The Peculiarity of Editing and Publishing Teaching Map Publications

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Abstract: Teaching map publications serve as crucial tools for geographic education, possessing both the general attributes of book publishing and the professional characteristics of cartography. Their editing and publishing is a systematic engineering project integrating political, scientific, educational, and artistic aspects, with a complexity far exceeding that of general books. Based on editorial and publishing practices, this paper deeply analyzes characteristics such as the high information load of map language, its strong political nature, complex formation processes, and the condensation of immense wisdom and labor. Furthermore, from the perspective of the entire editing and publishing workflow, it discusses the peculiarity of the topic selection process, the complexity of new edition compilation and proofreading, and the maintenance of reprints. The study points out that the specificity of teaching map publications imposes higher requirements on publishing units regarding professional talent cultivation, quality control, resource investment, and technological innovation. Meanwhile, facing digital transformation in education, curriculum reform, and artificial intelligence, teaching map publishing must fully recognize and follow its editorial laws, innovating to create high-quality publications that withstand the test of time and teaching practice.

Keywords: Teaching Maps; Editing and Publishing; Peculiarity; Map Language; Map Compilation

1. Introduction

Maps are hailed as the "second language" of geography. They are not only carriers of spatial information but also key tools for cultivating students' core competencies such as regional cognition, comprehensive thinking, and geographic practice [1-2]. Consequently, maps have been widely applied in both geographical and historical teaching practice [3-4]. As an important part of the textbook system, teaching map publications (including teaching wall maps, atlases, fill-in map books, etc.) possess both the attributes of special commodities and educational functions. They must not only follow the scientific laws of cartography but also align with curriculum standards and the cognitive psychology of students at specific stages. Therefore, the editing and publishing of teaching maps is a systematic project integrating political, scientific, educational, and artistic qualities, and its complexity far exceeds that of general text-based books.

In recent years, with the country's increasing emphasis on territory awareness education and the implementation of relevant map management regulations, the publishing standards for teaching map publications face stricter requirements. Meanwhile, scholars at home and abroad have extensively discussed the compilation and design of teaching maps. Withers (2021)analyzed credibility and quality control issues in map publishing from a historical perspective, revealing the challenges publishers face in maintaining scientific authority [5]; Mrvar and Gasperic (2023)compared traditional and modern teaching map materials, discussing the evolution and application prospects of map forms in the digital context. In terms of compilation technology [6], De Maeyer (2022)and Cron et al. (2009)proposed new navigation concepts for the interactive design of school atlases [7-8], while Anderson and Cartwright (2005)systematically outlined the development process of illustrated world atlases[9]. These studies provide theoretical support for understanding the technical characteristics of teaching maps.

However, examining current publishing practices and theoretical research, we find that existing literature mostly focuses on specific

cartographic techniques, visualization designs, or case studies of single varieties, lacking a systematic review of the specificity of teaching maps from the perspective of the entire editing and publishing process. Especially in the new era, how to balance the political, scientific, and pedagogical applicability of teaching maps, and how to cope with the maintenance pressure brought by the rapid update of current data, are practical problems faced by every teaching map editor.

This paper aims to fill this research gap. Based on editing and publishing practices, it provides an in-depth analysis of the full life cycle of teaching map publications from topic planning to reprint maintenance. The article will first start with the uniqueness of map language, analyzing its characteristics in information load, expression logic, and formation process; then, it will reveal the special laws of teaching map publishing from dimensions such as the specificity of the topic selection flow and the complexity of compilation and proofreading flows for new and reprinted editions. This study not only helps enrich the theoretical system of map publishing but also has important practical guiding significance for optimizing publishing processes, avoiding publishing quality risks, and improving the level of teaching map compilation.

