google, even though it is sometimes framed as an alternative to the 'market based pedagogies' and business models of big tech in education.

Enacting markets through training

Along with the construction of hybrid digital infrastructures, edtech brokers provoke the enactment of pedagogic routines and habits in schools through coaching and training sessions for the use of edtech. The coaching provided by brokers is specifically designed for the usage of the products they promote which, as mentioned before, span big tech and local edtech companies. Discursively, these sessions are sold to teachers either in positive terms as an opportunity to innovate their practice or, in negative terms, as a way to 'jump on the digital train before is too late' and avoid the professional shortcomings of an outdated teaching practice (Ortegón, Decuypere & Williamson, 2025). The range of training opportunities offered by brokers is wide. The catalogue of Umbrella, for instance, includes 'fundamentals' such as 'Gamifying teaching lessons', Using AI in the classroom' or 'Adaptive learning using technology in the classroom'. There are sessions tailored specifically to ICT coordinators and administrators like 'Security auditing and cyberessencials', 'Making the most out of your IT budget', or 'Managing change and innovative leadership'. Lastly, there are sessions more directly related to particular brands including 'Becoming a Google school', or Google, Microsoft and Canva certifications for individual coaches, trainers and educators. These training sessions are constantly updated by brokers because the edtech innovations they promote are also constantly evolving, proving to be a valuable business opportunity for brokers to engage in continuous training and re-training of teachers. In words of the CEO of Star:

> Every year there's new people that need to be coached and trained and there's technology that needs to be implemented, so it's an ever-ongoing business, you know.

Brokers thus provide the necessary training for teachers to be synchronized to the digital infrastructure they help build for schools and keep afloat the 'ever-ongoing business' deriving from these arrangements. Market plans are the not only embedded in the materiality in the school, but also embodied in the pedagogical practices and routines of teachers.

The pedagogic training provided by edtech brokers is also, in specific cases, supported and financially sponsored by policy organizations. In one of the countries where we conducted interviews, brokers not only translated between industry and schools to create a common desirable scenario for digitalization, but also between industry and policy. This was possible as the broker was chosen to advance the agendas of the Ministry of Education. With the goal of creating 'a future-oriented and secure ICT infrastructure for all compulsory education schools', significant resources were mobilized by the ministries of education and innovation to advance policies like the provision of personal, subsidized laptops for every secondary student, a significant budget for the creation of an online platform for personalized learning, or subsidized training sessions to schools provided by brokers. The presence of policy organizations thus legitimizes the presence of brokers in schools and provides material support for the business models of the edtech products that brokers advocate for.

In these schools, however, it is common that school directors and teachers also organize internal sessions for the use of edtech. As such, the coaching to teachers is done by both brokers *and* in-house teachers with advanced edtech skills. The translation of edtech use to teachers is then a translation provided by two different voices, coaches from broker organizations and in-house teachers. An interesting finding from the interviews is that these 'tech savvy' in-house teachers sometimes also work as consultants for brokers. In that sense, the two different voices in charge of updating and reconfiguring the professionality of the teacher are not entirely separate. Rather, they tended to be aligned. Through their work as coaches in other schools, teachers can advance their career as well as materializing their desire to be a positive influence for colleagues beyond their schools. Some of these teachers/coaches would describe themselves or their motivation to be coaches as follows:

> Everyone at school really knows: 'OK, if I have a question about IT or integration of IT, I know who to go to'.
>
> My enjoyment, I guess, for using technology, has always been there, so when I think about computing as a subject, that obviously lends itself to digital learning and digital pedagogy.
>
> I always describe myself as a cautious risk taker when it comes to the use of technology. I don't know if those necessarily sit together those two words, but I'm happy to try new technology, try and get it scaled within school, so you know multiple teachers are using it.

The process of making teachers 'edtech ready' is a responsibility of both brokers and schools, and this joint effort is considered as beneficial by local school actors. As described by one school director:

> Our training happens in two phases or two different blocks in the sense that we've got our own in-house career long professional learning program where we'll individually take turns to deliver and share training with each other (…) but we also, where appropriate, have external companies come in to do training with us as well. (Tom)

The presence of such professional expertise among the working staff of brokers is crucial for their framing as experts in speaking both the language of the industry and the language of practice. Pedagogic coaches provide translational expertise in criss-crossing the discourses of private industry and state schooling. When brokers enact particular ideas of teacher professionality, aligned with values of pedagogic innovation and digital leadership, their aim is not only to provide a set of technical knowledge but to synchronize the practice of teachers to the hybrid infrastructure that they build. Through their coaching sessions, brokers make sure that the infrastructure they install -through joint efforts of industry, policy, school authorities, and brokers- will be used in the intended ways of the industry that designed the products in the first place.

Synchronizing teachers to the digital infrastructure was described as one of the biggest challenges of brokers. When describing the attitude towards edtech of other colleagues, one teacher, who is receiving training to become a coach for a broker organization, said:

> Oh, they're very scared of it [of using digital technologies], even the young teachers. I'm an old teacher, but even the young colleagues who come fresh in are scared of using it. I use it for everything. I use it for assignments, I use it for exams, I use it for the course itself. Everything is digital from now on, and teachers are like, 'oh, what if the Wi-Fi falls out?'. Well, if it falls, it falls… but it has never fallen out. So, where's the problem? But they are so scared of it, I don't know why (…) But I'm convincing some of my colleagues. Colleague by colleague. I have a lot of colleagues to go, but yeah, they're scared of it.

A school director mentioned a similar unwillingness from teachers to engage with the digital infrastructure of the institution, making emphasis on the gaps in level of proficiency and attitude towards edtech among the teacher workforce of her school:

> All the teachers struggle with technology. They lose time because they don't know enough to use it in an efficient way. It's not a skill that is automatic. So, they need a lot of time, but the difference between the teacher who knows using technology and the one who doesn't is… the gap is giant.

In face of this challenge, brokers position themselves as a trusted partner to schools in the project of teachers' professional self-actualization, discursively framing the technologies they promote as safe, pedagogically relevant, and easy to use. From the perspective of the industry, brokers actively work on paving the way of edtech into schools, sometimes with the support of governments, and also working in tandem with local 'edtech optimist' teachers and educational authorities who advocate for the use of edtech. The teachers that align with the discourse of

brokers thus embody the possibilities of digital transformation, and act as key element to reinforce the 'translational authority' of brokers among other teachers, and becoming a relevant voice in defining what it means to be a future-oriented teacher in the contemporary school. The influence of brokers and those who share their discourse is ultimately expected to irradiate beyond the confines of those who are already convinced of the benefits of edtech, and to impact all teachers at a given school for long periods of time. These translations reconfigure the relationship between industry and schools, constructing the professionality of the public educator in cooperation with private technology vendors.

Mis-translations and non-enactments

Although the enactment of digital infrastructures and synchronization with teacher practices are essential for advancing the presence of the edtech industry in schools, it is important to acknowledge that these plans are not always enacted in the intended way. Indeed, the interviews and observations also indicated moments where brokers' translations between schools and industry did not materialize as expected. These instances are termed here as moments of mis-translation and non-enactment. One recurring example was teachers' preference for in-house training sessions in contrast to those provided by brokers. While both, according to teachers, 'have their own place', the in-house training was described as the most frequent and sometimes most useful option. While brokers build their identity by claiming to have an internal perspective to the life of the school, for instance by emphasizing the teaching background of their staff or they platform agnosticism, they can still be perceived as not fully grasping the needs of each school:

> They [external partners] might normally just do general introductions to like iPads or Apple classroom, but (…) that's the type of stuff that we can already do in-house. We want to try and get them to show us some tools that maybe are lesser-known accessibility tools or being able to use them within particular curriculum areas where we maybe don't have the specialisms or the expertise. After we said that to them, they ended up doing a session about creative arts, you know, music, sound production and recording and things, because we didn't have that expertise.

This teacher, with over twenty years of classroom experience, recounted all his experiences during the years dealing with intermediaries that guide schools in digital procurement and use, and acknowledges that the contrast between previous intermediaries or resellers of tech and edtech brokers is significant. In his words:

> There were some quite big, accredited companies who would claim they were Microsoft certified, Apple certified, but when you actually spoke to the people, it tended just to be whatever was the

> highest income from the kickback on the products of ours. They didn't really seem to have any real knowledge of education and the equipment and practice. I think that's totally different now.

This testimony suggests that edtech brokers have successfully positioned themselves as more than just resellers of tech, as their projection and self-presentation of educational expertise manages to create a distinct organizational identity for them, resulting in a higher level of trust from schools and stronger alliances between both. However, this also suggest that the authority of brokers is sometimes contested by teachers and their professional preferences. Thus, if brokers want to enact educational changes around edtech, they have to prove their additional value in comparison to what schoolteachers have to offer. In the schools where we conducted interviews, the 'in-house' level was very advanced and, for that reason, the expectations of these schools were therefore 'rather high' and sometimes not met by brokers. This is clear in the following example of a school director that received coaching sessions by Star:

> Each year, there are priority projects for schools to upgrade their knowledge about a subject in a school team. So, a boot camp is such a priority project that's financed by the government. We didn't have to pay for it. Nothing. So, the organization makes a project, and they present it to the schools, and they have the authorization of the government. They will get paid by the government. Schools don't have to pay.
>
> So, it's free, and our expectations were rather high. But I understand afterwards that there are a lot of miscommunications between the school and the organization, miscommunications about the goals. Miscommunication about what it meant, really, concretely, what's going on. What will be, what are the teachers able to learn at this moment. No, it didn't match. But it's our fault also. We should have been better informed. We should have discussed it more before choosing this kind of lessons project, yeah.

The reason why the training provided by Rocket didn't match with the school's expectations is because this school, like others that were part of the study, wanted to focus on the management of Google workspace, and the session provided by brokers was a more general session about edtech use, which is the free option that is financed for the government (see previous section). Since the expectations of the schools and the coaching sessions of brokers 'did not match', this is an example of a mis-translation between schools and brokers. However, the mismatch does not speak of the catalogue of brokers nor of the capacity of their coaches, since they offer a wide range of options regarding Google use. Rather, it speaks of the lack of fit between the free sessions sponsored by the government and the expectations of schools. While policy authorities are heavily financing the digitalization of schools via the intermediary work of brokers (via free training sessions to schools provided by brokers), schools sometimes prefer different training paths than the ones suggested top-down.

Because of the interest of policy organizations in the success of the educational enactments of edtech brokers, there were representatives of the government observing and evaluating the sessions that we, as researchers, also observed. This speaks of how these spaces led by brokers are at the center of industry, policy and research priorities. More concretely, it suggests that brokers' training sessions (and their success) are a priority of policy authorities that are investing significant financial resources in the digitalization of education and expect to see concrete proof of 'return in investment', for instance via the training of teachers in the use of edtech. Moments of non-enactment then happened within a wider ecology that pushes forward the presence of edtech industry into public education at regional and national levels. As we tried to show, the intervention of brokers enact concrete changes for schools, but is also fragile and with of moments of mis-translation and non-enactments precisely because of the disparate interests and agendas of the actors brokers bring together.

Conclusion

This study presented how edtech brokers, as emerging authorities in the policy and practice of education, advance the presence of the edtech industry into public schooling, translating the goals of governments, industries, and schools into common agreements and action plans for digitalization. As connective nodes across industry and schools, edtech brokers create hybrid digital infrastructures composed of big tech and local edtech products, and they provide continuous training on the use of edtech, offering technical knowledge and motivational force to promote tech-intensive change among teachers. We also showed moments of mis-translation and non-enactment, where teachers and school directors did not follow the suggested path of brokers and gave prominence to their own subjective understanding and institutional priorities regarding their schools' needs and goals.

The translational practices that we described in the analysis show that, when edtech brokers enact concrete realities for schools, they do so in ways that are heavily mediated by the preferences and local expertise of school actors, which sometimes enter into conflict with the original plans of brokers. They sometimes advance the presence of big tech companies and sometimes advance the presence of local alternatives of edtech with different business models and pedagogical paradigms. They integrate the knowledge of local teachers to enact changes in their pedagogical practice, but they give preference to those teachers that position themselves professionally as experts in improving their practice through digital technologies. Because of this capacity to guide schools and regulate the access of the industry into school systems, edtech

brokers ‘govern’, to a certain extent, the possible relationships and synergies between schools, governments, and the edtech industry.

By studying edtech brokers in terms of their translations and enactments, we contributed analytically to show that the implementation of edtech agendas in schools is never a straightforward, linear process starting in policy document or market projections and ending in schools, conceiving them as passive subjects of industry or government authorities. Conversely, we understood processes of school digitalization as the result of a translation between disparate interests, goals, and educational ideas, and we studied how brokers operate as translators between different stakeholders, bringing together the different social worlds of industry, policy, and schools, and creating new synergies and collaboration between them. These new collaborations are made possible by brokers’ work of creating common vocabularies and projections of desirable scenarios that are conceived as beneficial for both industry and schools. Importantly, these scenarios are not a mere reproduction of policy or industry goals, but rather a hybrid agenda where both ‘public’ and ‘private’ actors are taken into consideration.

As edtech brokerage continues to proliferate in schools, there is a need to further study how schools react to guidance on edtech procurement and use, as well as the technical, legal and pedagogical criteria that is privileged in said support. It has been argued that schools need to make informed and strategic decisions in their digital transition, independent from edtech market actors, to prevent the subtle cooptation of their digital transformation by global technology companies (Kerssens, 2024, p. 14). However, we tried to show that it is not so easy to think of processes of public intervention as completely isolated from industry actors. Consequently, we suggest further research to empirically understand how teachers and schools are receiving guidance by intermediary organizations, including brokers, consultants, and ‘ambassador’ teachers, to unravel the forces that are currently deciding how teachers should upskill their professional expertise in a digital age. Studying the practices and effects of edtech brokers is one step further to understand how schools are transforming due to, and sometimes in spite of, the edtech industry.

General conclusions

This study set out to study edtech brokers as new intermediaries in education policy and practice. As actors operating between industry, schools, governments, and research centers, edtech brokers mediate between different agendas and objectives for digitalization and create common plans for action. Their influence included training schools and school systems in how to undertake their paths for digitalization, supporting the market positioning of certain edtech brands in schools, or being central in deciding how edtech evidence is created and used. The main research questions that guided this study on edtech brokers and their influence were:

- RQ1: What are the main *practices* through which edtech brokers mediate between schools, edtech industry, government, and research centers?
- RQ2: What concrete changes in schools, edtech companies, government organizations, and research centers can be attributed to brokers' practices of mediation?

With these questions in mind, I now provide an answer to each of them, highlighting the empirical, analytical and methodological contributions of this work. Later, I discuss the limitations of this study and signal future paths for research, connecting my findings with adjacent sub-fields within the domain of educational studies.

First research question: What are edtech brokers' main practices of mediation?

