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INTRODUCTION

Youthful minds and hands: Learning practical knowledge in early modern Europe

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Figure 1. Ripa, Cesare. 1709. *Iconologia, or, Moral Emblems, by Cesare Ripa*. London: Benjamin Motte [Utrecht University Special Collections: ICON 166], p. 73.

In Cesare Ripa's famous and often translated anthology of personifications, *Studio* (to learn) is described as a young man (*un Giouane*) in the original Italian edition (see fig. 1, above). In this image from the eighteenth-century English edition, the learning of youths is represented as an activity characterized by solitude: reading a book on one's own. The cock on the left functions as a symbol for the diligence of such isolated young learners (Ripa 1603; Ripa 1709; Ripa 1971). Ripa's personification represents youthful learning as quite the opposite of the collective production of knowledge in the laboratory, and the technologies of learning in the workshop or on the shop floor. In the early modern period, the "studio" referred to a place for reading and drawing surrounded by books, spatially removed from the workshop or "laboratory" in which manual work was performed (Dupré 2014).

Yet, recent scholarship has shown that practical knowledge – collectively obtained in workshops or laboratories – became increasingly characteristic of the dominant knowledge cultures

in the early modern period. The boundaries between the "laboratory" and the "studio" became permissible, in the sense that books (and by extension, media) came to play a role in the production and transmission of practical knowledge. However, what sort of effects the increased value and appreciation of practical knowledge had for processes of youthful learning is a question which has not yet been answered. This topical issue therefore explores a type of early modern youthful learning that was absent in Ripa's representation of "studio": the acquisition of practical knowledge. Practical knowledge is "the knowledge needed to obtain a certain product – for instance, an artistic or mechanical artefact, or specific outputs, such as healing practices or mathematical results that follow a defined workflow" (Valleriani 2017, 1). As Matteo Valleriani notes in a recent book on "practical knowledge," the workflow can be a recipe, a construction procedure, an instruction, or take another how-to form. The central question is how did young people appropriate and distribute practical knowledge, and how did learning processes change in response to knowledge cultures placing emphasis on the value of practical knowledge?

This topical issue argues that in the early modern period the merging of tutoring or apprenticing and the use of media in education, emerged as a response to this challenge. We use a multidisciplinary approach and combine different types of sources and media (Ripa's *Iconologica*, maps, handbooks, youth literature, students' lecture notes, etc.), to argue that innovative collaborative and mediated learning practices were developed in the early modern period to allow young people (from children to adolescents to young adults) to obtain the skills they needed to participate in cultures and societies that valued practical knowledge.

A new multidisciplinary perspective on youth and knowledge

The articles in this issue are set against the background of the major transformation of the intellectual cultures of Europe between 1500 and 1800. Recent scholarship in the history of science has shown that the rise of a new knowledge culture in early modern Europe benefited from the accumulation, structuring, and valuation of practical knowledge (including tacit and embodied knowledge). Scholarship on artisanal epistemologies in particular has called into question traditional distinctions between the hand and the mind as well as between theory and practice (Roberts, Schaffer, and Dear 2007; Smith and Schmidt 2007; Smith 2004; Smith 2009; Valleriani 2017; Long 2012; Dupré, De Munck, and Clarke 2012; Dupré and Göttler 2017). Moreover, recent scholarship has examined how and why knowledge was codified and visualized (Smith and Beentjes 2010; Smith 2010; Harkness 2007; Long 2001). Knowledge production is also considered to be a social and collective practice. In her analysis of knowledge circulation in early modern Europe, Lissa Roberts defines knowledge as something to be cognitized and embodied by books as well as human bodies, and as a community-based practice, developed in processes of joint learning (Roberts 2012a).