2. Characteristics of Map Language

Maps are tools that formed before writing, using graphic language to express things. There have been various definitions of maps for a long time. Starting from the perspective of modern cartography, a map is a graphic representation reduced to a plane using a symbol system based on certain mathematical rules. It depicts natural and social phenomena on Earth (or other planets), conveying their quantity, quality, distribution in time and space, and development and changes through information formed by cartographic generalization [10]. Maps contain three aspects of content. First is the mathematical basis, including control points, coordinate grids, scale, map orientation, and other elements related to converting spherical space to planar space. Second are geographic elements. For general maps, geographic elements on the map include independent features, settlements, transportation networks, drainage systems, landforms, boundaries, etc.; for thematic maps, in addition to the geographic base elements in general maps related to the theme, they also include thematic

elements. For example, in a map of population distribution in a certain region, the map content representing the population quantity belongs to thematic elements. Third are marginal elements, including the map frame, map title, legend, diagrams, scale, and compilation notes.

Compared with other languages, map language has its uniqueness, mainly reflected in large information volume, strong political nature, complex formation process, and the condensation of immense wisdom and labor.

2.1 Large Volume of Information

Taking a 16-mo book as an example, if the presentation form is a map (referring here to a general map with a certain load), the standard for converting each page to text is about 5000 words; if the presentation form is pure text, each page has only about 1500 words. The information loaded by the map itself is multi-layered and multi-dimensional, including both longitudinal and lateral information, as well as direct and indirect information. Longitudinal information refers to topography, rivers and lakes, transportation, settlements, etc. For each item of longitudinal information, it contains lateral information; taking transportation as an example, it includes lateral information such as traffic line types and road grades. Information that can be read directly from the map is called "direct information," while information obtained through certain classification and analysis is called "indirect information." Taking the "Distribution of Selected Megacities and Major Cities in the World" map as an example, we should be able to directly read direct information such as the point distribution of megacities at different times, the regional distribution of the earliest appearing cities, and the distribution of dense urban belts. Through analysis, we can also obtain indirect information such as the regional distribution characteristic that most megacities are distributed in coastal zones, the spatial development law that megacities expand from original large cities to surrounding areas, and the regional characteristics that world urban belts are mainly distributed along the Mediterranean coast, the Great Lakes region of North America, the eastern coast of China, and the coast of Japan.

2.2 Strong Political Nature

Maps are not only carriers of geographic things and phenomena but also solemn symbols of

national sovereignty and territorial integrity, reflecting the country's political stance, with serious political nature and strict statutory nature. In international law and state practice, maps are widely used as important evidence for defining national boundaries and declaring sovereignty. Their drawing and release are directly related to the accuracy and seriousness of the expression of the national territory. Any incorrect labeling of national boundaries, administrative divisions, or important place names may trigger diplomatic disputes and damage national interests.

2.3 Complex Formation Process

The formation of a map requires a series of complex processes. Since a map is a reduced representation of the geographic environment, it is first necessary to understand the geographic environment based on various materials. Then, based on the purpose and requirements of the map, conceive the map's content, representation methods, and production technology. Next is to form a map design scheme, which requires a large amount of comparison, testing, and modification during its formation. After the map design scheme is determined, the mathematical basis and symbol system of the map need to be determined. Then comes cartographic generalization. The basic purpose of cartography is to display the objective world with reduced graphics. However, when simply shrinking phenomena on the earth's surface, the characteristics and distribution laws of geographic phenomena we want to see do not appear, but instead produce results we do not need: the spacing, width, and length of features are reduced by the same proportion, adjacent discrete objects are crowded together, and complex feature outlines appear chaotic and congested. In order to enable readers to clearly read the graphics on the map, and for these graphics to reflect the characteristics and distribution of geographic phenomena, cartographic generalization is needed. Cartographic generalization is a very complex process of selection and generalization. After cartographic generalization is completed, map decoration is required before entering the map drawing stage.

2.4 Condensation of Extensive Wisdom and Labor

Map compilation is an intellectual labor process integrating cartographic knowledge, subject-specific knowledge, editing and publishing knowledge, and aesthetics and design knowledge. In the map compilation process, priority must be given to ensuring the scientific nature, accuracy, completeness, and timeliness of geographic variables and map data. Map compilers need to possess cartographic generalization skills, select appropriate map expression methods, and adopt appropriate graphics, colors, and map configuration relationships. In addition, with the development of multimedia and information technology, various map forms such as electronic maps, multimedia maps, and multi-dimensional maps have emerged. Map compilers also need to conduct research on the information integration of traditional paper maps and these other forms of maps.