Edtech brokers' practices of mediation were defined as the practices through which edtech brokers connect actors and shape relations across the education sector, ultimately materializing a set of possibilities, conditions, and constraints for edtech usage in schools. As an answer RQ1, three main practices were identified and empirically disentangled throughout the four chapters. In the first study, via the analysis of brokers' documentation (brokers' websites, social media communications, reports and white paper), I showed that brokers intend to (i) construct a digital infrastructure of the school, (ii) create and mobilize knowledge of 'what works' in education, and (iii) influence the professionality of the teacher in a digital age. These practices were identified as a result of a mapping of the edtech sector that was discussed in the introduction and the first chapter. This exercise was equally supported by the working definition of edtech brokers as organizations that operate between the edtech industry, public schools, research centers and governments, guiding schools in the procurement and pedagogical use of edtech. After an initial answer to RQ1, I acknowledged that not all brokers are equally composed, nor are all of them involved in every practice. Three different types of brokers were then suggested

to understand the multifariousness of brokers, namely ambassador brokers, search engine brokers, and data brokers. With a typology of edtech brokers and an understanding of the main practices through which brokers intend to mediate across educational actors, the first study provided an initial basis to explore edtech brokers through and beyond their produced documents. Indeed, this study offered 'the first analytical steps as well as a roadmap to further disentangle how edtech brokerage is occurring in and impacting the educational field' (p. 48). However, 'the concrete ways in which brokers remove or add friction to the relation between the actors they connect is to be explored empirically' (p. 48).

Once these practices were identified, the next three chapters were specifically designed to gain empirical insight into how these practices unfold. Through interviews and observations, coupled with the gathering and analysis of documents produced by brokers, I set out to explore the professional expertise of brokers that made the practices possible and the educational ideas and imaginaries that were at once guiding *and* materializing through such practices. The goal was, not only to *say that* brokers enact a set of practices that transform schools, the edtech industry, governments and research centers, but to *show how* this happens or fail to happen. In line with the relational framework of the project, the practices of brokers were conceived as something constantly in the making, and as a product of a negotiation between different actors, where none occupies a stable, pre-given role (e.g., policy actors as determining what happens in schools, or edtech markets determining policy development). Because of the emerging nature of brokers' practices, and the goal of transcending the 'telling that' for the 'showing how', the next studies approached brokers by means of empirical investigations, in an iterative process that could strengthen the initial findings that emerged from the desk research (Fenwick & Edwards, 2010; Law, 2008).

The second study focused on two 'search engine' brokers, and explored how brokers build the evidentiary mechanisms that produce knowledge of 'what works' in edtech. The interviews showed that edtech brokers answer in particular ways the question of what is counted as 'valid' evidence when evaluating edtech, and that this knowledge is mobilized and stabilized in the forms of badges, ranks, and curated lists of edtech products, including some edtech products in their lists, and excluding others. Importantly, edtech brokers used different 'participatory' mechanisms of evidence-making, including the participation of in-house educational experts (i.e. a sub-set of school teachers) to assess edtech products, and the creation of a definition of 'leaning' that served as the basis for the evaluations created by educational researchers. The in-house educational experts that worked in tandem with brokers were described in the interviews

as ‘idealists’ and as having ‘lot of affection for educational technology’. The participatory elements of brokers’ practices of evidence-making foregrounded the different sorts of professionality involved in edtech brokerage, including researchers, marketing experts, and professionals in data safety and compliance. In relation to debates about evidence making, metrics and quantification mechanisms in education, this study contributed to show that edtech brokers are exemplary of a ‘participatory turn’ in evidence making (Bandola-Gill et al., 2022), providing schools, markets and governments knowledge that transcends the technical reliability (for instance, provided by RCT’s) and moves to provide ‘social proof’ as a proxy for representing the judgment and professional expertise of teachers.

The third study focused on how ‘ambassador brokers’ aim to influence the professionality in teachers in a digital age, and how they seek to advance scenarios where edtech becomes increasingly embedded into daily school practices. Through different forms of training and coaching sessions in schools, ranging from one-day workshops to months-long tailored coaching at school levels, edtech brokers build an ‘affective atmosphere’ designed to enthuse and inspire teachers in the use edtech. Such an atmosphere is built sequentially, first through developing relationships of trust with teachers, then by promoting a ‘user friendly’ approach to the edtech products and ‘making the user friendly’ towards the same products (Gorur & Dey, 2021), and ultimately encouraging them to adopt a long-term, entrepreneurial attitude towards edtech where teachers not only become capable of using edtech but also become a source of inspiration for other colleagues.

The participatory dimension of this practice was equally visible, for instance when brokers framed themselves as ‘platform agnostic’ to recommend edtech based on the contextual needs of the school, and regardless of which particular brand is adopted in the end. As such, when brokers transform the professionality of the teacher, they distance from framing themselves as mere resellers of whatever edtech solutions best serve their financial interests. Despite their ‘agnosticism’, this practice equally showed that, when brokers aim to influence schools, they align more smoothly with teachers that are ideologically close with the goals of brokers, or as one interviewee described it, teachers that are not forced to adopt edtech but that ‘want to do it themselves’.

The fourth study addressed more directly the third practice of mediation, namely the building of a digital infrastructure. Beyond the analysis of their promoted products and services, it showed how brokers build a *hybrid* digital infrastructure through alliances with different instances of the edtech industry, including ‘big tech’ companies of the like of Google and

Microsoft, and local edtech start-ups more attuned to the curricular needs of the specific educational context where brokers operate. Such infrastructure unfolds at the level of both software and hardware, including laptops, tables, and different apps and platforms devoted to teaching and learning and school administration. Related to the practice of infrastructure building, the first study already showed how brokers *aimed* to build the infrastructure at software and hardware levels, but the fourth study showed how that infrastructure is actually created through brokers-schools interactions.

Second research question: How do brokers transform the actors they connect?

Exploring the practices of brokers, especially in the empirical studies, clearly showed how brokers transform the actors they connect. Each study, in its own way, provided elements to answer RQ2. The second study showed how brokers are not passive transmitters of policy plans for digitalization but negotiate the way in which policy agendas are actioned (or not), modifying and negotiating the plans of policy makers in regard to edtech adoption in schools as well as growth prospects for the edtech industry. In other words, edtech brokers emerged as 'mediators' rather than mere 'intermediaries' in digitalization plans (Geiss & Röhl, 2024; Latour, 1994, 2007), translating and modifying the goals of the actors they connect.

Arrow, for instance, was described from the outset as 'a very political project'. For the interviewee, 'in this kind of project, where there's a lot of political sensitivity, you sometimes have to go in one direction, then you need to steer in a slightly different direction'. As such, brokers navigate tensions for policy enactment and use their own pedagogical and technical criteria to sometimes advance and sometimes contest policy mandates, ultimately steering the way such mandates land in schools. A concrete example is when brokers managed to include certain edtech products because of their perceived pedagogical relevance despite not being initially contemplated as financially feasible by the funders of the project.

In a similar way, brokers played a central role in defining what counts as evidence. They decided to a great extent which sorts of scientific techniques of evidence-making were taken into account to produce reliable knowledge about 'what works' in edtech. As mentioned in the interviews, what counts as 'evidence' is subjective, and the subjectivity of brokers decided what counts as valid edtech evidence in an environment of evidence paucity and reported uncertainty from teachers and schools (Hillman, 2022). For example, the 'social proof' in form of reviews is one highlighted form of recognizing the quality of edtech. While brokers rely strongly on measurements of social proof, this does not mean that user reviews are the only measurement

considered, since both analyzed brokers also evaluated edtech according to other forms of assessment including RCTs and pedagogic reviews by educational consultants. However, in both cases, the research insights strived to find a balance between scientific rigor, applicability to schools, and usefulness to the market (more about that below). Because brokers decided what type of knowledge is used and prioritized to create edtech evidence, they positioned themselves as 'knowledge governors' (Bandola-Gill et al., 2022), acting as connective nodes between the world of research, industry, and schools.

The second study equally showed how edtech brokers shape markets. As extensively elaborated in the introduction and throughout the four chapters, different instances of the edtech industry have gained increasing relevance in the educational landscape over the past years, conceiving school systems as profitable yet relatively underexploited market segments. When producing easy-to-implement snippets of evidence to guide schools in processes of procurement, edtech brokers clearly benefit the products whose quality has been 'proved' with a competitive advantage when trying to access schools. As mentioned during the interviews, the value of the certificates produced by brokers has even expanded internationally. Next, for instance, has increasingly received requests for assessing and certifying edtech products from different Countries in Europe and beyond, making it clear that the knowledge produced by them contribute to legitimize the market adequacy of the edtech products they assess, even well beyond the geographical boundaries of where the product was evaluated. As to which type of products thrive in the evaluation of the brokers, some factors mentioned included flexible, adaptive, interoperable solutions based on a platform business models, compliance with data safety regulations in line with European frameworks, and pedagogical relevance as evaluated by teachers and pedagogical staff of broker organizations.

The fourth study also gave insight into how brokers shape markets, contributing to the findings of the second study. Not only by producing 'objective' evidence, but by the market promotion of particular products and though providing coaching on their use, ambassador edtech brokers favor certain edtech products and exclude others. The type of edtech that brokers favor is, as mentioned before, a hybrid mix between big tech and local edtech products. Because brokers supported the procurement of big *and* local edtech when deciding, together with teachers, what edtech works best for them, they position themselves at the paradoxical position of strengthening *and* countering the 'infrastructural dependency' of public education on big tech companies (Cone & Lai, 2024), ultimately using the perceived needs of the schools as the anchor to decide which edtech products were promoted. They still advanced the overall

acceleration of digitalization of education in the sense of creating the material and professional conditions for an intensified use edtech use in schools. This was visible, for instance, when brokers provide Chromebooks, and their corresponding Google ecosystem, to schools for daily school life of teachers and students, or when brokers promote the use of edtech start-ups to support the curricular needs of the school (which some are interoperable with Google and consequently used from within the Google environment). In either case, brokers proved essential to secure the 'ground-level' realization of the market plans of the edtech companies they promote (Gorwa & Veale, 2021), giving a competitive advantage to those brands for which brokers acts as ambassadors, and mediating between the locality of the school and the significant amount of public expenditure in education.

Besides governments, research centers, and instances of the edtech industry, brokers profoundly shaped schools. The third study emphasized how they aim to transform schools, not only by giving teachers the technical skills required to embed edtech intro practices, but by creating an affective atmosphere so that teachers *want* to change. Their influence was thus described as an 'affective pedagogy' (Berlant & Greenwald, 2012) with the goal of transforming schools into increasingly hospitable spaces for the affordances, routines and habits created by an increasing presence of edtech. As such, edtech brokers transform schools into edtech environments, emphasizing their benefits for saving time, improving the quality of instruction, and modernizing teachers' practice. This transformation is evidently not initiated or exclusively pushed forward by brokers, but takes place in a moment where different policy and industry actors continue to advocate for the benefits of digital innovation in education and promoting its use (Cobo & Rivas, 2023; Jobér, 2024; Žmavc & Bezlaj, 2024).

While the third study explained how brokers seek to influence schools, it ended up stating that 'examining the ways in which teachers accept, react to, or simply ignore the coaching of brokers, is an important next research step'. Consequently, the fourth study went beyond the plans of brokers to show brokerage in action, giving insight into how the practices of brokers are received in schools. It showed how brokers provide continuous training that, paired up with the local expertise of schools, manage to create long-standing changes in the routine of teachers and incorporate edtech into the daily practices of teachers. Importantly, this study showed how the plans of brokers can be modified or obfuscated by the internal logics and priorities of schools, stressing the double way in which brokers change schools and are changed by them as well. The friction between brokers and schools was key for forming an idea of the extent of the influence of brokers. It showed how, while their presence is significant, as is the budget they

mobilize and the actors they manage to bring together, the process of affecting teaching practices are not straightforward.

During the interviews, it was said that the alliances that brokers made possible were 'unforeseen', but the fourth study showed that such alliances and agendas do not necessarily translate in immediate change in schools, especially because of the prevalence of schools' own pedagogical preferences and routines. These findings are in line with studies that show how schools don't limit themselves to passively implement externally imposed plans for reform, but rather can debate it, reframe it or simply ignore it in light of an existing ethos and culture of the school (Ball et al., 2011; Braun et al., 2010). When it comes to digital technologies, schools decide how and when to implement changes considering the potential benefits or threats of edtech at pedagogical and organizational levels, given that sometimes it is not clear whether a new technology will save or consume more time in the daily life of the school (Wikström et al., 2024).

Revisiting the initial definition of edtech brokers and its relevance:

After having answered the two main research questions of the dissertation, it is worth to revisit the definition I have proposed for edtech brokers, and to reflect if it is justified to conceptualize edtech brokers as separate organizations. Edtech brokers are defined as organizations that operate between the edtech industry, public schools, research centers and governments, guiding schools in the procurement and pedagogical use of edtech. This definition is supported by the whole empirical part of this project, which was designed to gain insight into how brokers exactly connect the aforementioned actors. If we are looking to properly understand and eventually operationalize such definition, there are two extremes we want to avoid. First, we want to avoid claiming that edtech brokers, as novel actors, are reshaping and revolutionizing the whole landscape around digital technologies, as well as the actors they connect. The second extreme we want to avoid is to say that "everything" can be an edtech broker, or that such definition can apply to a myriad to actors without adding significant added value to our understanding of the current network of digital education policy and practice. As often happens, the truth lies in the middle of these two extremes. I tried to show extensively that edtech brokers, either in the form of ambassador, search engine, or data brokers, connect actors in a way that was not happening before, in a moment that is marked by the increasing presence of digital technologies in the classroom.

This does not mean that brokers are the only organizations that operate in such cross-boundary spaces. Indeed, there are cases of teacher ambassadors (Selwyn & Szili, 2025), teacher influencers (Saldaña et al., 2021; Schroeder et al., 2024), or consultants (Joecks, 2024), just to name a few, that are equally reshaping relationships between schools, industry, government, and research. However, they do it in distinct ways that are necessary to explore in detail, as I explored the practices of brokers. What these examples show, all in their significant way, is that the landscape of education policy and practice include a range of in-between actors that play an increasingly important role the provision and use of digital technologies.

Because there are new actors reshaping these relationships, there is a scholarly need to equally enrich our language and conceptual repertoire to make sense of this new reality. For this reason, it would not be wise to equate such intermediary actors with more established actors, like governments, companies, or school unions, just because they withhold relationships, and are co-constituted, by such actors. More specifically, edtech brokers are not reducible to schools, although they relate to schools; They are reducible to edtech companies, although they partner up with them; They are not comparable or reducible to government organizations, although they sometimes receive support from them (or decide to operate in spite of them); And they are not research centers, although they are familiar with "scientific" techniques of knowledge making to guide markets, governments, and schools. The fact that they collaborate closely with such actors, and that they have the power to even influence or transform their course of action, does not mean that they are contained in them. The fact that certain governments, for instance, financially support the operations of brokers, does not make them a branch of the government. On the contrary, the nuance is to be found in exploring questions such as, why do governments support brokers, what type of changes are governments promoting through their partnership with brokers that was not possible before, how exactly does this partnership take place, in which ways the agendas of brokers and governments differ in spite of their partnership, and so on. Assuming that they are reducible to well-known actors or to "the usual suspects" in education policy and practice (Lewis, 2021), and therefore implying that we already "know" how they work and operate, would be to miss an opportunity to understand the operations of emerging actors that are re-shaping the way education policy is being implemented and enacted.