However, this scholarship on collective and mediated knowledge and learning practices has had little to say about the role of youth in these developing early modern knowledge cultures. This group has been largely ignored, even as interest in education and the specific stage of youth has grown from the sixteenth century onwards (Griffths 1996), and even though sociological, psychological, and historical research has identified the accumulation of human capital in the young as a vital catalyst for social change (Klimsta a.o. 2010; Roberts 2012b; Meeus 2011; Moller 1968). Some attention has been paid to students and the way they operated in the changing contexts of universities, as well as to the enormous expansion of the early modern schooling system (Rüegg 1992-2011; Van Miert 2009; Houston 1988; Boekholt & De Booy 1987). Yet, precisely because of the increased significance of practical knowledge in the early modern period, much of the transfer and production of knowledge took place outside universities and schools (e.g. Spufford 1981).

We therefore aim to explore a wider "laboratory of learning" as found in various social and political contexts (such as guilds), in both formal and informal learning environments (institutions as well as families), scrutinizing these contexts for practices of teaching and learning practical

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knowledge. While current historical research on youth mainly focuses on youngsters as knowledge consumers (Frijhoff 2012), we also look at young people's more active roles in their own education. We focus both on actual practices and on processes of conceptualization, assuming that practices of teaching and learning depended on and were rooted in debates about theory and ideals.

The originality of these articles does not lie solely in its focus on youth in an emerging knowledge culture. Equally innovative is our multidisciplinary approach: contributions come from historians of science, technology, and medicine, economic and social historians, literary scholars, intellectual historians, and historians of visual culture. The different disciplines have separated historiographical traditions as well as conceptualizations of knowledge and learning. Economic historians generally link knowledge to innovation and growth, as proved by their frequent use of the concepts "useful knowledge" and "human capital." In the past decades, educational practices have been studied within the context of guilds and crafts by economic and social historians who aimed to understand the fabric and economic organization of practical learning. Their focus has been on apprenticeship contracts, wages, and revenue models, usually without paying much attention to the content, didactics, and role of apprenticeship within broader contexts of socialization (De Munck 2007; De Munck, Kaplan, and Soly 2007; Prak and van Zanden 2013; Wallis 2008).

In literature studies, such economic aspects of knowledge are remarkably absent: knowledge is rather conceptualized as a cultural and social product, and a mediated and situated construct. Literary historians are accustomed to analyzing discourses and representations of knowledge rather than actual practices. They mainly focus on the transmission of pedagogical ideas through a range of media such as youth literature and pedagogical tracts (Lerer 2008; Bekkering 1989; Klemann 2011; Grenby 2015). Sociologists and anthropologists have done important work on craft apprenticeship and practical and embodied knowledge, which deserves to be recognized in the history of science (Marchand 2008; O'Çonnor 2007; Ingold 2013). In recent years, the history of science has extensively studied media practices and the function of images as modes of knowledge transmission. Historians of science have argued that the communication and transfer of knowledge was facilitated by images, including the visualization of hands-on skills (Kusukawa 2012; Dupré 2012; Dupré 2016). Yet, with the exception of Matthew Eddy's study of the use of visual media in the education of children, the imagined viewers of those images typically have been adults (Eddy 2013). More work has been done on early modern pedagogical reforms arguing in favor of reality-based teaching and the rise of "object lessons" in the seventeenth and eighteenth centuries. Kelley J. Whitmer has shown that images were acceptable to these pedagogical reformers; nevertheless, they preferred three-dimensional objects (craft and everyday objects as well as objects in collections) above images (Whitmer 2019; Whitmer 2017; Whitmer 2015).

Our multidisciplinary approach will allow us to bridge the gaps between and among these different disciplinary traditions. In this issue we explore the dynamic interplay between collaborative learning and mediated learning in early modern youth education.

The argument and the articles

The authors here contend that conceptual models of learning based on the dichotomy between schools (formal training) and practical knowledge eroded in the early modern period, when learning practices in apprenticeship ("knowing by doing") also became applied in other factual and fictional educational settings. Due to the misconstrued dichotomy between hand and mind, this has remained invisible to historians (Roberts, Schaffer, and Dear 2007). The articles offer both close studies of specific instantiations of these practices in the past and ways of conceptualizing those practices to place them in dialogue with others.

