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Front cover photography: The image shows part of the cartouche of the map *Ducatus Carnioliae tabula chorographica* by Janez Dizma Florjančič from 1744. The personified Carniola is surrounded by the coats of arms of noble families and a mountainous landscape showing the entrance to a mine, a waterfall, a river gorge, and people on stilts (Geographical Museum GIAM ZRC SAZU).

Fotografija na naslovnici: Na sliki je predstavljen del kartuše zemljevida *Ducatus Carnioliae tabula chorographica* Janeza Dizme Florjančiča iz leta 1744. Personificirano Kranjsko obdajajo grbi plemiških rodbin in gorska pokrajina, kjer so upodobljeni vhod v rudnik, slap, rečna soteska in osebi na hoduljah (Zemljepisni muzej GIAM ZRC SAZU).

TRADITIONAL AND MODERN CARTOGRAPHIC MATERIALS FOR GEOGRAPHY TEACHING: FROM BLAŽ KOCEN TO THE PRESENT

Rožle Bratec Mrvar, Primož Gašperič



Portrait of Blaž Kocen (Dom in svet 11-24, 1898).

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Rožle Bratec Mrvar¹, Primož Gašperič²

Traditional and modern cartographic materials for geography teaching: From Blaž Kocen to the present

ABSTRACT: This article presents cartographic teaching materials used in two different periods: the second half of the nineteenth century and the beginning of the 2020s. During the first period examined, the works of Blaž Kocen (also Blasius Kozenn) laid the foundations of school cartography in the Habsburg Monarchy. The most highly valued among them in central Europe were his atlases, which have the longest tradition of publishing in the world. In the second period, technological development and the COVID-19 pandemic laid the foundations for a faster transition to digital approaches to teaching. This article examines the use of maps, atlases, and textbooks by Slovenian geography teachers to determine whether modern (digital) teaching materials have replaced or will replace the traditional (paper) ones. It was established that the use of printed cartographic materials continues to predominate in geography teaching, which indirectly preserves the importance of Kocen's pioneering and visionary work.

KEY WORDS: cultural geography, cartography, geography instruction, geography didactics, school atlas, map, history of cartography, Slovenia

Uporaba klasičnih in sodobnih kartografskih učil za poučevanje geografije: Od Blaža Kocena do danes

POVZETEK: Namen članka je predstaviti kartografska učila dveh obdobj: v drugi polovici 19. stoletja in na začetku 21. stoletja. V prvem obdobju je Blaž Kocen s svojimi deli postavil didaktične temelje šolske kartografije na območju habsburške monarhije. V Srednji Evropi so bili strokovno najbolj cenjeni njegovi geografski atlasi, ki imajo najdaljšo tradicijo izhajanja na svetu. V drugem obdobju pa sta tehnični razvoj in pandemija postavila temelje za hitrejši prehod na digitalne didaktične pristope. V raziskavi smo preučili uporabo zemljevidov, atlasov in učbenikov pri slovenskih učiteljih geografije ter ugotavljali ali so oziroma bodo sodobna (digitalna) učila zamenjala klasične (papirne). Ugotovili smo, da pri pouku geografije še vedno prevladuje uporaba tiskanih kartografskih učil, s čimer se posledično ohranja pionirski in vizionarski pomen Kocenovega dela.

KLJUČNE BESEDE: kulturna geografija, kartografija, didaktika geografije, šolski atlas, zemljevid, zgodovina kartografije, Slovenija

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1 Introduction

This article highlights two periods reflecting the development and application of teaching materials in what is now Slovenia. Based on the large quantity of his works and their wide use in school geography, Blaž Kocen is considered one of the founders of modern geography teaching (or didactics). To better understand the importance of his work for geography in Slovenia, central Europe, and the rest of the world, the most important points in his professional career are presented, followed by an evaluation of his work in cartography and geography teaching.

Kocen is considered one of the most important geographers and cartographers, and the founder of geography teaching in the Habsburg Monarchy. In just over a decade (between 1860 and 1871), he produced an enormous quantity of cartographic works, especially school atlases. In the form of various adaptations and reprints, his atlases for primary schools and secondary schools, which have been printed in millions of copies and achieved great recognition in professional circles, have been published in at least 209 German editions to date; in addition, several dozen editions have also been published in Czech, Polish, Hungarian, Croatian, and Italian. A total of at least 297 different atlases have been published under his name, of which 210 or over two-thirds are secondary-school atlases (Bratec Mrvar et al. 2011). It is striking that over a century and a half later these works still bear the name of their original author, even though they have been reworked and updated in terms of both content and design. In 2011, *Grosser Kozenn-Atlas mit Atlas-CD* (Kocen's Great Atlas with CD) published by Hölzel even received the best school atlas award from the International Cartographic Association.

In Slovenia, several articles on Kocen's life and work have been published in newspapers (e.g., Dom in svet 11-24, 1898; Ljubljanski zvon 19-7, 1899; Jutro 21, 1921) and later in journals (e.g., Žagar 1973; Freljih, Bratec Mrvar and Gašperič 2020) and books (e.g., Kunaver 2009; Bratec Mrvar et al. 2011).



SLAVA KOVAČIĆ (PHOTO: ANTON IJHAN)

Figure 1: Kocen's birthplace at Hotunje. The house collapsed at the end of the 1960s.

Blaž Kocen was born in 1821 in the Styrian village of Hotunje near Ponikva (Figure 1). After elementary school, he attended the upper secondary school in Celje and then a lyceum in Graz. In 1845, he graduated in theology in Klagenfurt and was ordained the same year. He initially served as a curate in Šentrupert above Laško, Šoštanj, and Rogatec. In 1850, he became a substitute teacher at the upper secondary school in Celje, where he taught mathematics, physics, and natural history for two years. Then he studied at the Institute of Physics in Vienna for just under a year. In 1853, he obtained a full-time position as a teacher at the upper secondary school in Ljubljana. At that time, the school began purchasing modern geography teaching materials, and some of Kocen's students mention that he constantly carried one geography textbook or another with him (Marburger Zeitung, 25. 1. 1944).