In the case of edtech brokers, every proposed category of broker (i.e. ambassador, search engine, data broker) have their own specificity, and it's important to keep this categorization to capture their influence and reach as faithfully as possible. These three ways of brokering between schools, industry, government and research have the potential to serve as explanatory

devices across multiple context, although it's possible to add or modify this categorizations in the future. The important thing is to keep the pulse on the emerging expertise of intermediaries in general and on brokers in particular, and to keep on fine-tunning a conceptual definition of them based on empirical work of new and different cases.

Although the proposed categorization can serve as a guide to future studies, it is not possible to state beforehand which actors will play which role in the mediation practices of brokers. This is due to the fact that every process of mediation is different and, in line with the relational framework explained in more detail in the introduction, it is not possible to assume on beforehand a certain context in which edtech brokering take place, nor to assume that the same actors (schools, industry players, gonverments, research centers) occupy the same role in every case. Rather, the context in which brokerage occurs, and the "power" that every actor hold in every interaction, is a result of each particular assemblage. Power is better understood as something that is "made up" through practices rather than assumed (Woolgar & Lezaun, 2013). For that reason, it is difficult to say which actors have more weight than others, or which actors pursue which goals in advance. What is possible, however, is to affirm that in the mediation of brokers, myriad of actors take a particular role, which often include an intersection of policy, industry, and research actors, ultimately re-shaping the way edtech is advertised, procured, and used in schools and school systems.

Analytical and methodological contributions: A framework to study the agency of brokers

Beyond the empirical findings and the possibility to establish a definition of edtech brokers, this dissertation provides analytical and methodological tools to study edtech brokers and other intermediaries in education. By stressing their embeddedness and their relational nature, the present study gives an indication of how to study actors that operate 'in between' more stablished actors in educational policy and practice, beyond conceiving them only as functional to the actors they connect. This approach to brokerage is particularly useful to capture its socio-technical and socio-political dimensions. As concluded by a recent literature review on brokers in educational change conducted by Rechsteiner and colleagues (2024), brokerage is, by its origin, an interdisciplinary concept, and the theoretical framework from which they are understood will determine their very definition. While some studies focus on quantitatively studying the efficacy of brokerage with the overall goal of improving said efficacy (Willegems et al., 2016; Zuckerman et al., 2018), other studies, like this dissertation, focus on studying their complexity and socio-political dimension. This does not mean that different studies on brokers in education are opposed or contradictory to each other. Indeed, Rechsteiner and colleagues say

that ‘efforts to create a single framework for brokerage in the educational context might not be purposeful’ (p. 329) Conversely, ‘the multitude of theoretical frameworks is a strength of the concept rather than a limitation’ (p. 329). As such, we contributed to showing that edtech brokerage is a social process, relationally defined by the type of interactions between all the stakeholders involved, including academia, governance, schools, markets. Further studies, particularly those specifically interested in how different intermediary actors intervene in the digitalization of education, can find support in acknowledging their complexity and agency, thus addressing the social and political dimensions of such mediations.

Methodologically, I approached brokers’ socio-technical practices through different methodological entry points. As explained in more detail in the introduction, I empirically explored four different dimensions of edtech brokerage, namely their interface, design, and usage, and ecology (Decuypere, 2021). Studying the interface of edtech brokers, via their webpages and social media presence, was useful to unravel not only their products, services, alliances and composition, but also their pedagogical paradigms and the discursive framing of the change they envision for the education sectors through the promotion of edtech. The design was key for understanding how their practices are supported by a dedicated team of professional expertise (e.g., didactics, research, marketing) and scientific knowledge (e.g., data safety and compliance, surveys to teachers, RCTs), complementing the information obtained through the interface analysis. The usage in schools gave a clear idea of how, beyond projections and plans, edtech brokers create concrete changes in schools, also giving an idea of how market and policy plans land in schools through the mediation of brokers. Lastly, studying the ecology of edtech brokers served to situate them in relation to policy agendas and the doings of school, research and market actors, not only locating brokers as operating in a wider context, but understanding how edtech brokers create a particular context, that is, as an emergent property of the interaction between actors involved in edtech brokerage (Piattoeva et al., 2018)

The methodological and analytical foundations of the project then work in tandem to acknowledge the relationality of brokers. It showed that it is impossible to understand edtech brokerage without its relationship (but not necessarily alliances) with governments advocating for digital transformation to strengthening their human capital. In the same way, it showed the influence of market projections that co-create techno-optimist discourse of brokers and serves as support for brokers to build legitimacy in schools. With regards to schools, it showed how the practices of brokers are received by schoolteachers, school directors and ICT coordinators who manifested being, at the same time, overwhelmed by the changes and pressures that edtech

brings and hopeful about its potential to reduce workload and increase the quality of instructions. It also highlighted the role of research centers in grappling with the task of producing concrete deliverables about the pedagogical quality, data safety standards, or the effectiveness of edtech. If the theoretical framework of this study stressed on the interconnected and mobile dimension of edtech brokerage, the methodological framework captured such interconnectedness, holding grip on different temporal and spatial dimensions of brokerage including macro-level policy debates around edtech, mundane school practices mediated by the edtech promoted by brokers, accounts of the negotiations between brokers and policy centers, or insights on the making of the research that made possible the practices of brokers.

Based on these theoretical and methodological dimensions, and after the four studies conducted on edtech brokers, I now propose the overview of a framework that can serve as a guideline to capture the agency of different brokers and intermediaries operating in education, composed of four interrelated components:

1. Organizational composition

Intermediary organizations can be composed of different experts, be supported by different business models, or be situated at different spectrums of private and public spheres. For this reason, when studying them, it is important to first understand how they are composed. Exploring this component includes questions such as: How is this organization composed? How is it funded? How do they produce value? Who are their main partners? Where do they operate? Such questions can start revealing where these organizations are located across a wider network of educational actors and give an indication of potential relationships that are worth to explore further with other market, policy, and school actors. These questions can be approached through document analysis, website analysis, or analysis of social media (For related studies see Baroutsis & Lingard, 2022; Hartong, 2024)

2. Educational imaginaries

Defined as ‘collectively held, institutionally stabilized, and publicly performed visions of desirable sociotechnical futures’ (Jasanoff, 2015), educational imaginaries have been proved to be significant in advancing material change in education, guided by visions, policies, and projects of how to educate individuals and societies (Rahm, 2021). Studying the educational imaginaries of intermediary actors – i.e., their normative ideas on education that both support *and* materialize through a concrete set of practices – is key to understand what their intended role is in transforming education. It is equally useful to find ‘their own voice’ beyond more

well-explored educational imaginaries of government and market actors. If the organizational composition of intermediaries can give an indication of *how* they intend to operate, studying the educational imaginaries shows more clearly *what* type of operations and practices they seek to advance. For this step, useful questions to ask include: What are, according to these intermediaries, the most pressing problems in education today? What is the role that digital technologies play in solving these problems? How should the relationship between teachers and technology be? This dimension is promising to transcend an instrumental and de-politized study on intermediary actors, and can be explored through document analysis, observations and interviews (For related studies see Ferrante et al., 2023; Forsman et al., 2024; Miglani & Burch, 2021; Rahm, 2021; Ruiz & Gallagher, 2025).

3. Technical and epistemic work

The work of intermediaries is not only discursive but also technical. The cases of edtech brokers I explored throughout this dissertation exhibited a variety of professional expertise and ties with research centers that led them to produce stable forms of knowledge to guide schools in their questions around edtech procurement and adoption. Exploring the technical and epistemic work of intermediaries means to study and follow how they produce scientific insights and knowledge that can later work in tandem with their discursive work to mobilize changes in education. Understanding the epistemic work of brokers and intermediaries is useful to capture how their position as educational authorities is legitimized and sustained, as well as to capture the complex relations between more academic-technical work and commercial interests around the business of educational technologies. Guiding questions in these regard can be: In which domain of educational and learning sciences do these intermediaries situate themselves? What sorts of quantitative or qualitative methods are they using to build knowledge? Through which concrete forms and formats is this knowledge shared and distributed with wider audiences? These questions can be approached through interviews and document analysis (For related studies see Lewis, 2017; Lewis & Hogan, 2019; Williamson, 2017).

4. Reception

Lastly, a study on brokers and intermediaries that acknowledge their relationality should account for how their practices are received in educational settings. The first three dimensions suggested earlier are useful to disentangle *what* and *how* brokers seek to create change and ultimately impact school practices, but they strictly don't say anything conclusive in regard to *what actually happens* in schools because (or in spite of) their practices. Through interviews

with school actors, observations of teacher training sessions, or analysis of screen recordings that show how school actors interact with digital platforms created by brokers of other intermediaries, some guiding questions to explore how practices are received in schools are: What are the perceived benefits of the work of intermediaries in teachers' daily practices? What type of questions emerge by teachers when faced with brokers or other intermediaries? What sorts of patterns start emerging in the use of their digital platforms? (For related work see (Alirezabeigi & Decuypere, 2025; Selwyn et al., 2025).

This framework is meant to be adapted depending on the concrete needs of each study, but it can give an indication of how to conduct research on edtech brokers beyond the contexts that we explore in the four studies. Equally, it can be useful to explore other intermediaries in education. Intermediary actors operating within the digitalization of education are not only limited to edtech brokers but include a myriad of individuals or organizations including ambassador teachers (Arantes & Buchanan, 2023; Saldaña et al., 2021), consultants (Joecks, 2024), ICT coordinators (Geiss & Röhl, 2024), data office teachers (Grant, 2024), or national edtech alliances (Decuypere & Vanermen, forthcoming). These recent studies on intermediaries show, each in their own way, the agency and decision-making power of these intermediary actors. Grant (2024), for example, concluded that data office teachers are not just conduits of governmental data power, but that they exercised substantial agency through data infrastructuring, shaping the scope, extent and remit of data systems within their schools and making data work in their own school context (p. 67). Because of their increasingly relevant role, intermediaries re-situate and reframe questions about the politics and agency of the different set of actors that are currently shaping the digital transformation of education (Hartong, 2024).

When studying the relevance of intermediaries in education, it is important to emphasize that, in line with the empirical and relational approach of this work, power should be understood as composed in an heterogenous fashion of sometimes unexpected elements that are revealed only by means of investigation (Latour, 2013). Because of the conscious refusal of drawing on a wider "context" or other assumed-yet-unespecified markers as explanatory tools (Woolgar & Lezaun, 2013), power is not the explainer, but that which needs explaining. Indeed, nothing or no one has power in and of itself, but rather actors (humans, objects, organizations) gain authority by means of the relations that other actors start to uphold with them. Paraphrasing Gorur (2019, p. 1), who understands questions of power as "matters of encounter, ordering and distribution", studies informed by STS in education shift away from usual explanations of

politics as simply a matter of hegemony of the powerful. Refusing to accept power as something inherent in individual "powerful" actors or institutions, these studies insist to rather focus on how actors encounter each other, ordered and distributed themselves in particular instances, and how power comes to be assembled as a product of these constellations. As such, brokers and other intermediaries might have power when bringing actors together and changing their course of action towards the creation and positioning of discourses and practices that find stability and certain consistency over time. We showed the required effort behind making these discourses hold and stick in educational agendas discussing the benefits, potential and pitfalls of digital technologies in education.

It has been argued consistently that changes around technology always *presuppose* particular sorts of users as much as they actively *configure* their users (Woolgar, 1990). In education, for example, the platforms that are currently used at schools, including those promoted and advertised by brokers, always imply what Decuypere calls an "environment of expected use", namely how the platform interface is anticipated to be received, what typical user behavior is anticipated to be (and desired), and how user activities are regulated through the interface's (facilitating or constraining) materialized design (Decuypere, 2021, p. 75). Analysis on such platforms include the cases ClassDojo (Manolev et al., 2019), GrassHopper (Decuypere, 2019) or TeacherTapp (Helgetun & Decuypere, 2024). For this reason, the power of brokers or any other intermediaries to be studied in the future, based on the associations and relations they make possible, might also extend to the way that educational practices unfold around the edtech products they advance, and in the way they configure what it means to be an educational actor, either being a teacher using edtech, a school director negotiating procuring contracts, an edtech company legitimizing themselves to schools and government, or a research center building knowledge around the benefits or risks of edtech in education.

Studies informed by the proposed framework, and who understand power in this way, can continue to further disentangle how intermediaries continue to play an important role in digital education policy and practice. For instance, it can explore how issues of evidence making and teacher professionality unfold in the future as the influence of digital technologies continues to take unpredictable turns. These type of debated can gain increasing relevance in the years to come, as the following example seems to indicate. A recent announcement of the European Edtech Alliance (EEA) titled 'Banning Digital Devices in Schools: A Step Backward for Education?' (European Edtech Alliance, 2025) discusses the recent regulation of the Madrid Regional Government announcing the ban of individual digital devices in all publicly funded

early childhood and primary schools, affecting over 500,000 students across more than 2,000 schools. This decision—set to take full effect at the start of the 2025–2026 academic year—will phase out individual access to tablets, laptops, mobile phones, and even digital books for students aged 0–12 (European Edtech Alliance, 2025). According to the announcement, 'the Madrid decision is a reminder of how quickly progress can be rolled back — particularly when policy is shaped without collaboration or context' (ibid). Consequently, it calls for an 'evidence-based dialogue' that takes into account educators, researchers, and EdTech organizations, while preserving school autonomy and context-specific decision-making. While the Madrid regulation may be regional, the EEA suggest that the conversation it sparks must be continental. This announcement suggests that regulations and laws promoting or limiting the use of edtech in schools are a contested field, where the evidence to guide policy implementation keeps on playing a central role. Edtech brokers, as organizations with demonstrated influence in gathering different stakeholders (e.g., industry, research centers, governments, local practitioners) to produce stable, reliable knowledge of 'what works', could continue to play a central role in legitimizing or countering different policies around the digitalization of education. It is then important to keep on asking critical questions including what type of evidence is used, what is considered as 'robust' or 'good quality' evidence, who is in charge of building it, or how it gets socialized with schools. An in-depth exploration of these questions are crucial as the policies and mandates guiding the digitalization of education continue to advance.

Limitations: What can (or cannot) the case studies say about edtech brokerage?

The study on edtech brokers was supported by the analysis of four case studies. As the diagram presented in the introduction shows, the possible cases of edtech brokers are certainly not limited to four organizations. Moreover, edtech brokers are composed in diverse ways – some are for-profit companies akin to edtech start-ups, others are publicly funded projects, others are supported by private philanthropic capital – and not every broker performs the identified practices of mediation in the same way (RQ1). Precisely because not every broker is composed in the same way nor operates in the same way, the expected influence they can have on the actors they connect can also vary (RQ2). In that sense, it is worth asking what the limitations of my findings are.

To start answering this question, it is important to remember that the findings and contributions of this research are analytical, empirical, and methodological. The analytical value of the

findings is not hampered by the limited number of case studies. On the contrary, it served to establish a framework that is open to capturing the complexity and particularity of each broker. In this dissertation, I strived to provide elements to study actors beyond the 'usual suspects' in education policy and practice (Lewis, 2021), offering elements for capturing the complexity and socio-political dimensions of these emerging actors in dialogue with recent literature that critically explore educational intermediaries. Regarding this dissertation, every chapter closed with an invitation to explore the myriad of brokers that might be influencing policy and practice in different regions of the world that were not contemplated in this project. The methodological contributions operate similarly, as they offer a guide to study edtech brokers from different, though interrelated, methodological entry points, allowing for the possibility to explore the different ecologies, interfaces, usage, and design of edtech brokers. In short, the conceptualization and methodological approach to edtech brokers are enriched, rather than hampered, by the diversity of cases. Through the proposed framework inspired on the four studies of this dissertation, further studies can help to track the common factors, actors, and features that help explain the 'how' (e.g., how brokers connect schools and the market) and the 'what' questions (e.g., what consequences do they have on schools and market practices) across edtech brokerage (do Amaral, 2022).

