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A Typographical Evolution in the Louvain Lectures on Logic? How Students Used Printed Textbooks between 1474 and 1532

Abstract: This chapter examines how the new medium of the printed textbook impacted the teaching of logic at the Louvain Faculty of Arts between 1474 and 1532. It builds upon recent research that emphasizes that the printing press augmented the availability of texts for students, but never changed the core activities of universities. This essay studies the typography of textbooks that that were printed in the Low Countries between 1474 and 1532 and contained standard versions of the texts of Aristotle and Porphyrius. It also juxtaposes copies of textbooks with a notebook from a Louvain student to discover textual similarities. I argue that the new medium of the printing press impacted lectures on logic in Louvain between 1474 and 1532. Printers offered fixity when they produced a textbook that was geared towards use during lectures, which resulted in this new medium becoming a part of daily practice when teaching logic.

1 Introduction: The New Medium of the Printed Textbook

How did the printing press impact education at early modern universities? This chapter examines this broad question with a case study of the University of Louvain in the Low Countries. In particular, it studies how the new medium of the printed textbook impacted the teaching of logic at the Louvain Faculty of Arts between 1474 and 1532, with the help of a dataset I constructed entitled *Manuale Lovaniense*. This dataset offers a list of textbooks that were printed in Louvain and other cities in the southern part of the Low Countries, which could have been used by students and professors in the Louvain Faculty of Arts, as well as in the higher faculties of law, theology and medicine. It uses the existing relational database ODIS, allowing one to connect records of printers, publishers, and authors with records of publications. *Manuale Lovaniense* is at its core a historical dataset of books which works as a counterpart to *Magister dixit*, a database which contains digital reproductions of handwritten lecture notes from the University of Louvain between 1425 and 1797, the year the university was dissolved. Because of its focus

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on book history, the data within *Manuale Lovaniense* is well-suited to study the impact of the printed textbook on the Louvain lectures on logic.

Michael Baldzuhn argues that in order to investigate the true impact of a new medium on teaching, a study of the relationship between that new medium and daily practice during lectures is necessary (Baldzuhn 2010, 2063). Therefore, two methods are used throughout this chapter. First, a typographical study of Louvain textbooks, because typography is the action of arranging print material in service of a specific goal (Morison 1996, 3; Proot 2022, 174). When students possessed a copy of a text and annotated it during lectures, they became listeners, writers, and readers (Baldzuhn 2006, 266). Therefore, to understand how Louvain students used and read a textbook, in this case books that contained standard versions of the texts of Aristotle (384 BCE – 322 BCE) and Porphyrius (c. 233 – 305), it is necessary to study the layout of the page, as this delivers evidence on the intended use. Medieval and early modern books were designed objects that stored and transferred knowledge. Printers utilized certain typographic techniques to enhance their comprehensibility and, as this chapter will show, in the case of textbooks, their usability during lectures (Rautenberg 2015, 320 – 321; Proot 2022, 173). Second, I juxtapose copies of textbooks with a notebook from a Louvain student. The goal is to assess if textual similarities exist between the manuscript and the textbooks at the level of the source text. As such, it will become clear that the new medium of the printing press indeed impacted lectures on logic between 1474 and 1532. Printers offered fixity when they produced a textbook that was geared towards use during lectures, resulting in the Louvain Faculty of Arts becoming a varied media environment.

The rise of universities in medieval Western Europe was a result of the increasing population, as well as the intellectual resurgence during the 12th-century Renaissance. The goal of these novel institutions of higher learning consisted in educating professionals so that they could obtain positions in state and church administrations. Therefore, every university had a Faculty of Arts, as well as higher faculties wherein professors taught the subjects of civil and canon law, theology, and medicine. The method of teaching was scholasticism, meaning professors transferred ideas or knowledge from an accepted *auctor*, such as Aristotle for the courses on logic, physics, and metaphysics, to students by way of his works or *auctoritates.* This occurred through, on the one hand, a *lectio* commentary followed by *quaestiones*, and, on the other hand, examinations in the form of the *disputatio* (Axwell 2016, 4, 18 – 19, 21 – 27, 38; Blockmans 2020, 31, 38; Ebbesen et al. 2014, 43). Throughout the Middle Ages and the early modern period, university lecture halls were hybrid environments. The voice and the ear were the key components of lectures, but students also depended on the written word, as well as printed books after the invention of moveable type (Axwell 2016, 29; Baldzuhn 2006, 264).

Printed textbooks are important sources for studying the transfer of knowledge, and consequently historians, philosophers and neo-Latinists have studied them exhaustively and in various ways. For example, they have reconstructed the printing history of a textbook, or have focused on a textbook during a study of early modern student notes (Groote and Kölbl 2011; Oosterhoff 2018). Nevertheless, researchers have mainly studied these sources from the discipline of the history of ideas, hence focusing on the content. As early as 1993, Evelyn Tribble criticized such studies of the early modern printed book, as she argues that researchers have paid too much attention to the content and viewed the book as merely an unimportant carrier of the text (Tribble 1993, 1). Recently, Ursula Rautenberg renewed this criticism when she indicated not enough attention has been paid to the printed book as a reading medium (Rautenberg 2015, 320). Too strong a focus on content is also present in the historiography on printed textbooks written by Louvain professors in the 16th and 17th century (Lines 2008; Vanpaemel 2014; Geudens 2017; Geudens 2020). Studies on the content of textbooks are important because they provide information about what knowledge and philosophical doctrines the Louvain Arts professors taught to students. However, such studies fail to provide proof on how printed textbooks could be used during lectures. The new medium of the printing press offered novel opportunities, certainly compared to the production of medieval manuscripts, to arrange knowledge into visual units (Enenkel and Neuber 2005, 1–5).