In September 1855, he relocated to Gorizia, where he taught mathematics and physics at the upper secondary school and began to engage in geography research and write school textbooks. In 1859, he took up a position at the German-language upper secondary school in Olomouc (now in the Czech Republic), where he taught Latin, Greek, natural history, mathematics, physics, and, later, geography. Illness compelled him to retire early, in 1870. He died in Vienna a year later (Bratec Mrvar et al. 2011).

This article presents cartographic teaching materials used in two different periods: the second half of the nineteenth century and the beginning of the 2020s. During the first period examined, basic geography teaching materials were introduced, and, during the second period, technological development and the COVID-19 pandemic laid the foundations for transitioning to digital teaching approaches. Therefore, this study examines whether modern (digital) teaching materials have replaced or will replace traditional (paper) ones.

The nineteenth century saw the rise of modern cartography (Gašperič 2010). With the national revival in the second half of the nineteenth century, cartography in Europe became increasingly nationally oriented (Gašperič 2007). The content on maps became more detailed, with very accurate data. The second half of the nineteenth century was also when the first cartographic works for geography teaching were published, and so this period is directly related to Kocen as the author of school textbooks, atlases, and maps. The second period examined refers to 2022, when things began to normalize after the COVID-19 pandemic. This pandemic caused radical changes to society and the environment, which also had a strong impact on teaching and learning geography (Chang 2020). Work and education were carried out remotely. In 2021, the impacts of the pandemic were still strongly present in everyday life, but in 2022 they gradually eased off because by that point a sufficient number of people had recovered from it and had been vaccinated, and general awareness among people was also high. Therefore, the use of geography teaching materials among Slovenian geography teachers was examined along with their preferences in this regard.

2 Methods

The situation in the first period was examined by reviewing the life and work of the founder of geography teaching, Blaž Kocen. The discussion presents many of his seminal works in the form of maps, atlases, and textbooks, outlining his pioneering work, which has been preserved until today in the form of atlases. The situation in the second period studied was examined using an online survey among Slovenian geography teachers, which focused on the following:

- The use of wall maps, folded maps, and printed atlases in teaching geography and in geography exams;
- The use of digital maps in teaching geography;
- Views on using digital maps and atlases in the future;
- Familiarity with established Slovenian nineteenth- and twentieth-century cartographers, with an emphasis on Kocen.

An e-request to complete the questionnaire used in the survey was sent via the mailing list on the Geolista website, which is part of the Association of Slovenian Geographers and makes up an online database of emails of geographers, geography students, and anyone else interested in geography in Slovenia. The questionnaire was created in the application 1KA and sent to 883 recipients. Nineteen short questions were accessible online for five days (from November 6th to 11th, 2022), and a total of 132 respondents completed the questionnaire in full.

Primary school geography teachers predominated among the respondents that completed the questionnaire (54%), followed by secondary school teachers (technical and general high schools, and high schools with a specialization; 28%), university professors (geography departments in Ljubljana, Maribor, and Koper; 15%), and others (university of the third age, 3%).

3 Results

Printed cartographic materials still tend to predominate in geography teaching. Folded maps are used by 67% of respondents, printed school atlases by 79%, and wall maps by 81%.

Over half of the respondents (56%) require students to use folded maps in class, and 64% require them to use a school atlas. There are certain deviations between oral and written exams in terms of using cartographic materials. During oral exams, 46% of respondents report that their students use folded maps and 59% report that they use school atlases. During written exams, the corresponding percentages are 36% and 30%, respectively (Figure 2).

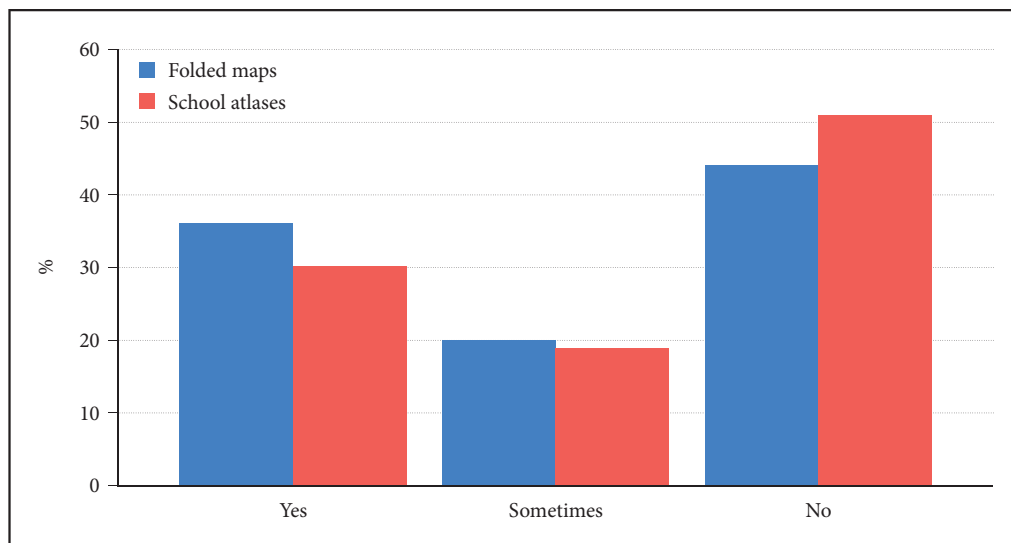


Figure 2: Use of folded maps and school atlases during written exams.