There can be potential concerns more targeted towards the empirical contributions and the more 'general' claims of edtech brokers derived from the four case studies. I purposefully selected organizations that would uphold, from the outset, different relationships with markets, governments, research centers, and schools, to capture the multifacetedness of brokers. As a result of this sampling of cases, the agency and particularity of brokers came to light throughout the studies, making it clear that a functional understanding of them (for instance, as organizations that work at the service of particular edtech brands, or as organizations that impose policy to schools in top-bottom ways) was insufficient to capture their complexity. In that sense, the empirical findings resonated with the analytical framework and were useful to show both how brokers operate and how they transform the actors they connect.

However, edtech brokers evolved with time and the concrete ways they operate advanced beyond what was captured in my studies. It is telling that some selected case studies have transformed significantly throughout these four years. Two of these organizations have grown exponentially, buying and incorporating under their own name other companies that were initially identified as edtech brokers performing similar practices. They have expanded their reach both across Europe and internationally, denoting new relationships and alliances with

governments, markets, research centers, and schools, as well as a bigger influence to decide the way edtech is being used and adopted. These transformations indicate that further work is needed to keep up with understanding the influence and reach of edtech brokers, particularly as they continue to grow in size and influence over the years. The growth of these companies indicates that the selected studies were accurately chosen to study emerging authorities in the education sector, and that the identified practices are reliable to understand the power of brokers, and how they are currently shaping the way edtech is procured, adopted, and used in schools.

Another identified organization, however, does not operate anymore because of funding reasons that were addressed during the interviews. Given the multi-sector funding sources of this brokers, following the development and eventual ending of this organization is indicative of the complexity of contemporary policy development and their particular rhythms and times (Tierens et al., 2024). More precisely, it is an important example of how policies and agendas in education, particularly in regard to the implementation of digital technologies, can be short-lived despite being heavily advertised and funded (e.g., Ames, 2019). Studying such cases offers a cautionary tale about the technology-driven developments in education, nuancing and situating hype-oriented discourses within a more realistic frame to understand their power but also their limitations (Komljenovic et al., 2023).

Regardless of the different trajectories of the case studies, it is important to clarify that the goal of this study was never to provide an all-encompassing, universal picture of edtech brokers and brokerage. This study provided an international picture of edtech brokerage and acknowledged their international dimensions which are worth studying in more detail for future research. However, and as it should be clear by now, striving for universality would go against the very foundations of this project. Indeed, my goal was not to produce true statements that can be generalized to all settings but rather to develop descriptive, context-relevant statements (Guba, 1981). Consequently, the validity of this study was constructed according to criteria such as attending to the complexities that exist in edtech broker organizations and schools, an authentic rendering of the context in which brokerage takes place, or a detailed description of how brokers operate according to the testimony of participants (Ravitch & Carl, 2021).

Still, and beyond any possible legitimation of the decisions taken during this research process, one important limitation of the study was the extent to which I could (not) collaborate and work together with edtech brokers to build together forms of knowledge that can integrate and synthesize the expertise of both the participants and the researcher towards new avenues of

using digital technologies in schools. For future work, I would like to explore the potential of not only conducting critical research on relevant actors for education policy and practice -like edtech brokers-, but also to re-imagine and actively design educational experiences around digital technologies in ways that learners and educators are placed at the center of importance, while the different social, political and economic dimensions of edtech are critically explored. Put in another way, if my research design supported by the IUDE toolbox aimed to explore dimensions of edtech brokerage such as: Interface, User, Design, and Ecology (see page 25), exploring what happens *with*, *on, behind and beyond,* the platforms and technologies that brokers promote, I would like in the future to have the opportunity to explore what happens with these technologies when experiences around them are designed *along*, or *together with* the subjects of my research.

This is for me the natural step of critical research, namely one that can maintain the criticality and can, at the same time, commit in a caring way with the educational practices that are being explored, proposing new possibilities and futures for them. This turn towards design has been present in the work of many critical edtech scholars. Some of the guiding values for such academic undertakings include (re)designing and using edtech with a view to ameliorating technology's long-term inequitable planetary impact' (Macgilchrist, 2021), or the recognition that educational technologies must not exacerbate existing inequalities or contribute to ecological harm or injustice (Decuypere et al., 2025). Ruiz, Rovincer, and Gallagher (2025) go even further, emphasizing the need to expand our objects of enquiry outside the so called first world, inviting us to explore the educational realities of the majority world, and to materialize, through inventive design, forms of digital imagination that can counter extractivist and neoliberal social dynamics that often impact educational practices.

As said before in the recounting of how my case studies evolved throughout the years, the empirical contributions of this thesis can lose descriptive power as edtech brokerage continues to advance (or as edtech implementation in schools continues to advance independently from brokers). Still, it is admittedly my hope that the findings of this study could be applicable, or transferable, to broader contexts while still maintaining their context-specific richness. That is, that the reader can make sense of their own context through the proposed description and analysis of this project. This is something that only time will tell and that each reader can assess by themselves.

Discussions:

Before finishing, I will connect the findings of this dissertation with three topics that are of interest for different types of educational researchers: the digital governance of education, the goals and purposes of teaching, and the affective forces operating in the promotion of digitalization of education. While my work on edtech brokers does not address directly either of these three topics, they are chosen specifically to highlight the power that educational intermediaries such as brokers can have to influence different levels of education policy and practice, given their situatedness between actors and their power to synchronize different agendas, processes and objectives into shared goals.

Digital governance of education and how policy moves

Questions of educational governance include how decisions are made, how power is distributed, and how accountability is ensured within education systems (Elfert & Ydesen, 2023). Following Williamson (2016), these questions need to be increasingly understood as questions of *digital* governance of education, as digital software technologies, data systems and the code algorithms that enact them continue to be a powerful influence in the way education is managed, imagined, and executed (Williamson, 2016, p. 4). Different studies in the past years have attended the call to understand issues of education governance in these terms, expanding their reach into new actors and spaces. This includes studying the role of private technology providers (Cone & Lai, 2024; Jobér, 2024), consultants (Joecks, 2024), shadow professionals (Lewis & Hartong, 2022), investors (Komljenovic et al., 2023; Williamson & Komljenovic, 2023), or philanthropies (Miglani & Burch, 2021; Roberts-Mahoney et al., 2016). This equally includes an interest in studying emerging spaces where governance happens beyond traditional sites of decision making including trade shows, edtech fairs (Decuypere et al., 2024; Gulson & Witzenberger, 2022; Player-Koro et al., 2022), or hackathons (Förschler & Decuypere, 2024). Because of the increasing number of actors, roles, and spaces of governance in digital education, Hartong has suggested the gradual emergence of what she describes as ‘governance by intermediarization’, that is, a process in which more and more actors that conceive themselves as intermediaries play an important role in the digital transformation of education (Hartong, 2024)

These studies make clear, as I tried to emphasize throughout this dissertation, that the landscape of (digital) education governance is better understood as something networked, where power is distributed and re-distributed beyond hierarchical structures and across different actors that are often overlooked. In that sense, the present study on edtech brokers does not only help to

confirm the existence of such an intricate network, and to get a more realistic depiction of how it is assembled, but to better understand how that network is composed, and how exactly the power is re-distributed when taking edtech brokers into account. Because actors do not operate independently within this network, and they work relationally toward certain strategic ends (Savage, 2020), having a better understanding of how brokers work and operate can be conducive to understanding how other actors in the edtech landscape (like the aforementioned) play their distinctive part in governing education.

Relatedly, the findings of this dissertation can also enter into productive dialogue with policy mobility research, or research concerned with how policy initiatives and plans 'move' across this network of actors. This includes studying how policy moves across countries and regions, creating new spatial and temporal arrangements that update and call into question the primacy of nation-states or other 'topographical' notions as independent decision makers in education policy (Decuypere & Lewis, 2023).As Peck and Theodore have argued, policy making has increasingly been 'debordered' (p. xv), or detached from their local dimensions. For instance, they empirically show how notions of 'best practice' travel to other geographical locations beyond the place where these practice originated or were evaluated. This happens because of an increased global connectivity at policy levels, suggesting that the network of digital governance -in this case in relation to education- is not only more densely populated by new actors, but that it has expanded its reach.

I have insisted throughout this dissertation that one of the main characteristics of edtech brokers are their local *and* global dimensions. They have 'a foot in both grounds' situating themselves as connective nodes between global imaginaries of reform and local school practices. Having a better understanding of brokers is then useful to understand how plans for educational reform beyond local context move through them and how these plans are translated by their emerging expertise. The contributions of this thesis, then, can help explore policies around digitalization not as fixed objects, but as complex and evolving social constructions that are increasingly reshaped by the emerging power of these 'glocal' authorities like edtech brokers.

Goals and purposes of teaching in a digital age

Besides issues of governance, the findings of this dissertation can illuminate debates on the goals and purposes of teaching and how they are changing (improving or worsening, depending on the ideological inclination) with and through digital technologies. A well-established tradition of educational researchers have elaborated on the insight that, when teachers teach,

they bring to the fore their ideological, intellectual and epistemological stances, opening up intimate and personal dimensions of their selves when relating with students (Evans, 2002). Because of this vulnerability and particularity of the job of the teacher (and the stark contrast between teacher professionality and more instrumental or detached forms of professional work), different scholars have stressed the distinct ethical and political dimensions of teaching (e.g., Biesta, 2009; Kelchtermans, 2009; Masschelein & Simons, 2019). As a paradigmatic case, Hannah Arendt makes a plea to regain the authority of the teacher as a knowledgeable professional, to ensure that they can introduce the world and its value to the new generations in ways that are truly transformative and emancipatory. When she famously claims that 'education is the point at which we decide whether we love the world enough to assume responsibility for it' (p. 13), it is important to remember that, for her, this responsibility takes the form of authority, and this authority is primarily exerted by the teacher.

It is not uncommon that, in a similar way to Arendt, scholars warn about the dangers of focusing excessively on measurement and comparison of educational outcomes (G. Biesta, 2009), as this vision of education– and teaching – can easily be coopted by social, economic, or political agendas that do not necessarily look out to conserve the transformative power of schools (Masschelein & Simons, 2015). The ongoing digital transformation of education has brought into a new light these potential threats, and has created the conditions for a conflictual interplay between professionalization and de-professionalization of teaching (Hartong & Decuypere, 2023). Questions like this, of a more normative inclination (i.e., what teaching *should* be), can be explored better when considering the actors such as brokers that, right now, have an important say in defining the goals and purposes of teaching, and are actively training teachers for the present and future of their practice. As shown in this dissertation, brokers provide the material conditions to ensure the possibility of constant professional update and profile themselves as emerging authorities in guiding the transformation of the teaching practice as digital technologies become more pervasive in daily practices. In that sense, for those interested in studying the goals and purposes of teaching, studying brokers would equate to study an interlocutor that is *de facto* deciding, to a certain extent, what teaching is and should be.

Affective forces in digital education

One of the most impactful empirical findings of this dissertation is related to the emotional and affective components of brokers' practices. Their work is not only technical, but is, perhaps as importantly, motivational. Brokers advance edtech not only through evidence of what works or

more ‘technical’ arguments, but through different routines, technologies, discourses, images and sounds that are assembled to create emotional dispositions from the side of teachers and schools. Examples like their coaching sessions or their advertisement videos make it clear that their practices do not only appeal to the more ‘rational’ selves of teachers and schools, but that are designed to emotionally move them towards goals conceived as desirable, or steer them away from paths that are considered undesirable, outdated or dangerous. Indeed, brokers create an affective atmosphere designed to make teachers and schools *want* to change.

Placing emphasis on how emotional dispositions operate, affect theory researchers strive to capture the social, technical and discursive elements that shape bodies to action through affective work. They ask, for instance, how emotions work to align some subjects together with others or against others in political projects or social goals (Ahmed, 2004). This strand of research conceive affect as a powerful political force, and a key contribution that has been developed over the years is challenging the assumption that emotions are a private matter. On the contrary, affect theory researchers show how emotions are rather reciprocal and relational, determined by forces that precede the personal and subjective experience (Anderson, 2009; Berlant & Greenwald, 2012). Emotions are political because how we feel is determined by external forces than in turn shape how we act in the subjective and social world.

Insights from affect theory have already been used in educational research, specifically studying questions related to digital technologies. Finn (2016) studied how school ‘datascapes’ or data visualizations create and maintain a sense of progress that is strategically aligned with specific disciplinary regimes and render anyone not affiliated with this project as subject to intervention. Robinson & Leander (2025) explored how edtech platforms mediate affective dimensions of teacher-family communications, algorithmically producing a humanoid script that sets the tone of the conversations between parents and schools, selectively filtering which emotions are deemed appropriate for professional communication and which are not. These studies explore an essential aspect of digitalization, namely, how different instances of edtech make the user feel, and how such feelings precede and make possible certain actions and concrete realities.

As was shown in this dissertation, edtech is sold, promoted, and adopted by schools in contexts where disagreement and conflict are present, rather than being passively accepted as neutral tools for deployment. In the midst of these debates, it is important to study, not only the efficacy of edtech, their pedagogical value, or their business models, but the emotive allure they have and how it influences the professional lives of teachers or the societal imaginaries that are channeled through in schools. The future for education that is affectively promoted in regard to

edtech adoption defines and limits in important ways what schools are and what their role in society could be. A better understanding of the affective forces of edtech is thus an important step to better understand the potential and risks of such a promoted future.

Closing remarks

Issues around the digital governance of education, the goals and purposes of teaching in a digital age, and the affective forces in digital education, are indicative of how the emerging expertise of edtech brokers has the potential to keep on transforming, or at least influencing, different aspects of education policy and practice. They are equally indicative of how questions and points of concern for educationalists and educational researchers should be increasingly posed in terms of their digitality.

This dissertation started with the hope of exploring such fundamental questions and 'updating' them to a historical moment marked by the influence of digital technologies. After the process of studying the practices and influence of edtech brokers, this dissertation ends with the hope that the findings here achieved can contribute to a better understanding of the landscape of digital education. Such understanding can contribute, in turn, to the project of collectively articulating how schools keep on changing form amidst digitalization, and to take care of them as a public good that face new potentialities and points of concern brought forward by digital technologies.