3. Peculiarity of the Topic Selection Completion Process for Teaching Map Publications

The compilation and publication of publications mainly include five processes: topic approval, topic compilation, topic release for printing, topic printing and warehousing, and topic settlement. The particularity of teaching map publications in the topic completion process is mainly reflected in the topic compilation process (see Figure 1). First, editing and production are carried out according to the topic content, followed by the "three-proofs and three-reviews" process, including self-proofing, first proofing, second proofing, preliminary review, second review, and final review. During this process, proofs will be output multiple times. After the proofreading is completed and modifications are made, the map will be submitted for review, sending the printed sample to the map technical review department for audit. If the audit is not passed, it will be modified and resubmitted; if the audit is passed, the map review opinions will be implemented. At this time, a map approval number will also be obtained, and then the ISBN application will be carried out. The ISBN application will go through departmental review, business management department review, ISBN handling, and issuance processes before the ISBN can be obtained. After obtaining the ISBN, some topics also need to apply for CIP information. Then comes the signature application, which will also pass through the departmental review, business management review, and editor-in-chief review. After the

signature is approved, the topic can be released for printing. For reprinted varieties, they will enter the topic release stage directly from the proofreading link. In the entire topic compilation process, map submission for review, implementation of map review opinions, and obtaining the map approval number are three processes unique to teaching map publications compared to general text publications. regarding the three processes of editing and production, three reviews and three proofreadings, and reprinting, teaching map publications have stricter requirements and more complex operations than general text publications due to their special attributes.
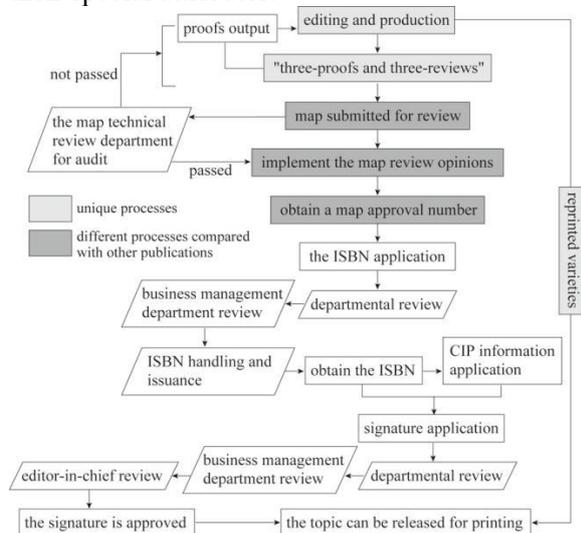

Figure 1. Topic Compilation Process for Teaching Map Publications

4. Complexity of New Edition Compilation and Proofreading Processes for Teaching Map Publications

4.1 Complexity of Technical Workflows

The technical workflows for the compilation and proofreading of teaching map publications are complex, as shown in Figure 2. First, the responsible editor produces a sample based on front-line research, curriculum standard study, and textbook analysis. The sample can only be determined after passing through three reviews and modifications. After the sample is determined, it enters the compilation process of specific content. Teaching atlases generally include four main contents: maps, schematic diagrams and diagrams, pictures, and text.

For map content, first, a unified map symbol system and legend for the publication must be produced, i.e., specific representation regulations for various elements on the map such as settlements, rivers and lakes, boundaries, transportation, topography and landforms, general symbols, agricultural symbols, industrial symbols, and annotations. After the unified map symbol system and legend are completed, a compilation scheme must be determined for each map. The compilation scheme includes the following content: first, determine the scale; then retrieve vector data or data from the database, perform projection transformation, determine the map frame range, determine the central meridian, and determine a suitable geographic base map; then determine the thematic map content. If existing content cannot meet compilation needs, other materials must be used. After materials and base maps are determined, the operation method needs to be determined, followed by determining the drawing content, which includes geographic base maps and thematic elements. Drawing requirements must also be clarified, and if there are other instructions, they must be written out clearly. The next link is for cartographers to perform computer drawing, with each layer drawn separately. After computer drawing is completed, it is reviewed by the responsible editor, modified, and finally forms a finished map, which will enter the "three-proofs and three-reviews" stage of map content. The "three-proofs and three-reviews" of map content is very complex, requiring proofreading and review of elements on each layer, including mathematical basis, coastline and water systems, topography, settlements, road transportation, latitude and longitude lines, annotations, thematic elements, and map decoration.