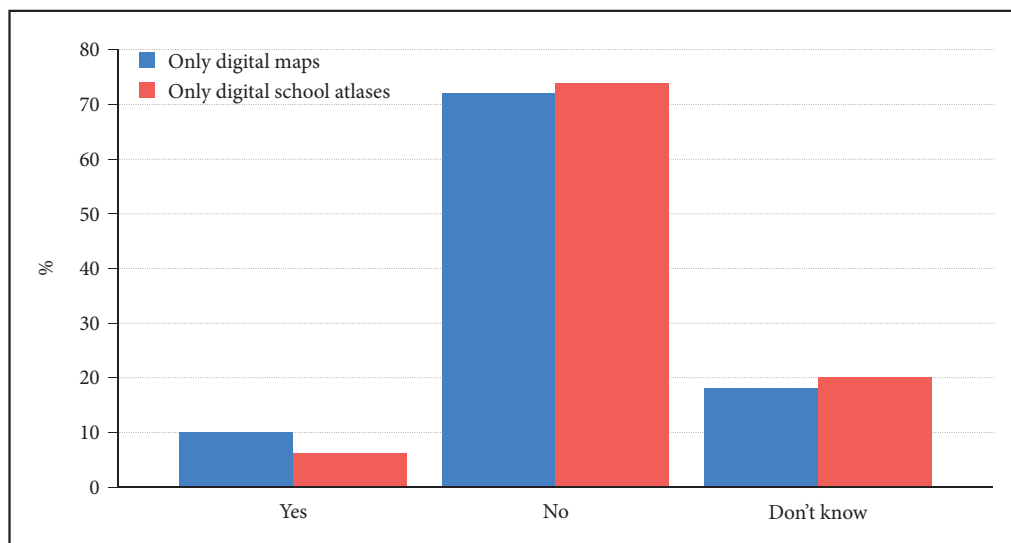


Figure 3: Teachers' views on the use of digital maps and atlases in five years.

With regard to using digital or printed cartographic teaching materials, 48% of respondents reported that they use both types of materials equally, 36% prefer printed materials, and 16% prefer digital ones. In addition, most teachers agree that only digital maps (72%) or digital atlases (74%) will not be used in five years (Figure 3).

This article describes Kocen's life and work in detail, and so the goal was also to determine whether the teachers are familiar with him as a person whose work influenced the production and importance of cartographic materials (i.e., maps, atlases, and textbooks). In addition to Kocen, the respondents were also asked about Peter Kozler (1824–1879) and Valter Bohinec (1898–1984). The businessman, lawyer, geographer, cartographer, and politician Peter Kozler was the author of *Zemljevid slovenske dežele in pokrajin* (Map of the Slovenian Land and Regions) printed in 1852. The map was a cartographic depiction of the United Slovenia political program, which strove for a single Slovenian province within the Habsburg Monarchy. The librarian, speleologist, geographer, and cartographer Valter Bohinec coauthored many general geographical and thematic maps used in schools and elsewhere. Most respondents were good at identifying Kozler and Kocen as geographers and cartographers (95%), but they were somewhat less familiar with Bohinec (85%). The results were similar for their works. Kozler was identified as the author of atlases and/or maps by 95% of the respondents, Kocen by 93%, and Bohinec by 73% (Figure 4).

4 Discussion

The survey examined the ratios between the current use of traditional materials and digital sources, which are also increasingly applied in geography teaching. Even though at the end of the twentieth century increasingly more atlases were available in electronic form on CDs, traditional printed atlases continued to predominate in geography teaching (Dent 1996). The survey among Slovenian geography teachers thus investigated whether that still applied to Slovenian schools a quarter of a century later. The results showed that school atlases continue to predominate in geography teaching in Slovenian schools (they are required

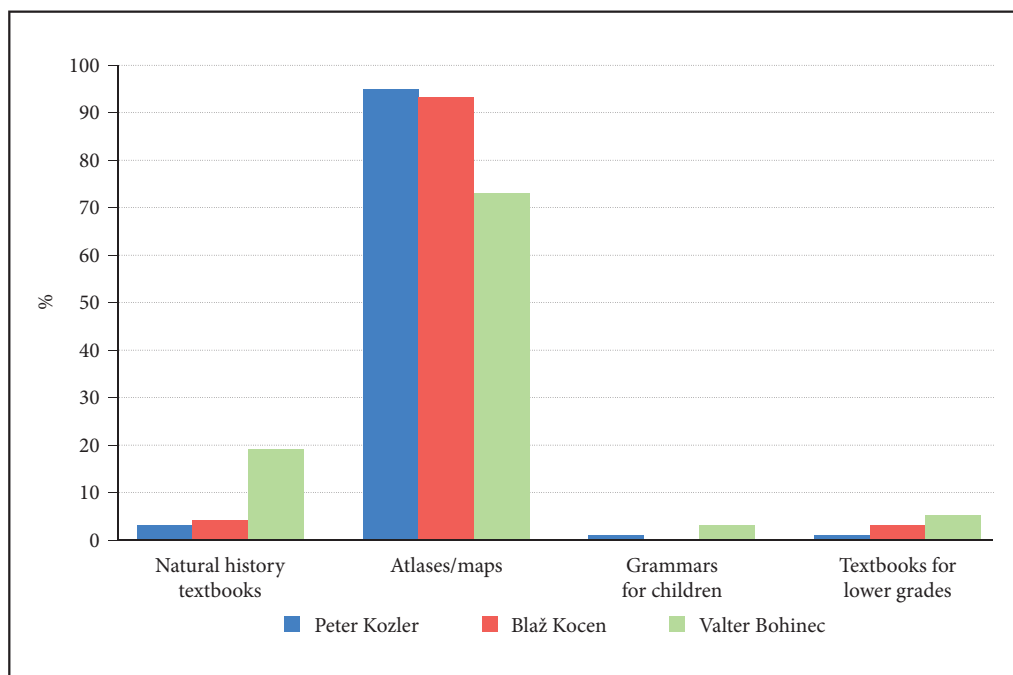


Figure 4: Teachers' views on the work of Peter Kozler, Blaž Kocen, and Valter Bohinec.