References

Ahmed, S. (2004). Affective Economies. *Social Text*, *22*(2), 117–139. https://doi.org/10.1215/01642472-22-2_79-117

Alirezabeigi, S., & Decuypere, M. (2025). Evaluating datafied time: exploring the multiple temporalities of teachers' work with digital assessment. *Critical Studies in Education*, *66*(2), 197–212. https://doi.org/10.1080/17508487.2025.2451886

Alirezabeigi, S., Masschelein, J., & Decuypere, M. (2020a). Investigating digital doings through breakdowns: a sociomaterial ethnography of a Bring Your Own Device school. *Learning, Media and Technology*, *45*(2), 193–207. https://doi.org/10.1080/17439884.2020.1727501

Alirezabeigi, S., Masschelein, J., & Decuypere, M. (2020b). The agencement of taskification: On new forms of reading and writing in BYOD schools. *Educational Philosophy and Theory*, *52*(14), 1514–1525. https://doi.org/10.1080/00131857.2020.1716335

Ames, M. G. (2019). *The Charisma Machine*. The MIT Press. https://doi.org/10.7551/mitpress/10868.001.0001

Anderson, B. (2009). Affective atmospheres. *Emotion, Space and Society*, *2*(2), 77–81. https://doi.org/10.1016/j.emospa.2009.08.005

Arantes, J. (2023). Educational data brokers: using the walkthrough method to identify data brokering by edtech platforms. *Learning, Media and Technology*, 1–14. https://doi.org/10.1080/17439884.2022.2160986

Arantes, J., & Buchanan, R. (2023). Educational data advocates: emerging forms of teacher agency in postdigital classrooms. *Learning, Media and Technology*, *48*(3), 493–513. https://doi.org/10.1080/17439884.2022.2087084

Ball, S. J. (2003). The teacher's soul and the terrors of performativity. *Journal of Education Policy*, *18*(2), 215–228. https://doi.org/10.1080/0268093022000043065

Ball, S. J. (2008). New Philanthropy, New Networks and New Governance in Education. *Political Studies*, *56*(4), 747–765. https://doi.org/10.1111/j.1467-9248.2008.00722.x

Ball, S. J. (2012). *Global education inc. : new policy networks and the neo-liberal imaginary* (Routledge, Ed.). Routledge.

Ball, S. J., & Junemann, C. (2012). *Networks, New Governance and Education*. Bristol University Press. https://doi.org/10.46692/9781847429810

Ball, S. J., Maguire, M., & Braun, A. (2011). *How Schools Do Policy*. Routledge. https://doi.org/10.4324/9780203153185

Ball, S. J., & Thawer, S. (2018). Nodes, Pipelines, and Policy Mobility. In *The Wiley Handbook of Global Educational Reform* (pp. 71–86). John Wiley & Sons, Ltd. https://doi.org/https://doi.org/10.1002/9781119082316.ch4

Bandola-Gill, J., Grek, S., & Tichenor, M. (2022). Governing the Sustainable Development Goals Quantification in Global Public Policy Connecting the Goals Sustainable Development

Goals Series. In *Governing the Sustainable Development Goals. Quantification in Global Public Policy* (pp. 133–147). https://link.springer.com/bookseries/15486

Baroutsis, A., & Lingard, B. (2022). A methodological approach to the analysis of PISA microblogs: social media during the release of the PISA 2015 results. *Journal of Education Policy*, *37*(6), 904–924. https://doi.org/10.1080/02680939.2021.1937706

Bergviken Rensfeldt, A., & Player-Koro, C. (2024). *Platformized Teacher Work – Obstacles and Diffractions in Assessment Work Practices* (pp. 39–58). https://doi.org/10.1007/978-3-031-58622-4_3

Berlant, L., & Greenwald, J. (2012). Affect in the End Times. *Qui Parle*, *20*(2), 71–89. https://doi.org/10.5250/quiparle.20.2.0071

Biesta, G. (2007). Why "what works" won't work: Evidence-based practice and the democratic deficit in educational research. *Educational Theory*, *57*(1), 1–22. https://doi.org/10.1111/j.1741-5446.2006.00241.x

Biesta, G. (2009). Good education in an age of measurement: on the need to reconnect with the question of purpose in education. *Educational Assessment, Evaluation and Accountability(Formerly: Journal of Personnel Evaluation in Education)*, *21*(1), 33–46. https://doi.org/10.1007/s11092-008-9064-9

Biesta, G. J. J. (2010). Why 'What Works' Still Won't Work: From Evidence-Based Education to Value-Based Education. *Studies in Philosophy and Education*, *29*(5), 491–503. https://doi.org/10.1007/s11217-010-9191-x

Bloom-Christen, A., & Grunow, H. (2022). What's (in) a Vignette? History, Functions, and Development of an Elusive Ethnographic Sub-genre. *Ethnos*, 1–19. https://doi.org/10.1080/00141844.2022.2052927

Brändle, L., Berger, E. S. C., & Howard, M. D. (2024). Crossing Technological Boundaries: Brokerage and the Emergence of Innovation Networks. *Academy of Management Journal*. https://doi.org/10.5465/amj.2023.0439

Braun, A., Maguire, M., & Ball, S. J. (2010). Policy enactments in the UK secondary school: examining policy, practice and school positioning. *Journal of Education Policy*, *25*(4), 547–560. https://doi.org/10.1080/02680931003698544

Brown, C. (2019). What is the research brokerage role that can be played by social relationships? In *The Role of Knowledge Brokers in Education* (pp. 108–122). Routledge. https://doi.org/10.4324/9780429462436-8

Caves, K., & Oswald-Egg, M. E. (2023). The networked role of intermediaries in education governance and public-private partnership. *Journal of Education Policy*, 1–24. https://doi.org/10.1080/02680939.2023.2190166

Centre, E. C. J. R., Redecker, C., & Punie, Y. (2017). *European framework for the digital competence of educators – DigCompEdu* (Y. Punie, Ed.). Publications Office. https://doi.org/doi/10.2760/159770

Cobo, C., & Rivas, A. (2023). *The New Digital Education Policy Landscape*. Routledge. https://doi.org/10.4324/9781003373018

Cohen, D. (2024). Any Time, Any Place, Any Way, Any Pace: Markets, EdTech, and the spaces of schooling. *Environment and Planning A: Economy and Space*, *56*(1), 270–287. https://doi.org/10.1177/0308518X221084708

Cone, L., & Lai, S. S. (2024). Infrastructural dependency in the datafied welfare state: the case of Google Chromebooks. *Learning, Media and Technology*, 1–17. https://doi.org/10.1080/17439884.2024.2437680

Costa, C., Bhatia, P., Murphy, M., & Pereira, A. L. (2023). Digital Education Colonized by Design: Curriculum Reimagined. *Education Sciences*, *13*(9), 895. https://doi.org/10.3390/educsci13090895

Cuban, L. (1986). *Teachers and machines : the classroom use of technology since 1920*. New York (N.Y.) : Columbia university. Teachers college press. http://lib.ugent.be/catalog/rug01:000137478

Danaher, J. (2022). Techno-optimism: an Analysis, an Evaluation and a Modest Defence. *Philosophy & Technology*, *35*(2), 54. https://doi.org/10.1007/s13347-022-00550-2

Day, E., Pothong, K., Atabey, A., & Livingstone, S. (2022). Who controls children's education data? A socio-legal analysis of the UK governance regimes for schools and EdTech. *Learning, Media and Technology*, 1–15. https://doi.org/10.1080/17439884.2022.2152838

DeBray, E., Scott, J., Lubienski, C., & Jabbar, H. (2014). Intermediary Organizations in Charter School Policy Coalitions. *Educational Policy*, *28*(2), 175–206. https://doi.org/10.1177/0895904813514132

Decuypere, M. (2019). Researching educational apps: ecologies, technologies, subjectivities and learning regimes. *Learning, Media and Technology*, *44*(4), 414–429. https://doi.org/10.1080/17439884.2019.1667824

Decuypere, M. (2021). The Topologies of Data Practices: A Methodological Introduction. *Journal of New Approaches in Educational Research*, *10*(1), 67–84. https://doi.org/10.7821/NAER.2021.1.650

Decuypere, M., Grimaldi, E., & Landri, P. (2021). Introduction: Critical studies of digital education platforms. In *Critical Studies in Education* (Vol. 62, Issue 1, pp. 1–16). Routledge. https://doi.org/10.1080/17508487.2020.1866050

Decuypere, M., Hartong, S., Brandau, N., Joecks, L., Loft-Akhoondi, A., Ortegón, C., Tierens, T., & Vanermen, L. (2024). Maneuvering constellations of valuation: a critical investigation of the edtech startup sector. *Critical Studies in Education*, 1–20. https://doi.org/10.1080/17508487.2024.2362196

Decuypere, M., Hartong, S., Joecks, L., Knox, J., Ortegón, C., Schmidt, R., & Williamson, B. (2025). *Critical Edtech Studies. Defining the field; envisioning the future. 2025 Position statement after the inaugural edition of the European Conference on Critical Edtech Studies (ECCES)*.

Decuypere, M., Hartong, S., & van de Oudeweetering, K. (2022). Introduction Space- and time-making in education: Towards a topological lens. *European Educational Research Journal*. https://doi.org/10.1177/14749041221076306

Decuypere, M., & Landri, P. (2021). Governing by visual shapes: university rankings, digital education platforms and cosmologies of higher education. *Critical Studies in Education*, *62*(1), 17–33. https://doi.org/10.1080/17508487.2020.1720760

Decuypere, M., & Lewis, S. (2023). Topological genealogy: a methodology to research transnational digital governance in/through/as change. *Journal of Education Policy*, *38*(1), 23–45. https://doi.org/10.1080/02680939.2021.1995629

Decuypere, M., & Simons, M. (2016). Relational thinking in education: topology, sociomaterial studies, and figures. *Pedagogy, Culture & Society*, *24*(3), 371–386. https://doi.org/10.1080/14681366.2016.1166150

Decuypere, M., & Simons, M. (2020). Pasts and futures that keep the possible alive: Reflections on time, space, education and governing. *Educational Philosophy and Theory*, *52*(6), 640–652. https://doi.org/10.1080/00131857.2019.1708327

DfE. (2022). *Future opportunities for education technology in England*.

do Amaral, M. P. (2022). *Comparative Case Studies: Methodological Discussion* (pp. 41–60). https://doi.org/10.1007/978-3-030-96454-2_3

Dobson, J. (2023). *The Birth of Computer Vision*. University of Minnesota Press.

Edtech Evidence Exchange. (2021). *The Edtech Genome Project Report*.

Elfert, M., & Ydesen, C. (2023). *Global Governance of Education* (Vol. 24). Springer International Publishing. https://doi.org/10.1007/978-3-031-40411-5

European Comission. (2020). *Digital Education Action Plan 2021-2027*. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0624#document1

European Edtech Alliance (2025). *Banning digital devices in schools: A step backwards for education?* https://www.edtecheurope.org/news/banning-digital-devices-in-schools-a-step-backward-for-education

Evans, L. (2002). *Reflective practice in educational research: Developing advanced skills*. Continuum.

Facer, K., & Selwyn, N. (2021). *Digital Technology and the Futures of Education: Towards 'Non-Stupid' Optimism*.

Fassbender, W. J. (2025). Of teachers and centaurs: Exploring the interactions and intra-actions of educators on AI education platforms. *Learning, Media and Technology*, 1–13. https://doi.org/10.1080/17439884.2024.2447946

Fenwick, T., & Edwards, R. (2010). *Actor-Network Theory in Education*. Routledge. https://doi.org/10.4324/9780203849088

Fenwick, T., & Edwards, R. (2011). Introduction: Reclaiming and Renewing Actor Network Theory for Educational Research. *Educational Philosophy and Theory*, *43*(sup1), 1–14. https://doi.org/10.1111/j.1469-5812.2010.00667.x

Ferrante, P., Williams, F., Büchner, F., Kiesewetter, S., Chitsauko Muyambi, G., Uleanya, C., & Utterberg Modén, M. (2023). In/equalities in digital education policy – sociotechnical

imaginaries from three world regions. *Learning, Media and Technology*, 1–11. https://doi.org/10.1080/17439884.2023.2237870

Ferreira, G. M. dos S., & Lemgruber, M. S. (2019). Great expectations: a critical perspective on Open Educational Resources in Brazil. *Learning, Media and Technology*, *44*(3), 315–326. https://doi.org/10.1080/17439884.2019.1639190

Finn, M. (2016). Atmospheres of progress in a data-based school. *Cultural Geographies*, *23*(1), 29–49. https://doi.org/10.1177/1474474015575473

Flury, C., & Geiss, M. (2023). Computers in Europe's Classrooms: An Introduction. In *How Computers Entered the Classroom, 1960–2000* (pp. 1–12). De Gruyter. https://doi.org/10.1515/9783110780147-001

Forsa, B. (2022). *Teachers Are Burnt Out: Technology Can Help*.

Förschler, A., & Decuypere, M. (2024). Where are we heading? Hackathons as a new, relational form of policymaking. *Journal of Education Policy*, *39*(4), 519–540. https://doi.org/10.1080/02680939.2024.2313199

Forsman, M., Forsler, I., Opermann, S., Bardone, E., & Pedaste, M. (2024). Future classrooms and ed-tech imaginaries. Notes from the Estonian pavilion at EXPO 2020 and beyond. *Learning, Media and Technology*, *49*(1), 133–146. https://doi.org/10.1080/17439884.2023.2237875

Freeman, R. (2009). What is 'translation'? *Evidence & Policy*, *5*(4), 429–447. https://doi.org/10.1332/174426409X478770

Frelin, A. (2013). Teacher Professionality. In *Exploring Relational Professionalism in Schools* (pp. 5–13). SensePublishers. https://doi.org/10.1007/978-94-6209-248-8_2

Gagnon, S., Mailhot, C., & Ziam, S. (2019). The role and contribution of an intermediary organisation in the implementation of an interactive knowledge transfer model. *Evidence & Policy*, *15*(1), 07–29. https://doi.org/10.1332/174426418X15166967955544

Gallagher, M., & Knox, J. (2019). Global technologies, local practices. *Learning, Media and Technology*, *44*(3), 225–234. https://doi.org/10.1080/17439884.2019.1640741

Garcia, P., Fernández, C., & Okonkwo, H. (2020). Leveraging technology: how Black girls enact critical digital literacies for social change. *Learning, Media and Technology*, *45*(4), 345–362. https://doi.org/10.1080/17439884.2020.1773851

Geiss, M., & Röhl, T. (2024). Working at the frontier: Swiss educational information and communication technology coordinators as mediators and intermediaries of the digital transformation. *Research in Education*, *120*(1), 72–90. https://doi.org/10.1177/00345237241242989

Gerhold, L., & Brandes, E. (2021). Sociotechnical imaginaries of a secure future. *European Journal of Futures Research*, *9*(1), 7. https://doi.org/10.1186/s40309-021-00176-1

Gerrard, J., Savage, G. C., & O'Connor, K. (2017). Searching for the public: school funding and shifting meanings of 'the public' in Australian education. *Journal of Education Policy*, *32*(4), 503–519. https://doi.org/10.1080/02680939.2016.1274787

Glasgow, R. E., & Emmons, K. M. (2007). How Can We Increase Translation of Research into Practice? Types of Evidence Needed. *Annual Review of Public Health*, *28*(1), 413–433. https://doi.org/10.1146/annurev.publhealth.28.021406.144145

Gorur, R. (2014). Towards a Sociology of Measurement in Education Policy. *European Educational Research Journal*, *13*(1), 58–72. https://doi.org/10.2304/eerj.2014.13.1.58

Gorur, R. (2016). Seeing like PISA: A cautionary tale about the performativity of international assessments. *European Educational Research Journal*, *15*(5), 598–616. https://doi.org/10.1177/1474904116658299

Gorur, R., & Dey, J. (2021). Making the user friendly: the ontological politics of digital data platforms. *Critical Studies in Education*, *62*(1), 67–81. https://doi.org/10.1080/17508487.2020.1727544

Gould, R. V, Fernandez, R. M., & Fernandezt, R. M. (1989). Structures of Mediation: A Formal Approach to Brokerage in Transaction Networks. In *Source: Sociological Methodology* (Vol. 19).