This issue shows that, faced with the challenge of practical knowledge, traditional educational contexts (such as universities) adopted aspects of the apprenticeship model. Part one is dedicated

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to such expanded practices of collaborative learning. The central question here is how did young people training in fields traditionally dominated by learning by reading begin to learn hands-on and collaboratively (from peers and adults)? How did apprenticeship shape knowledgeable practitioners in the sciences and medicine?

Richard Oosterhoff clearly demonstrates that already from the early sixteenth century onwards, students and their masters joined forces to create and distribute knowledge within the context of universities and bookshops. In his contribution, Jonathan Barry analyzes how medical education gradually developed into an apprenticeship model in the eighteenth century.

As appears from Patrick Wallis's paper, the expanding practices of apprenticeship learning laid an important but not sufficient basis for the acquisition of advanced skills among the young. His close analysis of the education of British apprentices shows that individual agency and advanced studies were vital aspects of their progress: in many cases, innovation was, above all, spurred by skills and knowledge developed beyond the context of the apprenticeship.

In this way, the first part of this issue highlights the general significance of the apprenticeship model: the imitation of adults was central and dominant as an educational model in various contexts. Nevertheless, as Wallis reminds us, a balanced judgment of the educational model is required. Participation in the new knowledge cultures that emerged in the early modern period, critically depended on creative and autonomous youths who were able and willing to look beyond the borders of their workshop.

In Wallis's paper, books and media are considered to be important instruments within the alternative and autonomous course plans of ambitious pupils. In part two, several articles explore aspects of such mediated learning processes in several social and geographical contexts (e.g. Wandel's paper is about the education of a prince; Dietz discusses youth literature published for a broader audience), and in different media environments (e.g. Wandel on maps and Dietz on books). How were young people invited to use media (books, maps, images) as places of learning? How did media shape modes of becoming knowledgeable? How were travel stories and maps used to make children agents of learning?

Wandel's paper on the education of a young prince focuses on the transmission of skills and practical knowledge. Wandel argues that the prince's maps were not only used to transmit geographical knowledge, but simultaneously contributed to the prince's abilities to use media and to understand mediated representations of the world. As alternative modes of learning, maps made the young prince media-literate and skilled to explore the outside world. In a more general way, we claim that media products invited youngsters to combine knowledge from different knowledge domains (e.g. on the merging of political and geographical knowledge) and created opportunities to learn skills that – applied in a wider and different context – indeed resulted in innovation (Wallis and Oosterhoff).

However, Els Stronks and Feike Dietz question the relationship between media products and autonomous learning processes. Stronks examines the way media products (for both youths and adults) created and materialized concepts of youthful invention and curiosity, highlighting a dominant discourse on docility and guidance rather than on innovation. Dietz's paper reveals the emancipatory as well as restrictive character of travel stories for children: while travel literature facilitated active knowledge acquisition among youngsters, especially in the later eighteenth century, it left little room for autonomous agency. The youngsters' access to practical knowledge, we may conclude, was limited by the ways in which adults set up learning communities and media practices.

The six articles deal with different periods, social classes, countries, and learning contexts. We definitely do not aim to present one overarching European model of apprenticeship, or a chronological development to explain all educational practices. However, taken together, these papers highlight the emergence of new ways of teaching and learning practical knowledge in the early modern period. An important consequence of the rise of new cultures valuing practical knowledge was the invention of a new educational model connecting collaborative learning to practices of

mediated learning. Not only do the papers demonstrate the adoption of the apprenticeship model to teach youths in medicine and the sciences, they also show that we cannot understand such educational methods without taking the ambivalent role of media into consideration. Media contributed to the acquisition of skills and agency among the young, while simultaneously limiting their spaces to learn.

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