by approximately two-thirds of the teachers surveyed), followed by wall maps and folded maps. Today's perception of geographical space has been radically changed by cell phones because »the need for one's own orientation in space is decreasing« (Fridl 2016, 175). The digital media are truly taking control, and so »the syllabuses and learning methods in Slovenian schools will have to be adapted to these changes« (Fridl 2016, 184). Due to the lack of literature and expertise, cartographic literacy development in Slovenia was only included in the initial stages of primary school education around 2000 (Umek 2001; Hergan and Umek 2011). In terms of the ability to use their functional knowledge, Slovenian children lag behind their Asian counterparts, in which the use of maps or cartographic symbols is reported to have a similar stimulating effect on the development of the brain as the use of Chinese or Japanese characters (Hergan and Umek 2013). The results of an extensive survey conducted in 1999 as part of the research project »Spoznavní zemljevid Slovenije« (Cognitive Map of Slovenia), in which respondents were asked to draw the mental images they had of familiar and unfamiliar places in Slovenia, are also very revealing (Natek 2002). The level of cartographic literacy among Slovenian primary-school students was already low in the first decade of the twenty-first century (Hojnik and Hus 2012), and it did not significantly improve over the following years (Fridl 2016). It can be confirmed that the transition from traditional to digital teaching materials is continuing to grow stronger. In the mid-2010s, approximately 90% of teachers predominantly used traditional textbooks, maps, and atlases (Fridl 2016), whereas this study reveals that today a large portion of teachers (48%) are using digital and printed materials equally. Distance learning has definitely also played a role in this. A major advantage of mobile cartography is »presenting spatial data to a mobile user based on his context and his profile« (Reichenbacher 2001, 44). Clearly, the use of interactive multimedia teaching aids and hypermedia content, such as e-textbooks, mobile apps, and GIS, is also on the rise (Cartwright, Peterson and Gartner 2007). Their importance in teaching is growing: they have become »an active digital database of geospatial information« (Kolnik 2020, 10). Also growing in importance are information and communication technologies, which »make it possible to virtually simulate the transition from observation /.../ to its cartographic representation« (Kolnik 2020, 8). However, the view presented by the Slovenian educator and geography teacher Slavko Brinovec (1936–2022) that an atlas and a map are indispensable because they »encourage students to walk outdoors with their eyes open and observe« (Lipovšek 2018, 58) continues to predominate. The aspect that Brinovec highlighted is also one of the main advantages of printed cartographic materials.

Kocen's cartographic work was the most productive during the time he spent in Olomouc, where he met the publisher, printer, bookseller, and merchant Eduard Hölzel (1817–1885), together with whom he established the largest and most important cartographic institute in the Austrian Empire (Slanar 1984). In a period spanning just twelve years, Kocen published three textbooks in ten editions, seven atlases in over fifty editions, over twenty pocket maps, and at least eleven wall maps (Bratec Mrvar 2000). His following statement nicely illustrates the importance of cartographic material: »Ultimately, it should also be noted that a map is still the most excellent geographical teaching aid because a book merely explains a map and indicates the most important points it contains« (Kocen 1877, 1).

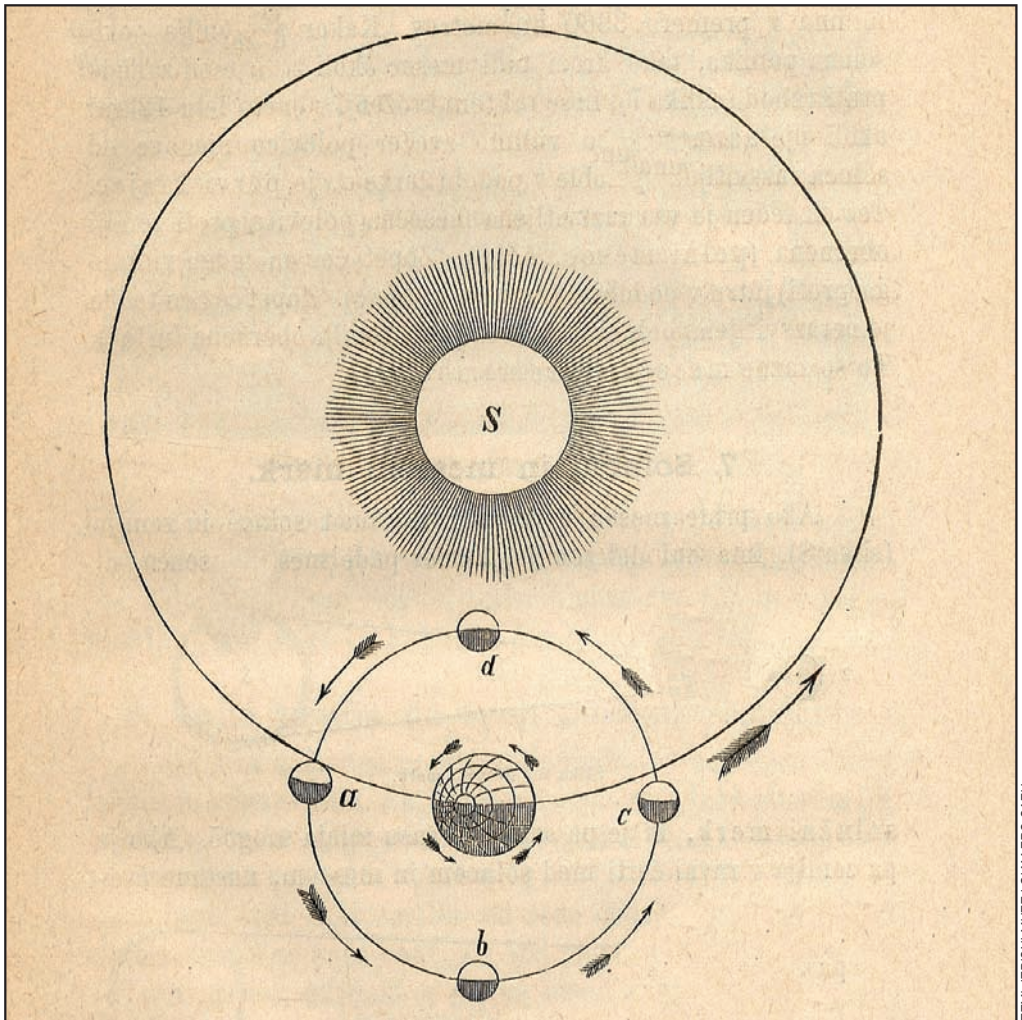
His works can be divided into four main categories: textbooks, maps, school atlases, and research works.