Granja, R. (2021). As Implicações Invisibilizadas do Tecno-Otimismo da Vigilância Eletrónica em Portugal. *Comunicação e Sociedade*, *40*, 247–267. https://doi.org/10.17231/comsoc.40(2021).3503

Granovetter, M. (1995). *Getting a Job*. University of Chicago Press. https://doi.org/10.7208/chicago/9780226518404.001.0001

Grant, L. (2024). Data infrastructuring in schools: New forms of professional edu-data expertise and agency. *Research in Education*, *120*(1), 54–71. https://doi.org/10.1177/00345237241257177

Grek, S. (2009). Governing by numbers: the PISA 'effect' in Europe. *Journal of Education Policy*, *24*(1), 23–37. https://doi.org/10.1080/02680930802412669

Grek, S. (2024). *The New Production of Expert Knowledge*. Springer International Publishing. https://doi.org/10.1007/978-3-031-46606-9

Grek, S., Lawn, M., Lingard, B., Ozga, J., Rinne, R., Segerholm, C., & Simola, H. (2009). National policy brokering and the construction of the European Education Space in England, Sweden, Finland and Scotland. *Comparative Education*, *45*(1), 5–21. https://doi.org/10.1080/03050060802661378

Grohmann, R. (2022). Beyond platform cooperativism. *Interactions*, *29*(4), 87–89. https://doi.org/10.1145/3540251

Guba, E. G. (1981). Criteria for assessing the trustworthiness of naturalistic inquiries. *ECTJ*, *29*(2), 75. https://doi.org/10.1007/BF02766777

Gulson, K. N., & Sellar, S. (2019). Emerging data infrastructures and the new topologies of education policy. *Environment and Planning D: Society and Space*, *37*(2), 350–366. https://doi.org/10.1177/0263775818813144

Gulson, K. N., & Witzenberger, K. (2022). Repackaging authority: artificial intelligence, automated governance and education trade shows. *Journal of Education Policy*, *37*(1), 145–160. https://doi.org/10.1080/02680939.2020.1785552

Hall, J. B., Møller, J., & Rönnberg, L. (2024). (Re)configurations of public education: marketisation, teacher professionalism, and individual rights of students and educators in Norway and Sweden. *Critical Studies in Education*, 1–19. https://doi.org/10.1080/17508487.2024.2420340

Hall, R. (2015). For a political economy of massive open online courses. *Learning, Media and Technology*, *40*(3), 265–286. https://doi.org/10.1080/17439884.2015.1015545

Hartong, S. (2016). Between assessments, digital technologies and big data: The growing influence of 'hidden' data mediators in education. *European Educational Research Journal*, *15*(5), 523–536. https://doi.org/10.1177/1474904116648966

Hartong, S. (2024). Governance by intermediarization. Insights into the digital infrastructuring of education in Estonia. *Research in Education*, *120*(1), 91–109. https://doi.org/10.1177/00345237241234613

Hartong, S., & Decuypere, M. (2023). Platformed professional(itie)s and the ongoing digital transformation of education. *Tertium Comparationis*, *29*(1).

Hartong, S., & Förschler, A. (2019). Opening the black box of data-based school monitoring: Data infrastructures, flows and practices in state education agencies. *Big Data & Society*, *6*(1). https://doi.org/10.1177/2053951719853311

Hartong, S., Geiss, M., & Röhl, T. (2024). Intermediaries and the digital transformation of schooling: An introduction. *Research in Education*. https://doi.org/10.1177/00345237241258700

Hartong, S., & Manolev, J. (2023). The construction of (good) parents (as professionals) in/through learning platforms. *Tertium Comparationis*, *29*(1), 93–116. https://doi.org/10.31244/tc.2023.01.05

Hartong, S., & Nikolai, R. (2017). Observing the "Local Globalness" of Policy Transfer in Education. *Comparative Education Review*, *61*(3), 519–537. https://doi.org/10.1086/692503

Helgetun, J. B., & Decuypere, M. (2024). One thing can be more than one thing: a comparative study of the teacher professionalization app 'TeacherTapp.' *Learning, Media and Technology*, *49*(4), 563–578. https://doi.org/10.1080/17439884.2023.2226876

Hillman, V. (2022). *Edtech procurement matters: It needs a coherent solution, clear governance and market standards*.

Hills, C. (2025). *Analogue automation: exploring data epistemologies in school* [University of Edinburgh]. https://doi.org/http://dx.doi.org/10.7488/era/5705

Hogan, A. (2025). *Commercialising Public Schooling*. Routledge. https://doi.org/10.4324/9781003213093

Hogan, A., & Thompson, G. (2020). *Privatisation and Commercialisation in Public Education* (A. Hogan & G. Thompson, Eds.). Routledge. https://doi.org/10.4324/9780429330025

HolonIQ. (2021). *2021 Global Education Outlook*.

HolonIQ. (2023). *EdTech VC down 80% on Q1 2022 and 83% on record high 2021. $1.1B of Venture Capital for Q1 2023*.

HolonIQ. (2025). *The size and shape of the Global Education Market*

Hughes, S. (2024). Hearts and minds: The technopolitical role of affect in sociotechnical imaginaries. *Social Studies of Science*. https://doi.org/10.1177/03063127241257489

Ideland, M. (2021). Google and the end of the teacher? How a figuration of the teacher is produced through an ed-tech discourse. *Learning, Media and Technology*, *46*(1), 33–46. https://doi.org/10.1080/17439884.2020.1809452

Ingraham, C. (2023). To Affect Theory. *Capacious: Journal of Emerging Affect Inquiry*. https://doi.org/10.22387/CAP2022.76

Jandrić, P., Knox, J., Besley, T., Ryberg, T., Suoranta, J., & Hayes, S. (2018). Postdigital science and education. *Educational Philosophy and Theory*, *50*(10), 893–899. https://doi.org/10.1080/00131857.2018.1454000

Jarke, J., & Macgilchrist, F. (2021). Dashboard stories: How narratives told by predictive analytics reconfigure roles, risk and sociality in education. *Big Data & Society*, *8*(1), 20539517211025560. https://doi.org/10.1177/20539517211025561

Jasanoff, S. (2015). One. Future Imperfect: Science, Technology, and the Imaginations of Modernity. In S. Jasanoff & S.-H. Kim (Eds.), *Sociotechnical Imaginaries and the Fabrication of Power* (pp. 1–33). University of Chicago Press. https://doi.org/doi:10.7208/9780226276663-001

Jasanoff, S., & Kim, S.-H. (2015). *Dreamscapes of modernity: sociotechnical imaginaries and the fabrication of power*. The University of Chicago Press.

Jasanoff, S., Markle, G., Peterson, J., & Pinch, T. (1995). *Handbook of Science and Technology Studies*. SAGE Publications, Inc. https://doi.org/10.4135/9781412990127

Jobér, A. (2024). Private actors in policy processes. entrepreneurs, edupreneurs and policyneurs. *Journal of Education Policy*, *39*(1), 20–39. https://doi.org/10.1080/02680939.2023.2166128

Joecks, L. (2024). Exploring the intermediary role of ed-tech consulting in Germany: In-between policy, pedagogy, and economics. *Research in Education*. https://doi.org/10.1177/00345237241242993

Kelchtermans, G. (2009). Who I am in how I teach is the message: self-understanding, vulnerability and reflection. *Teachers and Teaching*, *15*(2), 257–272. https://doi.org/10.1080/13540600902875332

Kelly, T. (2025). How platformised data collection practices in state primary schools in England mediate the parent–child relationship. *Learning, Media and Technology*, 1–16. https://doi.org/10.1080/17439884.2025.2505554

Kerssens, N. (2024). (Micro)soft power in Dutch public education: making classrooms platform-ready through partner work. *Critical Studies in Education*, 1–20. https://doi.org/10.1080/17508487.2024.2428808

Kerssens, N., Nichols, T. P., & Pangrazio, L. (2023). Googlization(s) of education: intermediary work brokering platform dependence in three national school systems. *Learning, Media and Technology*, 1–14. https://doi.org/10.1080/17439884.2023.2258339

Kerssens, N., & van Dijck, J. van. (2021). The platformization of primary education in The Netherlands. *Learning, Media and Technology*, *46*(3), 250–263. https://doi.org/10.1080/17439884.2021.1876725

Knox, J. (2021). Refocusing Zuboff's 'division of learning' on Education. *Seminar.Net*, *17*(2). https://doi.org/10.7577/seminar.4268

Knox, J., Williamson, B., & Bayne, S. (2020). Machine behaviourism: future visions of 'learnification' and 'datafication' across humans and digital technologies. *Learning, Media and Technology*, *45*(1), 31–45. https://doi.org/10.1080/17439884.2019.1623251

Komljenovic, J. (2021). The rise of education rentiers: digital platforms, digital data and rents. *Learning, Media and Technology*, *46*(3), 320–332. https://doi.org/10.1080/17439884.2021.1891422

Komljenovic, J., Williamson, B., Eynon, R., & Davies, H. C. (2023). When public policy 'fails' and venture capital 'saves' education: Edtech investors as economic and political actors. *Globalisation, Societies and Education*, 1–16. https://doi.org/10.1080/14767724.2023.2272134

Kucirkova, N. (2024). *Elevating EdTech Investment: Prioritizing Evidence-Based Practices forLasting Impact, .*

Kucirkova, N. I. (2024). 'Educational' apps are worth billions. We need to make sure they work. *Nature*, *634*(8036), 1020–1020. https://doi.org/10.1038/d41586-024-03471-6

Kure, A. E., Blikstad-Balas, M., & Brevik, L. M. (2025). Digital ambitions vs. classroom reality in Norwegian lower secondary schools: What digital competencies are students developing over time? *Teaching and Teacher Education*, *153*, 104843. https://doi.org/10.1016/j.tate.2024.104843

Latour, B. (1994). On technical mediation. *Common Knowledge*, *3*(2).

Latour, B. (1996). *Aramis, or The Love of Technology*. Harvard University Press.

Latour, B. (2000). When things strike back: a possible contribution of 'science studies' to the social sciences. *The British Journal of Sociology*, *51*(1), 107–123. https://doi.org/10.1111/j.1468-4446.2000.00107.x

Latour, B. (2007). *Reassembling the social: an introduction to actor-network-theory*. Oxford university press.

Latour, B. (2009). *The Making of Law –An Ethnography of the Conseil d'Etat*. Polity.

Law, J. (1984). On the Methods of Long-Distance Control: Vessels, Navigation and the Portuguese Route to India. *The Sociological Review*, *32*(1_suppl), 234–263. https://doi.org/10.1111/j.1467-954X.1984.tb00114.x

Law, J. (1987). On the Social Explanation of Technical Change: The Case of the Portuguese Maritime Expansion. *Technology and Culture*, *28*(2), 227. https://doi.org/10.2307/3105566

Law, J. (1999). After Ant: Complexity, Naming and Topology. *The Sociological Review*, *47*(1_suppl), 1–14. https://doi.org/10.1111/j.1467-954X.1999.tb03479.x

Law, J. (2008). Actor Network Theory and Material Semiotics. In *The New Blackwell Companion to Social Theory* (pp. 141–158). Wiley. https://doi.org/10.1002/9781444304992.ch7

Law, J., & Singleton, V. (2005). Object Lessons. *Organization*, *12*(3), 331–355. https://doi.org/10.1177/1350508405051270

Lee, S., & Lee, K. (2024). Smart teachers in smart schools in a smart city: teachers as adaptive agents of educational technology reforms. *Learning, Media and Technology*, *49*(3), 456–477. https://doi.org/10.1080/17439884.2023.2207143

Lewis, S. (2017). Governing schooling through 'what works': the OECD's PISA for Schools. *Journal of Education Policy*, *32*(3), 281–302. https://doi.org/10.1080/02680939.2016.1252855

Lewis, S. (2021). The turn towards policy mobilities and the theoretical-methodological implications for policy sociology. *Critical Studies in Education*, *62*(3), 322–337. https://doi.org/10.1080/17508487.2020.1808499

Lewis, S., & Hartong, S. (2022). New shadow professionals and infrastructures around the datafied school: Topological thinking as an analytical device. *European Educational Research Journal*, *21*(6), 946–960. https://doi.org/10.1177/14749041211007496

Lewis, S., & Hogan, A. (2019). Reform first and ask questions later? The implications of (fast) schooling policy and 'silver bullet' solutions. *Critical Studies in Education*, *60*(1), 1–18. https://doi.org/10.1080/17508487.2016.1219961

Lindroos Cermakova, A., & Havinga, B. (2024). *Evidence in EdTech: Who needs it and why?*

Lingard, B. (2013). The impact of research on education policy in an era of evidence-based policy. *Critical Studies in Education*, *54*(2), 113–131. https://doi.org/10.1080/17508487.2013.781515

Lohr, A., Sailer, M., Stadler, M., & Fischer, F. (2024). Digital learning in schools: Which skills do teachers need, and who should bring their own devices? *Teaching and Teacher Education*, *152*, 104788. https://doi.org/10.1016/j.tate.2024.104788

Macgilchrist, F. (2021). What is 'critical' in critical studies of edtech? Three responses. *Learning, Media and Technology*, *46*(3), 243–249. https://doi.org/10.1080/17439884.2021.1958843

MacKillop, E., Quarmby, S., & Downe, J. (2020). Does knowledge brokering facilitate evidence-based policy? A review of existing knowledge and an agenda for future research. *Policy & Politics*, *48*(2), 335–353. https://doi.org/10.1332/030557319X15740848311069

Magni, F. (2024). Teachers' shortage and initial teacher education reforms in Italy: an overview. *European Journal of Teacher Education*, 1–16. https://doi.org/10.1080/02619768.2024.2413677

Maguire, M., Braun, A., & Ball, S. (2015). 'Where you stand depends on where you sit': the social construction of policy enactments in the (English) secondary school. *Discourse: Studies in the Cultural Politics of Education*, *36*(4), 485–499. https://doi.org/10.1080/01596306.2014.977022

Malin, J. R., Brown, C., & Trubceac, A. S. (2018). Going for Broke: A Multiple-Case Study of Brokerage in Education. *AERA Open*, *4*(2). https://doi.org/10.1177/2332858418769297

Malouf, D. B., & Taymans, J. M. (2016). Anatomy of an Evidence Base. *Educational Researcher*, *45*(8), 454–459. https://doi.org/10.3102/0013189X16678417

Manolev, J., Sullivan, A., & Slee, R. (2019). The datafication of discipline: ClassDojo, surveillance and a performative classroom culture. *Learning, Media and Technology*, *44*(1), 36–51. https://doi.org/10.1080/17439884.2018.1558237

Markowitsch, J., & Hefler, G. (2019). *Future Developments in Vocational Education and Training in Europe: Report on reskilling and upskilling through Formal and Vocational Education training*. European Commission.