It is undeniable that the invention of moveable type was one on the major media evolutions in western history. A subject that is well-suited for studying the influence of new media is education, especially when it comes to the introduction of the printing press. Recurring themes among scholars who study the impact of the printing press on Renaissance education are printed textbooks and how professors and students coped with this new medium. For instance, in the context of Renaissance music education, John Griffiths argues that the printing press created a new type of music textbook which enhanced private study (Griffiths 2010, 126–127). Hans Rudolf Velten postulates the same idea when he stresses, through a study of reading and writing manuals, that a printed textbook stimulated private study. He also points to its polyfunctionality, as he argues that it was a teaching tool that could be transported between public lecture halls and the private home (Velten 2012, 34, 42–43, 45). Printed textbooks were indeed also used during lectures at universities. In some cases, professors authored a textbook that students could use during lectures, as is proven by the many student annotations in the remaining copies (Groote and Kölbl 2011, 63, 65, 76, 78, 86; Oosterhoff 2018). Ann Blair also stresses the importance of printed versions of the *auctoritates* in university lecture halls because they provided students with a fixed printed text, often

with large marginal spaces, giving them the opportunity to add notes (Blair 2008, 49).

To counter the too strong a focus on content in the historiography on printed textbooks used in the Louvain Faculty of Arts, I will focus on the printed versions of Aristotle's and Porphyrius' *auctoritates*. Particularly on those printed in the Low Countries between 1474 and 1532, which students could use in lectures on logic at the Louvain Faculty of Arts. The teaching of logic in Louvain during the 15th and beginning of the 16th century has received ample attention. It has become clear that professors were obliged to comment on a prescribed corpus of texts of Aristotle and Porphyrius (Roegiers 1993, 13–14; Roegiers 2012, 27; Papy 2012, 107–113, 119). Every text was treated initially through a *lectio* commentary or *expositio* and, subsequently, a set of questions and objections or *quaestiones*. Based on the study of student notebooks, it has been argued that the *quaestiones* resulted from dictation, whereby students copied the *expositio* beforehand, and subsequently used their copy as a textbook during lectures (Smeyers 1975; Geudens and Masolini 2016, 813–844; Masolini 2016, 204–216; Geudens 2018, 95; Geudens 2020, 289–330).

This is a compelling argument, particularly when studying the teaching of logic from a book-historical perspective. One of the powers of the printing press was fixity, meaning a large number of identical copies containing the same source text and typography could be produced. This occurred in the Low Countries between 1474 and 1532, as printers printed nine editions of books that contained standard versions of texts on logic by Aristotle and Porphyrius. These editions, therefore, are well-suited to elaborate on the existing literature by way of studying how printers, professors, and students coped with the possibilities of the printing press, as well as considering how these textbooks impacted lectures on logic in Louvain between 1474 and 1532.

2 Supplying Printed Texts

With the rise of universities, the demand for study material, in this case the scholastic texts that were commented on within university faculties, increased significantly (Beullens and De Leemans 2008, 89). Handwritten texts were indeed important because these enhanced memorization and, to some extent, canonized the content (De Ridder-Symoens 2012, 8–10). In the pre-handpress era, however, it was impossible to offer a copy of the essential works to every student (Baldzuhn 2006, 261; Baldzuhn 2021, 71–73). Nevertheless, students possessed their own notebooks, and how they acquired them differed regionally. For instance, in the university cities of Paris and Bologna, the *pecia*-system existed, giving students the oppor-

tunity to acquire handwritten copies of *auctoritates* in the shops of local *librarii* (Shooner 1988, 17–28; Rouse and Rouse 1988, 41–47; Baldzuhn 2006, 263; Soetermeer 2005). In the Holy Roman Empire, several universities established a special lecture so that students were able to produce their own copy of a text. These manuscripts resulted from dictation, and students subsequently used them as a textbook (Jensen 2004, 458, 466; Baldzuhn 2021, 73–74, 79–80). Due to a lack of evidence, it is not clear if both mechanisms were in place in Louvain, but it has been proven that students of the Faculty of Arts also produced notebooks, though seemingly in a less formal manner than did the students in the universities of Paris and the Holy Roman Empire (Smeyers 1978, 245–246; Geudens and Masolini 2016, 820–844). This means that in Louvain, in accord with other European universities, lecture halls were hybrid environments wherein the spoken and written word, as well as the ear, played a significant role.