4.1 Kocen's textbooks

Textbooks were Kocen's earliest educational works. He wrote four textbooks, which were published in a total of forty-one editions between 1858 and 1898 (Table 1). The first among them was the only one that he wrote while still teaching at the upper secondary school in Gorizia, and it was initially not published by Hölzel. In its introduction, Kocen explains that »a special value of geography lies in its explicitness and deeply entrenched conceptions of the subjects of its study« (Kozenn 1858, 3). In this textbook, he conceived learning as proceeding from »familiar, easy, and simple to unfamiliar, difficult, and synthetic consolidation of knowledge« (Kozenn 1858, 3). He supported the idea that students should copy drawings, sketches, and images (Figure 5), he stressed the importance of properly writing and pronouncing foreign geographical names, and he was the first to add information on their pronunciation in atlases. A need soon arose for separate textbooks for primary schools on the one hand and secondary schools on the other, which is why he started writing new textbooks. The last, significantly modified and abridged, edition of his first textbook for primary schools and the first grades of secondary schools, titled *Grundzüge der Geographie* (Basics of Geography), was published in 1871. His textbooks were also translated from German into Czech and Slovenian.

Table 1: Overview of Kocen's geography textbooks published between 1858 and 1898 (Kunaver 2009).

Title	Published 1858–1871	Published 1872–1898
<i>Grundzüge der Geographie</i> (Basics of Geography)	5	0
<i>Leitfaden der Geographie für die Schulen im Kaiserthume Oesterreich</i> (Guide to Geography for Schools in the Austrian Empire)	2	19
<i>Erdbeschreibung für Volksschulen</i> (Geography for Primary Schools)	4	10
<i>Die österreichisch-ungarische Monarchie: für den geographischen Schulunterricht</i> (The Austro-Hungarian Monarchy: Geography Teaching)	0	1
Total	11	30



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Figure 5: Illustration from the Slovenian edition of Kocen's *Erdbeschreibung für Volksschulen* (Kocen 1879) showing the orbits of the Moon and Earth around the Sun.

4.2 Kocen's wall maps and folded maps

After the mid-nineteenth century school reform, every primary and secondary school was required to have at least three wall maps: of the two hemispheres, Europe, and central Europe (Fuchs 1952). To this end, Hölzel started publishing Kocen's wall maps and folded maps before his atlases (Haardt 1898). Kocen's general geographical and historical maps were used in schools until the end of the nineteenth century. His wall maps and folded school maps (Table 2) were published in German, Czech, Hungarian, Croatian, and Polish.

Table 2: List of known maps published by Hölzel during the initial period of Kocen's cartographic activity.

Title	Type
<i>Planigloben or Halbkugeln der Erde</i> (The Earth's Hemispheres)	/
<i>Europa</i> (Europe)	Wall
<i>Schulwandkarte der Österreichisch-ungarischen Monarchie</i> (School Wall Map of the Austro-Hungarian Monarchy)	/
<i>Palästina</i> (Palestine)	/
<i>Königreich Böhmen</i> (The Kingdom of Bohemia)	Wall
<i>Mähren und Schlesien</i> (Moravia and Silesia)	Wall
<i>Niederösterreich</i> (Lower Austria)	Wall
<i>Oberösterreich</i> (Upper Austria)	Wall
<i>Kärnten</i> (Carinthia)	Wall
<i>Steiermark</i> (Styria)	Wall
<i>Oberösterreich und Salzburg</i> (Upper Austria and Salzburg)	Wall

Table 3: List of known regional maps published by Hölzel (most likely) after 1869.

Title
• <i>Höhenschichtenkarte von Ober-Österreich und Salzburg</i> (Map of Upper Austria and Salzburg with Contour Lines)
• <i>Handkarte von Böhmen</i> (Pocket Map of Bohemia)
• <i>Handkarte von Mähren und Schlesien</i> (Pocket Map of Moravia and Silesia)
• <i>Handkarte der Österreichisch-ungarischen Monarchie zur Übersicht der topographischen und politischen Einteilung</i> (Pocket Topographic and Political Map of the Austro-Hungarian Monarchy)
• <i>Berg- und Flußkarte der Österreichisch-ungarischen Monarchie</i> (Map of Mountains and Rivers in the Austro-Hungarian Monarchy)
• <i>Alpenländer</i> (Alpine Lands)
• <i>Österreichische Alpenländer</i> (Austrian Alpine Provinces)
• <i>Ungarn und Nebenländer</i> (Map of Hungary and Neighboring Lands)
• <i>Karte von Böhmen</i> (Map of Bohemia)
• <i>Karte von Galizien mit der Bukowina</i> (Map of Galicia and Bukovina)
• <i>Karte von Länder der ungarischen Krone</i> (Map of Hungarian Crownlands)
• <i>Karte von Mähren und Schlesien</i> (Map of Moravia and Silesia)
• <i>Karte von Karpathenländer</i> (Map of Carpathian Lands)
• <i>Karte von Nieder-Österreich</i> (Map of Lower Austria)
• <i>Karte von Ober-Österreich und Salzburg</i> (Map of Upper Austria and Salzburg)
• <i>Karte von Steiermark</i> (Map of Styria)
• <i>Karte von Kärnten</i> (Map of Carinthia)
• <i>Karte von Steiermark und Kärnten</i> (Map of Styria and Carinthia)
• <i>Karte von Krain mit Istrien</i> (Map of Carniola and Istria)
• <i>Karte von Krain, Istrien, Görz, unt. Kärnten und unt. Steiermark</i> (Map of Carniola, Istria, the County of Gorizia, Lower Carinthia, and Lower Styria)
• <i>Karte von Tirol mit Vorarlberg</i> (Map of Tyrol and Vorarlberg)
• <i>Schulkarte von Bayern</i> (School Map of Bavaria)
• <i>Schulkarte von Württemberg</i> (School Map of Württemberg)
• <i>Schulkarte von Baden</i> (School Map of Baden)
• <i>Schulkarte der Schweiz</i> (School Map of Switzerland)

Hölzel also published these maps in a reduced pocket format (Figure 6), along with maps of Alpine lands and the supplementary regional maps of all Austrian crownlands, Switzerland, Bavaria, Württemberg, and Baden. His pocket maps are rare and poorly preserved. An overview of his maps' titles and the territories depicted on them shows that Hölzel also planned to expand to the Swiss and German markets (Table 3). Because the maps have no dates, it can be concluded that the regional maps (*Vaterlandskarte*) were primarily published after 1869.