Masschelein, J., & Simons, M. (2015). Education in times of fast learning: the future of the school. *Ethics and Education*, *10*(1), 84–95. https://doi.org/10.1080/17449642.2014.998027

Masschelein, J., & Simons, M. (2019). Bringing more 'school' into our educational institutions. Reclaiming school as pedagogic form. In *Unterrichtsentwicklung macht Schule* (pp. 11–26). Springer Fachmedien Wiesbaden. https://doi.org/10.1007/978-3-658-20487-7_2

McGarr, O., Mifsud, L., & Colomer Rubio, J. C. (2021). Digital competence in teacher education: comparing national policies in Norway, Ireland and Spain. *Learning, Media and Technology*, *46*(4), 483–497. https://doi.org/10.1080/17439884.2021.1913182

Means, A. J. (2018). Platform learning and on-demand labor: sociotechnical projections on the future of education and work. *Learning, Media and Technology*, *43*(3), 326–338. https://doi.org/10.1080/17439884.2018.1504792

Means, A. J. (2021). Hypermodernity, automated uncertainty, and education policy trajectories. *Critical Studies in Education*, *62*(3), 371–386. https://doi.org/10.1080/17508487.2019.1632912

Mifsud, D. (2023). *Rethinking the Concept of Teacher Education: A Problematization and Critique of Current Policies and Practices* (pp. 1–23). https://doi.org/10.1007/978-3-031-28620-9_1

Miglani, N., & Burch, P. (2021). Education reform imaginaries: mapping - *scapes* of philanthropic influence. *Discourse: Studies in the Cultural Politics of Education*, *42*(5), 682–698. https://doi.org/10.1080/01596306.2020.1836747

Morozov, E. (2013). *To save everything, click here: the folly of technological solutionism*. PublicAffairs.

Mosleh, S. M., Kasasbeha, M. A., Aljawarneh, Y. M., Alrimawi, I., & Saifan, A. R. (2022). The impact of online teaching on stress and burnout of academics during the transition to remote teaching from home. *BMC Medical Education*, *22*(1), 475. https://doi.org/10.1186/s12909-022-03496-3

Müller, M., & Schurr, C. (2016). Assemblage thinking and actor-network theory: conjunctions, disjunctions, cross-fertilisations. *Transactions of the Institute of British Geographers*, *41*(3), 217–229. https://doi.org/10.1111/tran.12117

Murray Li, T. (2007). Practices of assemblage and community forest management. *Economy and Society*, *36*(2), 263–293. https://doi.org/10.1080/03085140701254308

Nachtwey, O., & Seidl, T. (2023). The Solutionist Ethic and the Spirit of Digital Capitalism. *Theory, Culture & Society*. https://doi.org/10.1177/02632764231196829

Narayan, D. (2022). Platform capitalism and cloud infrastructure: Theorizing a hyper-scalable computing regime. *Environment and Planning A: Economy and Space*, *54*(5), 911–929. https://doi.org/10.1177/0308518X221094028

Neal, J. W., Neal, Z. P., & Brutzman, B. (2021). Defining brokers, intermediaries, and boundary spanners: a systematic review. *Evidence & Policy: A Journal of Research, Debate and Practice*. https://doi.org/10.1332/174426420x16083745764324

Neal, J. W., Neal, Z. P., Mills, K. J., Lawlor, J. A., & McAlindon, K. (2019). What types of brokerage bridge the research-practice gap? The case of public school educators. *Social Networks*, *59*, 41–49. https://doi.org/10.1016/j.socnet.2019.05.006

Neal, J. W., Posner, S., & Brutzman, B. (2023). Understanding brokers, intermediaries, and boundary spanners: a multi-sectoral review of strategies, skills, and outcomes. *Evidence & Policy*, *19*(1), 95–115. https://doi.org/10.1332/174426421X16328416007542

Neil Selwyn. (2019). *Should robots replace teachers?* Polity.

Nemorin, S. (2024). Towards decolonising the ethics of AI in education. *Globalisation, Societies and Education*, 1–13. https://doi.org/10.1080/14767724.2024.2333821

Nichols, T.P., & Garcia, A. (2022). Platform Studies in Education. *Harvard Educational Review*, *92*(2), 209–230. https://doi.org/10.17763/1943-5045-92.2.209

OECD. (2023). *Shaping Digital Education*. OECD. https://doi.org/10.1787/bac4dc9f-en

Olofsson, A. D., Fransson, G., & Lindberg, J. O. (2020). A study of the use of digital technology and its conditions with a view to understanding what 'adequate digital competence' may mean in a national policy initiative. *Educational Studies*, *46*(6), 727–743. https://doi.org/10.1080/03055698.2019.1651694

Ortegón, C., Decuypere, M., & Williamson, B. (2024). Mediating educational technologies: Edtech brokering between schools, academia, governance, and industry. *Research in Education*. https://doi.org/10.1177/00345237241242990

Ortegón, C., Decuypere, M., & Williamson, B. (2025). 'Enthuse and inspire': edtech brokers and the affective construction of teacher innovation. *International Studies in Sociology of Education*, 1–17. https://doi.org/10.1080/09620214.2025.2501123

Ortegón, C., Williamson, B., & Decuypere, M. (2024). Edtech brokers and evidence governance: knowledge intermediaries in the education technology market. *Globalisation, Societies and Education*, 1–12. https://doi.org/10.1080/14767724.2024.2439419

Ozga, J. (2009). Governing education through data in England: From regulation to self-evaluation. *Journal of Education Policy*, *24*(2), 149–162. https://doi.org/10.1080/02680930902733121

Ozga, J. (2021). Problematising policy: the development of (critical) policy sociology. *Critical Studies in Education*, *62*(3), 290–305. https://doi.org/10.1080/17508487.2019.1697718

Paakkari, A., & Siippainen, A. (2025). Assembling desire. Analyzing the rollout of self-tracking devices in early childhood education. *Learning, Media and Technology*, 1–14. https://doi.org/10.1080/17439884.2025.2528926

Palmer, P. (1998). *Courage to teach: Exploring the inner landscape of a teacher's life*. Jossey-Bass.

Pangrazio, L., Selwyn, N., & Cumbo, B. (2023). A patchwork of platforms: mapping data infrastructures in schools. *Learning, Media and Technology*, *48*(1), 65–80. https://doi.org/10.1080/17439884.2022.2035395

Parra, J. D., & Edwards, D. B. (2024). Challenging the gold standard consensus: Randomised controlled trials (RCTs) and their pitfalls in evidence-based education. *Critical Studies in Education*, 1–18. https://doi.org/10.1080/17508487.2024.2314118

Perrotta, C. (2023). Afterword: Platformed professional(itie)s and the ongoing digital transformation of education. *Tertium Comparationis*, *29*(1), 117–130. https://doi.org/10.31244/tc.2023.01.06

Perrotta, C., Gulson, K. N., Williamson, B., & Witzenberger, K. (2021). Automation, APIs and the distributed labour of platform pedagogies in Google Classroom. *Critical Studies in Education*, *62*(1), 97–113. https://doi.org/10.1080/17508487.2020.1855597

Peters, M., Olssen, M., & Simons, M. (2009). *Re-reading education policies : a handbook studying the policy agenda of the 21st century*. Sense Publishers.

Piattoeva, N., Klutas, A., & Suominen, O. (2018). Making and mobilizing contexts in policy and research. In *World Yearbook of Education 2019* (pp. 202–218). Routledge. https://doi.org/10.4324/9781315147338-16

Player-Koro, C., Bergviken Rensfeldt, A., & Selwyn, N. (2018). Selling tech to teachers: education trade shows as policy events. *Journal of Education Policy*, *33*(5), 682–703. https://doi.org/10.1080/02680939.2017.1380232

Player-Koro, C., Jobér, A., & Bergviken Rensfeldt, A. (2022). De-politicised effects with networked governance? An event ethnography study on education trade fairs. *Ethnography and Education*, *17*(1), 1–16. https://doi.org/10.1080/17457823.2021.1976661

Rahm, L. (2021). Educational imaginaries: governance at the intersection of technology and education. *Journal of Education Policy*, *38*(1), 46–68. https://doi.org/10.1080/02680939.2021.1970233

Rahm, L. (2023). Educational imaginaries of AI. In *Handbook of Critical Studies of Artificial Intelligence* (pp. 289–300). Edward Elgar Publishing. https://doi.org/10.4337/9781803928562.00031

Ramiel, H. (2019). User or student: constructing the subject in Edtech incubator. *Discourse: Studies in the Cultural Politics of Education*, *40*(4), 487–499. https://doi.org/10.1080/01596306.2017.1365694

Rasch, M. (2020). *Frictie: Ethiek in tijden van dataïsme*. de Bezige Bij.

Ravitch, S. M., & Carl, N. (2021). Qualitative research: bridging the conceptual, theoretical, and methodological. In *Qualitative research bridging the conceptual, theoretical, and methodological*. SAGE.

Rechsteiner, B., Kyndt, E., Compagnoni, M., Wullschleger, A., & Maag Merki, K. (2024). Bridging gaps: a systematic literature review of brokerage in educational change. *Journal of Educational Change*, *25*(2), 305–339. https://doi.org/10.1007/s10833-023-09493-7

Roberts-Mahoney, H., Means, A. J., & Garrison, M. J. (2016). Netflixing human capital development: personalized learning technology and the corporatization of K-12 education. *Journal of Education Policy*, *31*(4), 405–420. https://doi.org/10.1080/02680939.2015.1132774

Robertson, S. L., & Beech, J. (2023). 'Promises promises': international organisations, promissory legitimacy and the re-negotiation of education futures. *Comparative Education*, 1–18. https://doi.org/10.1080/03050068.2023.2287938

Robinson, B., & Leander, K. (2025). 'I hope this email finds you well': how synthetic affect circulates through MagicSchool AI. *Learning, Media and Technology*, 1–13. https://doi.org/10.1080/17439884.2025.2527920

Rodway, J. (2019). Coaching as a Knowledge Mobilization Strategy: Coaches' Centrality in a Provincial Research Brokering Network. *International Journal of Education Policy and Leadership*, *14*(5). https://doi.org/10.22230/IJEPL.2019V14N5A864

Röhl, T. (2025). Machine teaching? Teachers' professional agency in the age of algorithmic tools in education. *British Journal of Sociology of Education*, 1–15. https://doi.org/10.1080/01425692.2025.2495625

Rowe, E. (2020). Buying and selling the public school in the market. In *Privatisation and Commercialisation in Public Education* (pp. 184–197). Routledge. https://doi.org/10.4324/9780429330025-15

Rowe, E. (2022). The assemblage of inanimate objects in educational research: mapping venture philanthropy, policy networks and evidence brokers. *International Journal of Educational Research*, *114*, 102005. https://doi.org/10.1016/j.ijer.2022.102005

Ruiz, N., & Gallagher, M. (2025). Rural education imaginaries in digital education policy: an analysis of CONPES 3988 in Colombia. *International Journal of Educational Development*, *113*, 103222. https://doi.org/10.1016/j.ijedudev.2025.103222

Ruiz, N., Gallagher, M., & Najjuma, R. (2025). Postdigital Science and Education and The Majority World. *Postdigital Science and Education*. https://doi.org/10.1007/s42438-025-00545-0

Rycroft-Smith, L. (2022). Knowledge brokering to bridge the research-practice gap in education: Where are we now? *Review of Education*, *10*(1). https://doi.org/10.1002/rev3.3341

Saldaña, C. M., Welner, K., Malcolm, S., & Tisch, E. (2021). Teachers as market influencers: Towards a policy framework for teacher brand ambassador programs in K-12 schools. *Education Policy Analysis Archives*, *29*(August-December). https://doi.org/10.14507/epaa.29.5654

Savage, G. C. (2020). What is policy assemblage? *Territory, Politics, Governance*, *8*(3), 319–335. https://doi.org/10.1080/21622671.2018.1559760

Schroeder, S., Shelton, C., & Curcio, R. (2024). Crafting the consumer teacher: education influencers and the figured world of K-12 teaching. *Learning, Media and Technology*, *49*(3), 442–455. https://doi.org/10.1080/17439884.2023.2207140

Sellar, S. (2015). A feel for numbers: affect, data and education policy. *Critical Studies in Education*, *56*(1), 131–146. https://doi.org/10.1080/17508487.2015.981198

Sellar, S. (2020). Machinic Affects. In *Mapping the Affective Turn in Education* (pp. 164–178). Routledge. https://doi.org/10.4324/9781003004219-17

Sellar, S., & Lingard, B. (2014). The OECD and the expansion of PISA: new global modes of governance in education. *British Educational Research Journal*, *40*(6), 917–936. https://doi.org/10.1002/berj.3120

Selwyn, N. (2015). 'There's so much data': Exploring the realities of data-based school governance. *European Educational Research Journal*, *15*(1), 54–68. https://doi.org/10.1177/1474904115602909

Selwyn, N. (2016). 'There's so much data': Exploring the realities of data-based school governance. *European Educational Research Journal*, *15*(1), 54–68. https://doi.org/10.1177/1474904115602909

Selwyn, N., Hillman, T., Eynon, R., Ferreira, G., Knox, J., Macgilchrist, F., & Sancho-Gil, J. M. (2020). What's next for Ed-Tech? Critical hopes and concerns for the 2020s. *Https://Doi.Org/10.1080/17439884.2020.1694945*, *45*(1), 1–6. https://doi.org/10.1080/17439884.2020.1694945

Selwyn, N., Ljungqvist, M., & Sonesson, A. (2025). When the prompting stops: exploring teachers' work around the educational frailties of generative AI tools. *Learning, Media and Technology*, *50*(3), 310–323. https://doi.org/10.1080/17439884.2025.2537959

Selwyn, N., Nemorin, S., & Johnson, N. (2017). High-tech, hard work: an investigation of teachers' work in the digital age. *Learning, Media and Technology*, *42*(4), 390–405. https://doi.org/10.1080/17439884.2016.1252770

Selwyn, N., Pangrazio, L., Nemorin, S., & Perrotta, C. (2020). What might the school of 2030 be like? An exercise in social science fiction. *Learning, Media and Technology*, *45*(1), 90–106. https://doi.org/10.1080/17439884.2020.1694944

Selwyn, N., & Szili, A. (2025). The role of 'AI advocate' teachers in mediating technological change across Australian schools. *Teachers and Teaching*, 1–16. https://doi.org/10.1080/13540602.2025.2596832

Sigler, T., Neal, Z., & Martinus, K. (2023). Brokerage as an urban and regional process between systems and scales. *Regional Studies*, *57*(2), 209–214. https://doi.org/10.1080/00343404.2022.2093343

Simons, M. (2015). Governing education without reform: the power of the example. *Discourse*, *36*(5), 712–731. https://doi.org/10.1080/01596306.2014.892660

Smallman, M. (2020). 'Nothing to do with the science': How an elite sociotechnical imaginary cements policy resistance to public perspectives on science and technology through the machinery of government. *Social Studies of Science*, *50*(4), 589–608. https://doi.org/10.1177/0306312719879768