The invention of moveable type augmented this hybridity. The number of available books, the speed of production, and the quantity of identical copies increased, which resulted in students acquiring a copy of a text more easily than previously (Baldzuhn 2006, 263; Corsten 1987, 84). The printing press also intensified the interaction between artisans and academics, as they relied upon each other to provide printed textbooks to students. An inherent economic reality has to be considered when it comes to printing books: investment was necessary and, as it often took years to sell-out a print run, printers only slowly recouped the costs incurred (Conway 1999, 28). These circumstances impacted their business strategies, leading printers to print books that were certain to be bought. Therefore, works prescribed relating to the curricula of university faculties, as well as textbooks that professors and students used during lectures, constituted an obvious choice for printers. This was especially true when they owned a print shop in a university city (Hirsch 1978, 116; Corsten 1987, 86–88; Döring 2006, 91–95, 97; Eisermann 2008, 162–163).

Already during the incunable (1450–1500) and post-incunable period (1501–1540), professors in Paris and Cologne authored textbooks and sent them off to be printed. Examples include the introductory textbooks on logic by Jacques Lefèvre d'Étaples (c. 1455–1537) and the commentaries of the Cologne professors Lambertus de Monte (1430/5–1499) and Gerhardus de Harderwijk (1455–1503). Both Richard Oosterhoff and Severin Corsten have shown that these books were intended for use during lectures, which resulted in printers producing numerous reprints (Corsten 1987, 88; Oosterhoff 2018). Only one edition of a logic textbook authored by a Louvain professor was printed before 1530, in this case by Maarten van Dorp (1485–1525), though his book was not printed in Louvain. In 1512, the Parisian printer Henri Estienne (fl. 1502–1520) printed van Dorp's *Introductio facilis, ad Aristotelis libros logice intellegendos utilissima.* Gilles de Gourmont (fl. 1506–1533), a Parisian who owned a book shop in Louvain, commissioned the print

run, and the textbook was intended to be used during van Dorp's lectures in the pedagogy of the Lily (Verbeke 2013, 232–238; Geudens 2020, 295).

This chapter however, focuses on the printed editions of the standard texts of Aristotle and Porphyrius, which constituted the *Organon* of logic at the Louvain Faculty of Arts. The statutes from 1429, which were reaffirmed throughout the early modern period, obliged *Artes* professors to read Porphyrius' *Isagoge* and Aristotle's *Categoriae*, *De interpretatione*, *Analytica priora*, *Analytica posteriora*, *Topica*, and *De sophisticis elenchis* (Roegiers 2012, 27, 29; Geudens and Masolini 2016, 816–820). The first three works constituted the *Logica vetus*, whereas the last four made up the *Logica nova* (Gibson 1982, 54, 57–59). Because printers in university cities could sell these texts locally as well as internationally, these publications were potentially profitable (Corsten 1987, 90, 95). This led Johannes van Westfalen (fl. 1473–1503) and his *socius* Dirk Martens (c. 1446–1534) to print a *Logica vetus* in Alost in 1474. The Louvain printer Conrad Braem (fl. 1474–1483) also printed two editions of the *Logica vetus* in 1474 and 1475, as well as editions of *Analytica priora* and *Analytica posteriora* in 1475 and 1476. After a gap of 33 years, Dirk Martens produced a *Logica vetus* in 1509, a *Logica nova* in 1510, and his first full course textbook on logic in 1525. His son-in-law, Servaas I van Sassen (c. 1495–c. 1556), reprinted the 1525 edition in 1532 (Needham 1982, 6–8, 15–16; Dauwe 1974; State Archives Louvain, nr. 712: fol. 292r, 298rv, 299rv; Aristotle and Porphyrius 1525; Aristotle and Porphyrius 1532).

All of the abovementioned textbooks presume the Latin translations of Boethius (c. 480–525) and James of Venice (?–after 1147). Boethius' translations were compiled at the beginning of the 6th century, as part of his intention to translate all of Aristotle's Greek texts on logic. His translation project eventually only got as far as Porphyrius' *Isagoge*, and Aristotle's *Categoriae*, *De interpretatione*, *Analytica priora*, *Topica*, and *De sophisticis elenchis.* His translation of Aristotle's *Analytica posteriora* has not been preserved, resulting in the translation made by James of Venice becoming the received text from the 12th century onwards. This translation circulated more widely than the texts of other medieval translators, such as William of Moerbeke (ca. 1215–1286), and Gerard of Cremona (ca. 1114–1187). The Latin translations of Boethius and James of Venice together formed Aristotle's *Organon.* Late ancient philosophers read those texts in a certain order, starting with the basics in the works of *Categoriae* and *De interpretatione*, and then proceeding towards the complex theories of reasoning in the *Analytica priora*, *Analytica posteriora*, *Topica*, and *De sophisticis elenchis.* This order also became embedded in the logic curriculum in medieval and early modern universities, particularly in Northern Europe, where the translations of both Boethius and James of Venice served as the basis for the study of logic (Casey 2012; Geudens 2020, 293). This was also true of the Louvain Faculty of Arts, where Boethius was

ubiquitous in the lectures on logic. It is, therefore, not unsurprising that the texts in the Louvain textbooks that were printed between 1474 and 1532 contained the translations of Boethius and James of Venice.