What is now Slovenia is depicted on the *Map of Styria and Carinthia*, and the *Map of Carniola, Istria, the County of Gorizia, Lower Carinthia, and Lower Styria*; the latter could also be dubbed a »map of the Slovenian lands« because on it the Slovenian linguistic border is marked in blue by hand. It must have been inspired by the well-known *Map of the Slovenian Land* published by Peter Kozler in 1853, which used a similar scale and depicted a similar area. On Kocen's map, nearly all the names are provided exclusively in German.



ZBIRKA PRIMOŽA PREMŽLA

Figure 6: Kocen's Map of Styria from around 1869.

4.3 Kocen's school atlases

What are known in German as the *Kozenn-Atlanten* 'Kocen's atlases' remain the most highly recognized school atlases in Austria today (Table 4). Their German, Czech, Polish, and Hungarian editions were followed by many other licensed editions across Europe and beyond (Kretschmer and Dörflinger 1995; Bratec Mrvar 2012). Best known in central Europe is Kocen's secondary-school atlas (Figure 7), which was published without interruption from 1861 to 1978, and then again from 1996 onward. It was published in nearly three hundred different editions and reprints under various titles, and its »descendants«, *Kozenn Schulatlas* (Kocen's School Atlas) for primary schools and *Großer Kozenn-Atlas* (Kocen's Great Atlas) for secondary schools, continue to be published today. These atlases became a watershed teaching aid that allowed Austrian teaching to become autonomous and free from the predominant German influence. Kocen thoroughly modified and updated his atlases, improving them constantly in terms of their technical features and content.

Table 4: Overview of Kocen's atlases published between 1861 and 2022 (Dörflinger and Hühnel 1995; Kretschmer 1995; Kunaver 2009; Birsak 2021).

Title and type of atlas	German	Czech	Polish	Hungarian	Croatian	Italian	Total
<i>Geographischer Schul-Atlas für Gymnasien, Real- und Handels-Schulen der österreichischen Monarchie</i> (secondary school atlas, 1861–1978)	113	27	20	2	20	4	186
<i>B. Kozenn's oro-hydrographischer Atlas</i> (orohydrographic atlas, 1864–1873)	3	1	0	0	0	0	4
<i>Geographischer Atlas für die Schulen der österreichisch-ungarischen Monarchie. Ausgabe in 6 Karten</i> (school atlas with six maps, 1869)	1	2	1	1	0	0	5
<i>Geographischer Atlas für die Schulen der österreichisch-ungarischen Monarchie. Ausgabe in 12 Karten</i> (school atlas with twelve maps, 1868–1876)	6	1	1	1	0	0	9
<i>Geographischer Atlas für die Schulen der österreichisch-ungarischen Monarchie. Ausgabe in 18 Karten</i> (school atlas with eighteen maps, 1868–1874)	3	1	2	1	0	0	7
<i>B. Kozenn's kleiner geographischer Schul-Atlas</i> (small school atlas, 1862)	1	2	0	0	0	0	3
<i>Schul-Atlas der österreichisch-ungarischen Monarchie</i> (school atlas, 1870–1882)	6	1	0	0	0	0	7
<i>B. Kozenn's oro-hydrographischer Atlas der österreichisch-ungarischen Monarchie</i> (orohydrographic atlas, 1873)	1	0	0	0	0	0	1
<i>B. Kocen's geographischer Schul-Atlas für Bürgerschulen</i> (secondary school atlas, 1876–1896)	5	0	0	0	0	0	5
<i>B. Kozenn's geographischer Schul-Atlas für die k.k. Militär-Bildungsanstalten</i> (edited by Letoschek; atlas for imperial and royal military schools, 1889–1896)	5	0	0	0	0	0	5
<i>B. Kozenn's geographischer Schul-Atlas für den Gebrauch an österreichischen Lehrerbildungs-Anstalten</i> (edited by Seibert; atlas for teacher training schools, 1885–1910)	4	0	0	0	0	0	4
<i>B. Kozenn's geographischer Schul-Atlas für die k.k. Militär-Bildungs-Anstalten</i> (edited by Sonklar; atlas for imperial and royal military schools, 1876–1881)	7	0	0	0	0	0	7
<i>Kozenn-Atlas. Ausgabe für Hauptschulen</i> (edited by Güttenberger; secondary school atlas, 1930–1935)	15	0	0	0	0	0	15
<i>Neuer Kozenn Atlas</i> (The New Kozenn Atlas, 1996–2010)	13	0	0	0	0	0	13
<i>Kozenn-Schulatlas</i> (Kocen's School Atlas, 2007–)	15	0	0	0	0	0	15
<i>Großer Kozenn-Atlas</i> (Kocen's Great Atlas, 2011–)	11	0	0	0	0	0	11
Total	209	35	24	5	20	4	297

4.4 Kocen's research

In addition to textbooks, maps, and atlases, Kocen also produced several research works. While teaching at the upper secondary school in Gorizia, he conducted various meteorological measurements from July 1856 to June 1857, based on which he published the study *Das Klima von Görz* (The Climate of Gorizia) in the school's yearbook. In it, he described not only the climate, but also the rock, terrain, hydrology, vegetation, and soil of the Gorizia region, based on which he then examined the suitability of the landscape and climate for cultivating various crops. Among other things, he strongly supported the afforestation of the Karst Plateau (Kozenn 1857).