Sriprakash, A., Williamson, B., Facer, K., Pykett, J., & Valladares Celis, C. (2024). Sociodigital futures of education: reparations, sovereignty, care, and democratisation. *Oxford Review of Education*, 1–18. https://doi.org/10.1080/03054985.2024.2348459

Star, S. L. (1999). The Ethnography of Infrastructure. *American Behavioral Scientist*, *43*(3), 377–391. https://doi.org/10.1177/00027649921955326

Striphas, T. (2015). Algorithmic culture. *European Journal of Cultural Studies*, *18*(4–5), 395–412. https://doi.org/10.1177/1367549415577392

Swist, T., & Gulson, K. N. (2023). Instituting socio-technical education futures: encounters with/through technical democracy, data justice, and imaginaries. *Learning, Media and Technology*, *48*(2), 181–186. https://doi.org/10.1080/17439884.2023.2205225

Tampio, N. (2009). Assemblages and the Multitude. *European Journal of Political Theory*, *8*(3), 383–400. https://doi.org/10.1177/1474885109103850

Tierens, T., Decuypere, M., Alirezabeigi, S., & Hartong, S. (2024). Governing through time(s): temporal modes of governance in digital education policy. *British Journal of Sociology of Education*, *45*(4), 609–624. https://doi.org/10.1080/01425692.2024.2346844

Tierens, T., Decuypere, M., & Hartong, S. (2024). Navigating open-source platforms in schools: an inquiry into changing teacher professionality. *Learning, Media and Technology*, 1–15. https://doi.org/10.1080/17439884.2024.2392114

Turnhout, E., Stuiver, M., Klostermann, J., Harms, B., & Leeuwis, C. (2013). New roles of science in society: Different repertoires of knowledge brokering. *Science and Public Policy*, *40*(3), 354–365. https://doi.org/10.1093/scipol/scs114

UNESCO. (2023a). *An ed-tech tragedy? Educational technologies and school closures in the time of COVID-19*. UNESCO. https://doi.org/10.54675/LYGF2153

UNESCO. (2023b). *Global Education Monitoring Report 2023: Technology in education: A tool on whose terms?* GEM Report UNESCO. https://doi.org/10.54676/UZQV8501

Van den Hoonaard, D. K., & Van den Hoonaard, W. C. (2008). Data analysis. *The Sage Encyclopedia of Qualitative Research Methods*, *1*, 186–188.

van Dijck, J. (2020). Governing digital societies: Private platforms, public values. *Computer Law & Security Review*, *36*, 105377. https://doi.org/10.1016/j.clsr.2019.105377

van Dijck, J., Poell, T., & de Waal, M. (2018). *The Platform Society* (Vol. 1). Oxford University Press. https://doi.org/10.1093/oso/9780190889760.001.0001

Verelst, S., Simons, M., & Berghmans, M. (2025). The play of education and market: A literature review on the roles commercial actors play for K-12 education. *Policy Futures in Education*, *23*(1), 106–126. https://doi.org/10.1177/14782103241240238

Verger, A., Fontdevila, C., & Zancajo, A. (2016). *The Privatization of Education. A political Economy of Global Education Reform*. Teachers College Press.

Verger, A., Fontdevila, C., & Zancajo, A. (2017). Multiple paths towards education privatization in a globalizing world: a cultural political economy review. *Journal of Education Policy*, *32*(6), 757–787. https://doi.org/10.1080/02680939.2017.1318453

Verger, A., Steiner-Khamsi, G., & Lubienski, C. (2017). The emerging global education industry: analysing market-making in education through market sociology. *Globalisation, Societies and Education*, *15*(3), 325–340. https://doi.org/10.1080/14767724.2017.1330141

Waardenburg, L., Huysman, M., & Sergeeva, A. V. (2022). In the Land of the Blind, the One-Eyed Man Is King: Knowledge Brokerage in the Age of Learning Algorithms. *Organization Science*, *33*(1), 59–82. https://doi.org/10.1287/orsc.2021.1544

Watters, A. (2021). *Teaching Machines*. The MIT Press. https://doi.org/10.7551/mitpress/12262.001.0001

Wetherell, M. (2012). *Affect and Emotion: A New Social Science Understanding*. SAGE Publications Ltd. https://doi.org/10.4135/9781446250945

Wetherell, M., McCreanor, T., McConville, A., Moewaka Barnes, H., & le Grice, J. (2015). Settling space and covering the nation: Some conceptual considerations in analysing affect and discourse. *Emotion, Space and Society*, *16*, 56–64. https://doi.org/10.1016/j.emospa.2015.07.005

Wikström, P., Duek, S., Nilsberth, M., & Olin-Scheller, C. (2024). Smartphones in the Swedish upper-secondary classroom: A policy enactment perspective. *Learning, Media and Technology*, *49*(2), 230–243. https://doi.org/10.1080/17439884.2022.2124268

Willegems, V., Consuegra, E., Struyven, K., & Engels, N. (2016). How to become a broker: the role of teacher educators in developing collaborative teacher research teams. *Educational Research and Evaluation*, *22*(3–4), 173–193. https://doi.org/10.1080/13803611.2016.1247721

Williamson, B. (2014). Mediating Education Policy: Making Up the "Anti-Politics" of Third-Sector Participation in Public Education. *British Journal of Educational Studies*, *62*(1), 37–55. https://doi.org/10.1080/00071005.2013.857386

Williamson, B. (2016). Political computational thinking: policy networks, digital governance and 'learning to code.' *Critical Policy Studies*, *10*(1), 39–58. https://doi.org/10.1080/19460171.2015.1052003

Williamson, B. (2017a). *Big Data in Education: The digital future of learning, policy and practice*. SAGE Publications Ltd. https://doi.org/10.4135/9781529714920

Williamson, B. (2017b). Decoding ClassDojo: psycho-policy, social-emotional learning and persuasive educational technologies. *Learning, Media and Technology*, *42*(4), 440–453. https://doi.org/10.1080/17439884.2017.1278020

Williamson, B. (2017c). Who owns educational theory? Big data, algorithms and the expert power of education data science. *E-Learning and Digital Media*, *14*(3), 105–122. https://doi.org/10.1177/2042753017731238

Williamson, B. (2021). Making markets through digital platforms: Pearson, edu-business, and the (e)valuation of higher education. *Critical Studies in Education*, *62*(1), 50–66. https://doi.org/10.1080/17508487.2020.1737556

Williamson, B. (2022). Big EdTech. *Learning, Media and Technology*, *47*(2), 157–162. https://doi.org/10.1080/17439884.2022.2063888

Williamson, B. (2025). Re-infrastructuring higher education. *Dialogues on Digital Society*, *1*(1), 41–46. https://doi.org/10.1177/29768640241251666

Williamson, B., Celis, C. V., Sriprakash, A., Pykett, J., & Facer, K. (2024). Algorithmic futuring: predictive infrastructures of valuation and investment in the assetization of edtech. *Learning, Media and Technology*, 1–15. https://doi.org/10.1080/17439884.2024.2435820

Williamson, B., Eynon, R., & Potter, J. (2020). Pandemic politics, pedagogies and practices: digital technologies and distance education during the coronavirus emergency. In *Learning, Media and Technology* (Vol. 45, Issue 2, pp. 107–114). Routledge. https://doi.org/10.1080/17439884.2020.1761641

Williamson, B., Gulson, K. N., Perrota, C., & Witzenberger, K. (2022). Amazon and the New Global Connective Architectures of Education Governance. *Harvard Educational Review*, *92*(2), 231–256. https://doi.org/10.17763/1943-5045-92.2.231

Williamson, B., & Hogan, A. (2020). *Education International Research Commercialisation and privatisation in/of education in the context of Covid-19*.

Williamson, B., & Komljenovic, J. (2023). Investing in imagined digital futures: the techno-financial 'futuring' of edtech investors in higher education. *Critical Studies in Education*, *64*(3), 234–249. https://doi.org/10.1080/17508487.2022.2081587

Williamson, B., & Piattoeva, N. (2019). Objectivity as standardization in data-scientific education policy, technology and governance. *Learning, Media and Technology*, *44*(1), 64–76. https://doi.org/10.1080/17439884.2018.1556215

Winter, E., Costello, A., O'Brien, M., & Hickey, G. (2021). Teachers' use of technology and the impact of Covid-19. *Irish Educational Studies*, *40*(2), 235–246. https://doi.org/10.1080/03323315.2021.1916559

Woolgar, S., & Lezaun, J. (2013). The wrong bin bag: A turn to ontology in science and technology studies? *Social Studies of Science*, *43*(3), 321–340. https://doi.org/10.1177/0306312713488820

Žmavc, J., & Bezlaj, L. Z. (2024). The EU policy discourse on EdTech and constructing the image of an excellent teacher. *Learning, Media and Technology*, 1–14. https://doi.org/10.1080/17439884.2024.2405859

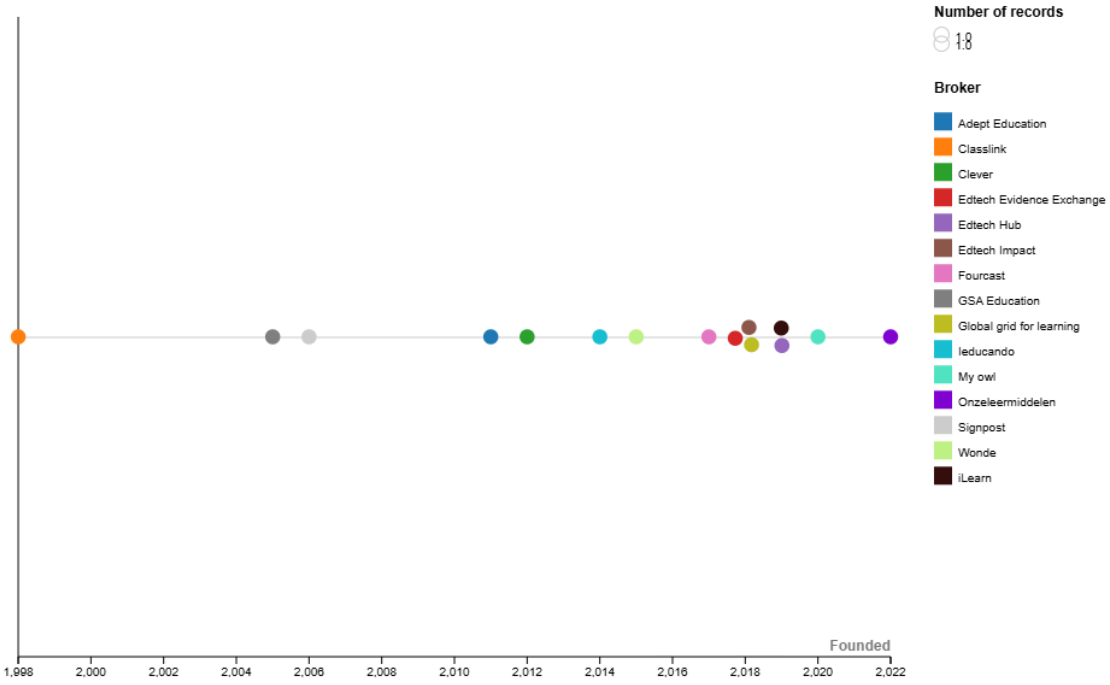
Zuboff, S. (2019). *The age of surveillance capitalism: the fight for a human future at the new frontier of power* (First edition.). PublicAffairs.

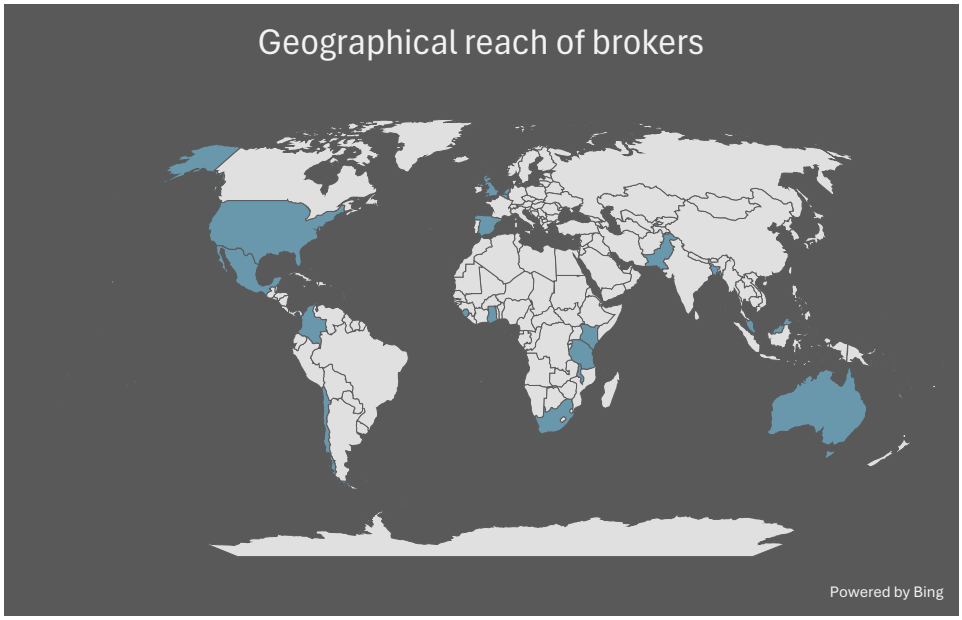
Zuckerman, S. J., Wilcox, K. C., Schiller, K. S., & Durand, F. T. (2018). Absorptive Capacity in Rural Schools: Bending Not Breaking During Disruptive Innovation Implementation. *Journal of Research in Rural Education*. https://digitalcommons.unl.edu/cehsedadfacpub

Annexes:

Example of brokers and graphics

Broker	Founded in	Reach (schools)	Country	Type of broker	Other Countries of operation
Global grid for learning	2018	30000	data	USA	N.A.
Fourcast	2017	300	ambassador	Belgium	UK
Signpost	2006	3500	ambassador	Belgium	N.A.
Adept Education	2011	6000	ambassador	UK	N.A.
iLearn	2019	750	search engine	Belgium	N.A.
Edtech Impact	2018	N.A.	search engine	UK	N.A.
Edtech Hub	2019	N.A.	search engine	UK	Bangladesh, Ghana, Kenya, Malawi, Pakistan, Sierra Leone, Tanzania
Wonde	2015	30000	data	UK	Australia, South Africa
Ieducando	2014	N.A.	ambassador	Spain	Colombia, México, Chile
Edtech Evidence Exchange	2018	N.A.	search engine	USA	N.A.
My owl	2020	N.A.	data	USA	N.A.
Clever	2012	110000	data	USA	N.A.
Classlink	1998	3000	data	USA	N.A.
GSA Education	2005	N.A.	ambassador	Singapore	Malasya, Philipines, Hong Kong
Onzeleermiddelen	2022	N.A.	search engine	Netherlands	N.A.


Number of records
1.8
Broker
Adept Education
Classlink
Clever
Edtech Evidence Exchange
Edtech Hub
Edtech Impact
Fourcast
GSA Education
Global grid for learning
leducando
My owl
Onzeleermiddelen
Signpost
Wonde
iLearn
Founded
1,998
2,000
2,002
2,004
2,006
2,008
2,010
2,012
2,014
2,016
2,018
2,020
2,022


Geographical reach of brokers
Powered by Bing