3 The Typography of the Louvain Printed Lecture Texts

Louvain was not a standalone case when it came to printing standard versions of the works of Aristotle and Porphyrius. Between 1474 and 1532, printers in Cologne, Leipzig and Paris also produced numerous editions and, compared to Louvain, on a much more continuous basis. When studying the typography of these textbooks, it becomes clear that the page layout of the Leipzig editions was different, though it must be noted that the Leipzig printers perfected a technique that was already used by their Venetian counterparts (Eisermann 2008, 163–164). In the Leipzig editions the text was printed in big letters and, in addition to wide margins, they also possessed very large interlinear spaces, which printers obtained by inserting a strip of metal or wood between lines. As a result, students had the opportunity to include marginal and interlinear notes in their copies (Leonhardt 2003, 21–22; Jensen 2004, 465, 481, 488; Eisermann 2008, 163–165). Jürgen Leonhardt argues that this type of layout dominated Leipzig publications between 1490 and 1522, though only in textbooks intended to be used during lectures at the local university (Leonhardt 2003, 24).

Leonhardt focused in particular on the texts of classical authors that professors used for Latin education, but the same layout is also present in textbooks that contain Aristotle's works (Leonhardt 2003, 24; Spandowski 2006, 236). Because of the direct link with academic lectures, Leonhardt defines these books as printed lecture texts, or with the German terms *gedruckte Kollegheft*e and *Vorlesungsdrucke* (Leonhardt 2003, 21; Leonhardt 2008, 90; Leonhardt 2015, 232). These books were also fascicles or small volumes, meaning that printers offered every text separately to students, resulting in students being able to acquire cheap and thin textbooks. If desired, they could bind these fascicles together in a *Sammelband*, which allowed them to possess a full printed coursebook (Leonhardt 2008, 91–92, 95–96).

This chapter will prove that the term printed lecture text can be used to refer to the Louvain editions printed between 1474 and 1532, as they served a common purpose. Although printers opted for a different layout compared to the Leipzig editions, they still ensured that students could use these textbooks during lectures on logic at the Louvain Faculty of Arts. In accord with the Leipzig textbooks,

they offered fixity to students through a standardized text, with a page layout that allowed students to add annotations. The layout of the Louvain printed lecture texts also evolved, as printers started to include different paratexts in the post-incunables. This shows that printers experimented with typographic techniques and followed evolutions in book design that would become widely accepted during the post-incunable period. Both the Louvain and Leipzig textbooks are to be considered as prime examples of how printers and professors coped with the new medium of the printing press. Printers used certain typographic techniques to ensure that these books were geared towards the needs of students during lectures.

Between 1474 and 1476, both van Westfalen and Braem constructed a well-thought-out business plan to increase the salability and usability of their books. First, they decided to print the Latin translations of Boethius, as the Louvain professors commented on these texts during classes on logic (Papy 2012, 120; Masolini 2016, 209). Secondly, they included wide margins around the text, offering ample space for students to include notes, though they only offered small interlinear spaces. Because 15th-century books resembled the physical appearance of manuscripts, incunables often had a rectangular text block with large margins (Proot 2021, 238, 269). However, the layout of the editions of van Westfalen and Braem that contained the texts of Aristotle and Porphyrius differed from other books they produced. Whereas three earlier incunables that van Westfalen printed in Alost contained 33 lines per page and a type area of 147 × 87 mm., his *Logica vetus* had 24 lines and a type area of 132 × 78 mm. The same occurred with Braem, in that, for instance, his *Logica vetus* was set to 23 lines per page and the text block measured 133 × 82 mm., which is significantly smaller than his other books (Needham 1982, 15–16). Both printers deliberately used a smaller type area in books that corresponded with the curriculum of the Faculty of Arts. As a result, they ensured that these printed lecture texts offered ample space for students to annotate.

The large blank spaces were also the result of van Westfalen and Braem printing a continuous text, as was typical for incunables (Janssen 2004, 39; Aristotle and Porphyrius 1474; Aristotle and Porphyrius 1474–1475; Aristotle and Porphyrius 1475; Aristotle 1475). The design of the early printed book evolved slowly because it often took generations for novel typographical techniques to become a common aspect of books (Proot 2015, 45, 48). However, in general, printers of incunables continued traditions that were already present in the production of manuscripts, such as inserting paragraph marks in order to structure the continuous texts into sections (Janssen 2004, 39, 43). It is noteworthy that Braem utilized these marks in his second edition of the *Logica vetus* in 1475, especially when considering that Joran Proot argues that paragraph marks appeared for the first time in a book in the Low Countries in 1483 and subsequently became a typical feature until 1520

(Proot 2021, 256; Proot 2022, 179; Aristotle and Porphyrius 1475). Braem's inclusion of paragraph marks was novel compared with his first edition, and also with the *Logica vetus* of van Westfalen, both produced in 1474 (Aristotle and Porphyrius 1474; Aristotle and Porphyrius 1474–1475). With the use of these marks, he divided the continuous text into sections. This assisted the student's reading experience during the professor's dictation. As a result, with the use of paragraph marks, Braem enhanced the usability of his reprint.

The design of printed books changed significantly in the post-incunable period. Book historians agree that between 1501 and 1540 the printed book took its final mature form, as printers included paratexts such as a title pages, running titles, and printed marginal glosses (Mullins 2013, 13; Proot 2021, 238–239). These innovations were important, especially when considering their effect on how readers read or used their books. With such paratexts, printers and authors navigated the reader through the text. However, they also utilized certain typographical techniques to enhance its comprehension. Printers marked words or sentences with the use of bold, italic, or capital letters. Moreover, they ruptured the continuous text through the use of indented paragraphs, white spaces, and also titles to inform the reader that a new chapter or treatise had begun. This added division helped the reader to memorize material (Janssen 2004, 41; Rautenberg 2015, 298, 312–314). An important auxiliary tool was the printed marginal gloss, which often constituted a single word, a sentence, or a separate paragraph. It offered additional information about a particular word or sentence, or elaborated on the author's hypothesis, meaning that it was always linked to the source text (Tribble 1993, 29, 135, 142; Stenner 2022).