Kocen published the study *Geographische Lehrmittel* (Geography Teaching Materials) in the 1861 yearbook of the Olomouc upper secondary school, which, in addition to other influential cartographic works he produced, earned him a place on the Imperial School Council, where he served as the only geographer. In this capacity, he helped shape the thorough school policy reform of that time. In the study mentioned, he explains his own perspective on geography teaching and defines the criteria for producing high-quality school atlases (Kozenn 1861b).

4.5 Importance of Kocen's works for teaching

For several years, Kocen engaged in thorough research on the geographical literature of his time, especially textbooks and atlases. He drew attention to the weaknesses in presenting material, outlining guidelines for improving geography teaching. Despite adopting cartographic elements from atlases by other authors, he also introduced many improvements. Because of this, he is also acknowledged among geographers for having broken new ground in geography teaching (Kretschmer 1990). He emphasized the communicative value of geography, which can be achieved through maps and atlases, as well as various drawings, illustrations, and data. Gradualness using an appropriate selection, scope, and distribution of learning material was also very important to him (from what is familiar, known, and easy to understand to what is unfamiliar



VEDECKÁ KNIPHOVA V OLMOUCI

Figure 7: Detail from the map of the Mediterranean in Kocen's 1861 secondary school atlas (Kozenn 1861a).

and more difficult). For example, in the chapter *Terrainlehre* (Terrain) from the first edition of his 1861 atlas, he highlighted the representation of terrain using the Lehmann hachure method (Kozenn 1861a) standardized in 1799 (Gašperič 2010). Contrary to the expectations of faster digitization of geography teaching expressed by some researchers (Fridl 2016), this survey showed that wall maps and traditional atlases continue to predominate in geography teaching (reported by 81% and 79% of teachers, respectively), along with folded maps (67% of teachers). Similar principles were highlighted by Brinovec (2004), according to whom maps are the most important teaching materials in geography teaching and teaching without a map is pointless. In addition, they point out that »geography contributes three further elements to general literacy: specific cartographic literacy and broader spatial literacy, which are part of people's general education, and geographical terminology« (Lipovšek Lenasi 2012, 1). In his *Geographische Lehrmittel*, Kocen examined the geographical materials at that time, adding that such »recommendations applied to teachers rather than students« (Kozenn 1861b, 1). He continues by explaining »the motives and ideas that guided him« (Kozenn 1861b, 1), which are also briefly presented in the introductions to his other works. Kocen highlights the importance of using many clear and detailed illustrations, which were, however, only included in more expensive teaching materials. He believed that the purpose of geography teaching was to explain and represent the Earth's landforms as clearly as possible. He ascribed great importance to sketches, drawings, and similar representations that made teaching and learning easier (Figures 8 and 9). This required the use of geographical teaching materials, such as books with pictures and sketches, wall maps and folded maps, and atlases. He drew attention to the key importance of wall maps and folded maps, which not even a good school atlas can replace, and which prove to be an indispensable teaching aid in geography teaching. Even now, many years later, teachers and students still use them for content, scholarly, and educational

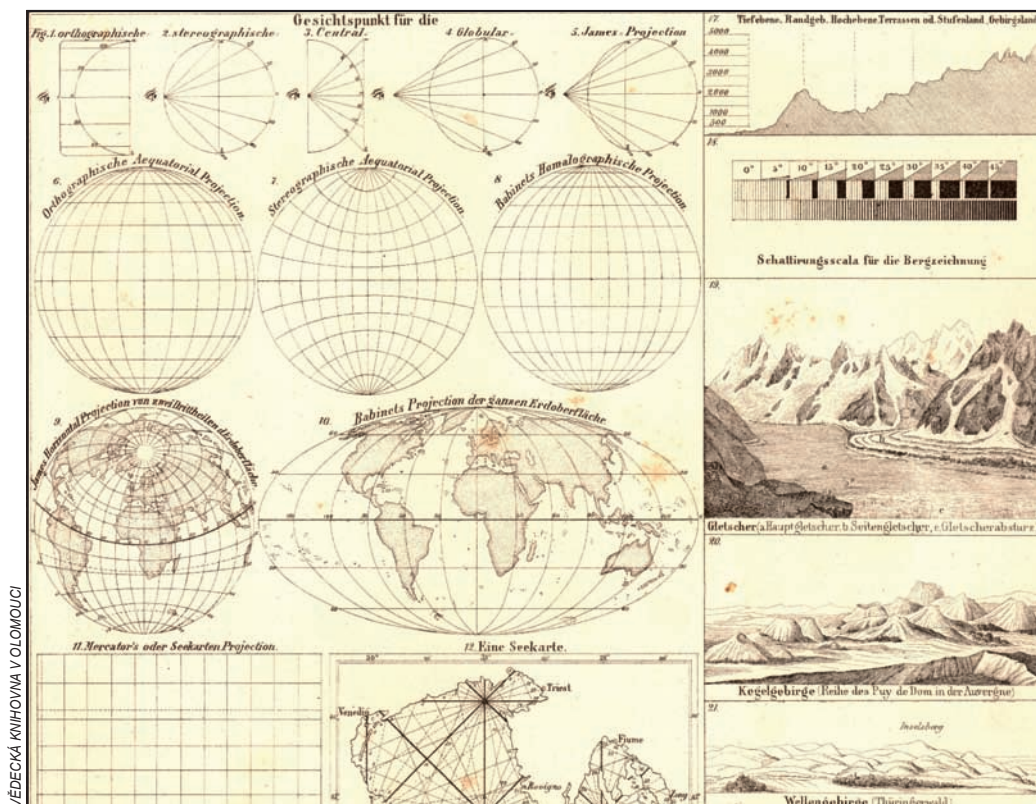


Figure 8: Detail from Kocen's 1861 secondary school atlas, with a clear representation of terrain (Kozenn 1861a).



ZEMLJEPIŠNI MUZEJ GJAM ZRC SAZU

Figure 9: Illustration from the Slovenian edition of Kocen's textbook *Erdbeschreibung für Volksschulen* (Kocen 1879), using various locations of a ship on the horizon to demonstrate that the Earth is round.

purposes, dealing with entirely practical problems in the process: »they are usually used by two students at a time, /.../ they are relatively expensive« (Brinovec 2004, 216).

Based on his work and achievements related to geography teaching (Žagar 1971), Kocen was appointed a member of the Imperial School Council in 1863 (*Laibacher Tagblatt* 126, 1871). Among other things, this council achieved that in 1871 geography began to be taught separately from history and statistics (Umlauf 1898). Until his early retirement in 1870, Kocen was also member of the Primary and Secondary School Examination Committee (Sitte 1996), but his most important legacy has been the obligatory use of school atlases in geography teaching since 1874 (Fuchs 1952), which, based on the research results, has barely changed. Kocen drew attention to the importance of folded maps, which not even a good school atlas can fully replace and are an indispensable teaching material. The reasons for this are not only related to research and teaching, but are also artistic and financial.

5 Conclusion

The results of the survey conducted among Slovenian geography teachers at all levels of education confirm that Kocen is known as an important cartographer. Despite the many online options available today, the use of printed cartographic teaching materials continues to predominate, which consequently maintains the visionary and pioneering importance of Blaž Kocen as the author of clear and detailed materials for teaching geography.

Based on these findings, it can be rightfully concluded that Kocen was a visionary that recognized the importance of cartographic teaching materials very early on; even a century and a half later, these materials remain the main tools used in geography teaching. To date, his textbooks, wall maps and folded maps – and, first and foremost, school atlases and their various adaptations – have been studied in detail, especially by Austrian geographers (e.g., Haardt 1898; Sitte 1996; Kretschmer and Birsak 2007). Over the past two decades, interest in his work has also grown significantly in Slovenia, which has mainly been due to various events and publications by experts (Rožle Bratec Mrvar and Jurij Kunaver), teachers (the Association of Slovenian Geography Teachers), and local communities (the Ponikva Tourism and Beautification Society and Blaž Kocen Primary School in Ponikva). Hence, it is not surprising that Kocen is well known among geographers and that the respondents considered him one of the best-known Slovenian cartographers.

Kocen's most important works include school atlases, which constituted a watershed in the development of school cartography. They have acquired epochal significance through numerous reprints, adaptations, and translations (Figure 10). His atlases continue to be published today, and his name has become a recognized brand, with which Hölzel successfully entered the international market. Therefore, Kocen's life and his other works, with his atlases ranking him among the immortal giants of European cartography, are also presented in detail. His perspectives on geography teaching presented in the article *Geographische Lehrmittel* (Geography Teaching Materials) also proved highly influential; in addition to other high-profile cartographic works, this study earned him a place as the only geographer and cartographer on the Imperial

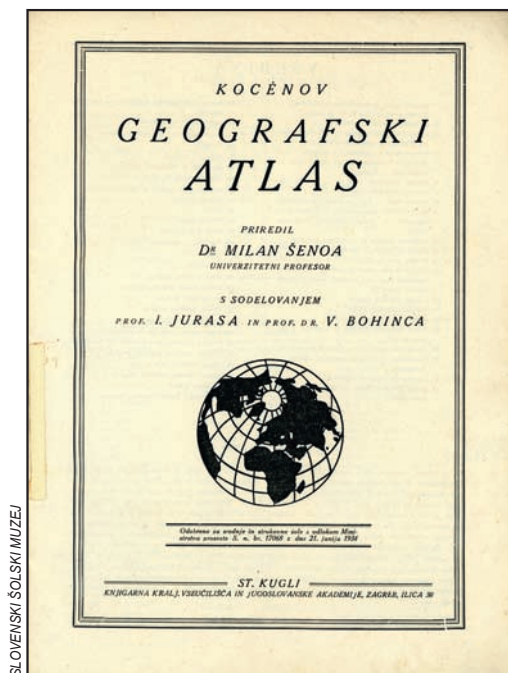


Figure 10: *Kocenov geografski atlas* (Kocen's Geographical Atlas), published in 1934 (Kocen 1934), which was reprinted several times until 1939. This was the only atlas with an introduction in Slovenian (translated by Valter Bohinec), whereas the maps were the same as in the Croatian edition.

School Council, where he helped shape the school policy reform. His atlases, which were known especially for their clarity, affordability, adaptability, and constant improvements, acquired an indispensable place in geography teaching. They have retained this place up until today, which is also proven by the survey results presented in this article. Slovenian geography teachers (75%) think that school atlases will not disappear from geography teaching in the next five years; similar applies to printed maps (according to 72% of teachers). Kocen's name is well known; 94% of respondents know him as a cartographer and author of geography teaching materials.

With a tradition spanning over 160 years, Kocen's atlas most likely holds a world record among atlases. It has a longer legacy than Diercke's Atlas, which has been published by the Braunschweig-based publisher Westermann since 1883 (Kretschmer, Dörflinger and Wawrik 1986) and, based on licensed editions by Mladinska knjiga, it is the best-known atlas in Slovenia, with a total of over 350,000 Slovenian copies sold so far. Unfortunately, partial Slovenian translations of Kocen's atlases were only published during the inter-war period – *Kocenov geografski atlas* (Kocen's Geographical Atlas) published between 1934 and 1939, with an introduction translated by Valter Bohinec (Figure 10) – whereas before that and especially recently the Slovenian market has proven to be insufficiently lucrative for a Slovenian publisher to dare publish one of his works in Slovenian.

In the future, the share of digital geography teaching materials both at school and in the home will most likely increase. The growing online availability of various content, increasing internet speed, and greater, higher-performance, and cheaper technical equipment (smartphones, computers, interactive displays, etc.) facilitate greater adaptability, innovativeness, and currency in teaching. Children and teens are growing up in a digital world, where programs and devices are constantly developed or improved. However, when it comes to learning and, perhaps even more evidently, studying and leisure use, traditional learning materials continue to have an advantage, especially in terms of their method of use and their independence from the internet, networks, and location.

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