These novelties in book design are present in the four Louvain post-incunables that came off the presses of Dirk Martens and Servaas I van Sassen between 1509 and 1532. In his *Logica vetus*, published in 1509, and his *Logica nova* from 1510, Martens made use of a new page layout. He added running titles and interrupted the source text by way of indented paragraphs and titles as well as sentences, such as "*finis secondi libri topicorum Aristotelis*," to signal the end of a book (Aristotle and Porphyrius 1509–1510). Another novelty involved printed marginal glosses, which Martens always placed next to the section of the text these elaborated on. The glosses informed the student which information he was able to retrieve from a particular section through words in the form of "*auctoritas*," "*solutio*," and "*obiectio*" or short sentences such as "*tres definitiones specialissimi*" and "*due definitiones generalissimi*" (Aristotle and Porphyrius 1509–1510). As a result, when the professor dictated a definition or mentioned a proposition of Aristotle's, the student immediately knew to which part of the source text he needed to turn.

The splitting up of the text, the running titles, and the printed marginal glosses led to a larger type area, but this was a common feature of books in the Low Coun-

tries. Whereas for incunables, the ratio between the type area and blank space on a page was 44 % to 56 %, these numbers were reversed during the post-incunable period (Proot 2022, 179). Both the textbooks of 1509 and 1510 were set to 35 lines per page, and the type area measured 190 × 115 mm. without glosses, and 190 × 140 mm with glosses (Aristotle and Porphyrius 1509–1510). Martens and van Sassen produced almost identical reprints in 1525 and 1532. The textbook of 1525 was set to 34 lines with a type area of 205 × 116 mm. without glosses, and 205 × 140 mm. with glosses, whereas the 1532 edition had 36 lines with a type area of 216 × 123 mm. without glosses, and 216 × 150 mm. with glosses (Aristotle and Porphyrius 1525; Aristotle and Porphyrius 1532). This enlargement had a significant impact on how students could use these textbooks during lectures on logic, because it reduced the blank space on the page. Hence, in comparison with the incunables of van Westfalen and Braem, the post-incunables were less suited for students to annotate around the type area.

The Faculty of Arts also had an important role in the production of the printed lecture texts from 1509 and 1510. Its professors compiled the manuscript, meaning they devised the titles and wrote the marginal glosses. This was the result of the dean of the Faculty and the regents of the four pedagogies contacting Martens in 1509 to print a *Logica vetus* on commission. They had a dual incentive. They wanted to standardize the course material throughout the four pedagogies and offer students a tool to be used during lectures. As the contract stipulated, Martens allowed ample space for writing (State Archives Louvain, nr 712: fol. 277r; Dauwe 1974). In 1510, Martens was again commissioned to print the texts of the *Logica nova*, which he produced in two separate print runs (State Archives Louvain, nr 712: fol. 292r, 298rv, 299rv; Adam 2018, 107). When it comes to the source text there are only small differences between the two post-incunables and the incunables. The professors ensured that Aristotle's doctrine stayed pure and was easily comprehensible to students, meaning they did not need to offer a commentary. Instead, and also because of lack of time, they compiled a text almost identical to Boethius' original, though free from anything they considered too lengthy or redundant (Aristotle and Porphyrius 1509–1510).

4 Using the Printed Lecture Texts

The majority of students matriculating in the Louvain university started their studies at the Faculty of Arts. The four pedagogies of the Pig, Lily, Falcon, and Castle were the cornerstones of the Faculty and served a dual purpose. Each pedagogy was presided over by a regent and employed its own professors who were often graduates of the Faculty, as well as baccalaureates from the higher faculties of

law, theology, and medicine. The latter resulted in students following lectures on logic, physics, and metaphysics in one of the pedagogies. In addition to being schools, the pedagogies were also places of residence in which students not only enjoyed their meals, but also followed a daily schedule that centered around lectures, study, and recreation (De Maesschalck 2021, 19, 29, 259–260). From 1450 onwards the pedagogies were well established within the Louvain Faculty of Arts, but there being multiple professors led to the course on logic not being uniform. For instance, the pedagogy of the Lily embraced the ideas of humanism, while in the last quarter of the 15th century several professors of the pedagogy of the Falcon were punished for not teaching the doctrine of Aristotle correctly (Ijsewijn 2015, 393, 411; Geudens 2020, 7–8).

Scholars have devoted a good deal of attention to the organization of the Louvain Faculty of Arts, its method of teaching, and how Louvain students took notes. Arts professors, as mentioned in the previous section, were obliged by the statutes of the Faculty to comment on a fixed corpus of texts from Aristotle and Porphyrius during lectures on logic (Roegiers 1993, 13–14; Roegiers 2012, 25, 27; Papy 2012, 107–113, 119). Through study of 15th- and early 16th-century student notebooks, it became clear that the daily practice largely corresponded with the theoretical framework, with the exception of the reading of Aristotle's *Topica.* Whereas professors treated Porphyrius' *Isagoge* and Aristotle's books *Categoriae*, *De interpretatione*, *Analytica priora*, *Analytica posteriora*, and *De sophisticis elenchis* in their entirety, they only commented on the first two books of the *Topica*, while the statutes prescribed that they read the first four of the eight books that constituted this work. This gap was sometimes filled through the *Auctoritates Aristotelis* of the other books of the *Topica*, giving students at least a short introduction to the omitted books. This occurred, for instance, in 1482, when three students inserted the *Auctoritates Aristotelis* of book three and four in their notebooks, while in 1502 a student added the *Auctoritates Aristotelis* of books three to eight (Geudens and Masolini 2016, 823; Masolini 2016, 210–211; Geudens 2018, 84–85).

These handwritten notebooks also provide evidence about the method of teaching logic in Louvain and how students took notes. The professors commented on every work detailed in the curriculum through, on the one hand, textual exposition, which Louvain students often defined as *continuationes* in the colophons of their notebooks and, on the other hand, *quaestiones* (Smeyers 1975, 247; Masolini 2016, 208–209). The *expositio* was a *lectio* commentary, a teaching tool that flourished within medieval universities. It delivered a literal explanation of an authoritative text to students so that they obtained a detailed and complete knowledge of it. *Lectio* commentaries always followed a typical structure in order to enable memorization. The authoritative text was divided into passages and sections fol-

lowed by paraphrases or the *expositio* (Weijers 1995, 11–16; Ebbesen et al. 2014, 60–63).

This approach also was used in Louvain where professors divided each work into books, treatises, and chapters. A brief survey then followed through the introduction of a lemma, which was consequently explained by way of paraphrases (Masolini 2016, 208–209; Geudens 2020, 289). As a result, students received a content analysis of the works of Aristotle, in particular, an introduction to his doctrine. The *quaestiones* delved deeper into Aristotle's doctrine through a set of questions and/or objections by which professors explained aspects that were either unclear or were considered to be problematic. In correspondence with the *expositio*, they followed a typical structure. The chapters discussed in the *continuationes* were briefly summarized, followed by clarifications through *notanda*, and ending with questions and objections (*quaeritur*, *obicitur*, or *arguitur*), as well as answers that started with *respondetur*, *dicitur*, *dicendum quod.* Scholars often consider the *quaestiones* to be more relevant sources because these contained new ideas and had an explanatory nature, whereas the *continuationes* stuck closely to Aristotle's original text (Masolini 2016, 209; Geudens 2020, 289–290; Coesemans 2019, 26–27).

When questioning, however, how a printed textbook that contained a standard version of the texts of Aristotle and Porphyrius was used during lectures, the *continuationes* are important sources. A study of the notebooks revealed that the physical appearance of the *expositio* differed from that of the *quaestiones.* The *continuationes* constituted one column and contained neat handwriting, suggesting these were not written during lectures. The *quaestiones,* in contrast, consisted of two columns and were penned in a fast handwriting with many more abbreviations, which suggests these were the result of dictation. It has been argued that students copied the *continuationes* beforehand, and then used them as a textbook during lectures on logic. The argument behind this is that, first, these sources contain marginal notes that elaborate on the text, and they were written in the same handwriting as the *quaestiones.* Second, the *continuationes* are paraphrases or abridgments that are very similar to Aristotle's original text and, moreover, identical passages occur in different notebooks (Smeyers 1975, 252–254, 260–262; Masolini 2016, 212–214; Geudens 2018, 95; Geudens 2020, 290–292).

The argument about the copying of the *expositio* beforehand and then using this copy as a textbook is compelling and important for assessing the impact of the printing press on lectures of logic in Louvain. It shows that the Louvain lecture hall was already a varied media environment, becoming, as I propose, even more varied after the invention of moveable type. Between 1474 and 1514, scribal culture continued to exist alongside the use of printed textbooks in the Louvain Faculty of Arts. This is proven by the existence of six notebooks which Louvain students produced between 1477 and 1514 (Geudens 2020, 302–325). It is also possible that stu-

dents did not actively use a printed textbook before 1509, or had difficulties acquiring a copy, as printers in the Low Countries did not produce any printed lecture texts between 1476 and 1509. However, students who did acquire such printed lecture texts received a new teaching tool that alleviated the need to copy because it replaced the handwritten *expositio*. Moreover, they annotated their copies during lectures, which is proven by the many notes that are present in surviving copies. I argue that this was the true impact of the printing press on lectures in the Louvain Faculty of Arts. It did not change the daily practice of teaching as the *lectio* commentary and the *quaestiones* remained the key components of lectures on logic, nor did it oust scribal culture. In fact, the printed textbooks led to the lecture halls becoming an even more hybrid environment, as from 1474 onwards, the printed word accompanied the voice, the ear, and the written word.

When textually comparing the Louvain printed lecture texts with a student notebook from 1502, it becomes clear that the source texts contained therein are similar and, in some cases, even identical. In his notebook from 1502, the student Alardus Tassard employed a typical page layout. It is noticeable that he wrote a few phrases in bold letters, such as "*mox de generibus dicetur*," "*videtur autem quod nec*" and "*tripliciter ergo dicendum*," to introduce a lemma (Ms. 0609, fol. 15v–16r). These short sentences match the beginning of the corresponding lemma in the printed textbooks. For instance, in Braem's *Logica vetus* from 1475, these sections start with "*mox de generibus & speciebus*," "*videtur autem neque genus neque species simpliciter dici*" and "*tripliciter igitur cum genus dicatur*" (Aristotle and Porphyrius 1475, fol. 1r–2r). There is only a small difference in the *Logica vetus* from 1509, and in its 1525 and 1532 reprints, as the professors omitted the word *mox* and constructed the following opening to that sentence: "*de generibus ergo & speciebus dicere*" (Aristotle and Porphyrius 1509–1510, Aiirv; Aristotle and Porphyrius 1525, Aiirv; Aristotle and Porphyrius 1532, Aiirv).

The similarity of these passages delivers the first evidence that students who acquired a printed lecture text were no longer required to copy the *expositio* by hand. The copying by hand must have been a laborious endeavor because, in addition to Aristotle's and Porphyrius' texts, the student Alardus Tassard copied many introductory sentences. In his notebook, the bold letters are followed by paraphrases which always start with an introduction to the subject the *auctor* discusses before stating his definitions and propositions. It is noticeable that the definitions and propositions are often underlined and similar or even identical to Boethius' original, as well as with the source text in the printed textbooks because these contained his translation (see Table 1). Table 1 is composed of sentences originating from the student notebook from 1502, Braem's *Logica vetus* from 1475, and the *Logica vetus* printed by Martens in 1509. Many more examples could be given, but it is clear that Table 1 delivers conclusive proof that printed lecture texts could

replace the earlier copying of the *expositio.* However, small differences exist between the source text of the incunable and the post-incunable, as well as between the handwritten notebook and the two printed textbooks. The textual difference between the two textbooks results from the production process of the edition from 1509. As mentioned earlier, the Faculty of Arts financed the print run of the *Logica vetus* from 1509, and its professors compiled the manuscript. Table 1 shows not only that they ensured the purity of Aristotle's doctrine by staying close to Boethius' original translation, but that the compilers of the manuscript also omitted anything they considered to be too lengthy or redundant.

Table 1: Comparison of a notebook with two printed textbooks.

Notebook from 1502	Logica vetus from 1475	Logica vetus from 1509
"*in prima particula Porphyrius enumerat tres questiones dificiles a quibus vult abstinere … quod subsistantia utrum sint corporata an incorporalia, et utrum sint separata a sensibilibus ut in sensibilibus posita …*"	"*sive subsistentia corporalia sint an incorporalia ! et utrum separata a sensibilibus an in sensibilibus posita*"	"*et si corporalia sint an incorporalia. Et utrum separata sint a sensibilibus an in sensibilibus sint posita*"
"*quod dicitur ab aliis rurso dicere genus uniuscuiusque generationis principium ut ab eo qui genuit ut a loco et quo quis genitus est*"	"*Dicitur autem et aliter rursus genus quod est uniuscuisque generationis principium vel ab eo qui genuit vel a loco in quo quis genitus est*"	"*altero modo dicitur genus; quod est uniuscuiusque generationis principium: vel ab eo qui genuit vel a loco in quo quis genitus est*"
"*Cum genus tripliciter dicatur de genere tertio modo apud philosophos sermo est quod diffinientes dicitur genus est quod praedicatur de pluribus differentibus specie in eo quod quid est ut animal*"	"*Tripliciter igitur cum genus dicatur ! de tertio apud philosophos sermo est, quod etiam describentes affignaverunt genus esse dicentes quod de pluribus et differentibus specie in eo quod quid sit predicatur ut animal*"	"*Tripliciter ergo cum genus dicatur, de genere tertio modo apud philosophos est sermo, quod diffiniverunt. Genus est quod praedicatur de pluribus differentibus specie: in eo quod quid est: ut animal*"
(Ms. 0609: fol. 15v–16r)	(Aristotle and Porphyrius 1475, fol. 1r–2r)	(Aristotle and Porphyrius 1509–1510, Aiirv)

There are also textual differences between the notebook and the printed lecture texts, which is explained by the fact that the two books only contain Boethius' Latin translation. The notebook, however, does contain introductory sentences such as "*in prima particula Porphyrius enumerat tres quaestiones difficiles in quibus vult abstinere*," which stem from the way professors taught logic in Louvain (see Table 1). They dictated a text and started every text of Porphyrius and Aristotle with a brief introductory survey. In this case, the professor indicated that Porphyr-

ius sums up three difficult questions in the first part of his *Isagoge.* The sentence quoted above was not part of the printed source text in the textbook from 1475, but professors were still dictating those words when students used a copy of this printed textbook during lectures. This is proven by the annotations of an anonymous student. He wrote a similar introductory phrase as the one quoted above in the margin and also added "*primo quaestio difficiles*" and "*secundo quaestio*," next to the sentences in the source text dealing with these questions (Aristotle and Porphyrius 1475, fol. 1r). An additional difference between the two printed lecture texts is that in the *Logica vetus* from 1509 these sentences are accompanied by the following printed marginal gloss: "*tres questiones difficiles*" (Aristotle and Porphyrius 1509–1510, Aiir). This eliminated the need for the student to write down the introductory phrases. In the case of the Louvain Faculty of Arts, the theory is that students produced notebooks until 1514, only for these to disappear until the end of the 16th century. From 1594 onwards, this system of writing a notebook returned. The majority of the 16th-century Leuven students thus no longer slavishly copied their professor's dictation, but took notes in the margins of their printed textbooks (Geudens and Papy 2015, 367–371). The *Logica vetus* of 1509, which was printed on commission for the Louvain Faculty of Arts, therefore counts as the beginning of that evolution towards primarily using printed textbooks during lectures on logic.

Because of the printing on commission and the involvement of professors, the *Logica vetus* from 1509 and the *Logica nova* from 1510 are examples of local knowledge creation, as these textbooks reflect local teaching practices from the beginning of the 16th century (for the importance of local knowledge production, see Johns 1991, 5, 16–17). As mentioned earlier, professors only commented on the first two books of Aristotle's *Topica.* It was probably not feasible for them to comment on the prescribed first four books because of the tight lecture schedule, as the course on logic had to be completed within nine months (Papy 2012, 107; Masolini 2016, 210). But professors did offer students an introduction to the other six books by way of the *Auctoritates Aristotelis.* This is proven by their presence in the student notebook from 1502. When studying which texts of the *Topica* are included in the *Logica nova* from 1510, it appears that Martens printed the first two books followed by the *Auctoritates Aristotelis* of book three to eight (Aristotle and Porphyrius 1509–1510, aiir–d5v). These disappeared in the reprints of the two textbooks from 1525 and 1532, which contained the text of the eight books of the *Topica* (Aristotle and Porphyrius 1525; Aristotle and Porphyrius 1532). One copy of the reprint from 1532 contains numerous student annotations in book three, but none in book four, which suggests that this student attended a lecture in which book three was treated. This could mean that, because of the printed textbook, professors were able to comment on more texts within the nine-month period. However, this theory requires more evidence to be conclusive, as only three

copies of the reprints from 1525 and 1532 remain, and only one of those contained student annotations.

5 Conclusion: The Value of Book History

It is noticeable that almost all of the studies on the teaching of logic in the medieval and early modern Louvain Faculty of Arts focused on student notebooks as primary sources. This is not surprising as these are first-hand testimonies from within the lecture halls. These manuscripts offer ample evidence on the daily practice of teaching and the transfer of knowledge in that context. However, in order to reconstruct a full picture of the teaching of logic, it is necessary to include printed books. The Louvain Faculty of Arts was after all an environment wherein scribal culture existed alongside a thriving book culture. Therefore, I argue that studying this subject from a book-historical perspective involving typical book-historical methods such as a consideration of typography, is important. This is particularly the case when questioning how the new medium of the printing press impacted everyday teaching practices.

In this article, I have focused on printed lecture texts, or textbooks that contained standard version of the texts of Aristotle and Porphyrius, that were printed in the Low Countries between 1474 and 1532. I follow Michael Baldzuhn's theory that, in order to investigate the true impact of a new medium on teaching, a study of the relationship between that new medium and daily practice during lectures is necessary. This means that in order to obtain conclusive results on the impact of the printing press, is it necessary to study the printed textbooks of the time, as well as the type of sources students already made use of before the arrival of the new medium. Therefore, I chose to study the page layout of nine printed lecture texts. The study of typography is important as this is the action of arranging print material in service of a specific goal. This means that the design of a book was always the result of a well thought out plan. Moreover, as we have seen in the case of both the Louvain and Leipzig textbooks, these typographical choices were often aimed at meeting the needs of the members of a local university. As a result, the page layout of a textbook reveals its intended use, but in order to assess how students actually used these sources during lectures on logic, a textual comparison between handwritten notebooks and printed textbooks is necessary.

Through this combination, it has become clear that the new medium of the printing press indeed impacted lectures on logic in Louvain between 1474 and 1532. A typographical study of the nine editions reveals that printers offered fixity, as they produced a textbook that was geared towards use during lectures. This was made possible by a specific page layout and the inclusion of a standard version of

the texts of Aristotle and Porphyrius. Moreover, printers ensured that textbooks evolved by way of using typographic techniques and paratexts, thereby improving usability during lectures. I argue, however, that the printing press did not change daily practice in lectures on logic between 1474 and 1532, as these still centered around the *expositio* and the *quaestiones*. The actual goal of purchasing these textbooks was to replace the copying of the *expositio*, which alleviated the students' writing task. Students who acquired a printed copy were also able to add marginal notes during lectures. Therefore, this case study of the Louvain Faculty of Arts affirms the theories of Baldzuhn and Gavin Moodie. Both argue that the printing press augmented the availability of texts for students, but never changed the core activities of universities (Baldzuhn 2006, 263, 266; Moodie 2014, 465–466; Baldzuhn 2021, 74). Hence, the printed textbook needs to be considered as an artifact that supported the oral communication between professors and students (Baldzuhn 2021, 85). This was exactly what occurred in Louvain where the printed textbook became a part of daily practice when teaching logic. As a result, because of the printing press, the Louvain Faculty of Arts became a varied media environment between 1474 and 1532.

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