For schematic diagrams and diagrams, first, consult materials and determine the theme, then determine the form of expression. After communicating ideas with the art editor, the art editor performs artistic drawing. After the art editor completes the drawing, the responsible editor reviews it. After modification, a finished diagram is formed, which will undergo "three-proofs and three-reviews" of subject content and graphical content.

For pictures and text, after editing and processing and determining the form of expression, formed graphics and text are created, and then the "three-proofs and three-reviews" of picture and text content can be carried out.

Then, the "three-proofs and three-reviews" of the combination of graphics and text must be carried out, including the relevance of the layout

positions of maps, schematic diagrams, diagrams, pictures, and text, the consistency of content, and the compatibility of content. Positional relevance refers to whether the layout positions of various graphics and texts appropriately reflect the coordination of graphics and texts; content consistency refers to whether the same content explained by various graphics and texts is unified; content compatibility refers to whether different content explained by various graphics and texts is mutually compatible and coordinated.
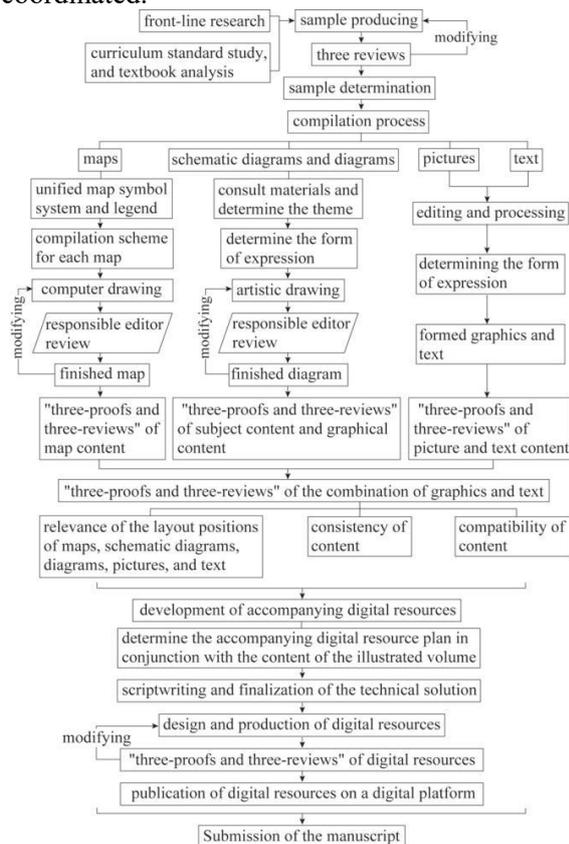
Figure 2. Technical Workflow for Compilation and Proofreading of Teaching Map Publications

4.2 Special Links in the Compilation Process

There are some special links in the compilation process of teaching atlases. First is the preparation of the base map. In the case of existing original base map data, projection transformation, scale determination, map frame range determination, and central meridian determination are required, followed by the selection of map elements according to thematic requirements. In the case of no original map data, it is more complicated. First, written records need to be collected, and the materials need to be spatiotemporally converted and corresponded

before map elements such as points, lines, and areas can be formed. The second special link is the collection and organization of thematic materials. Geography and history teaching maps involve a wide range of fields, including the universe and earth, meteorology and climate, hydrology, geology and geomorphology, resources, population, regional development, national security, tourism, urban and rural planning, environmental protection, information technology, ancient history, modern history, world history, Chinese history, and other fields. In addition, geography and history teaching maps involve huge spatiotemporal scales, ranging from the birth of the earth to the present and even the future world in time, and covering every place on earth and even other planets beyond earth in space. Furthermore, geography and history teaching maps have high requirements for the accuracy and precision of thematic materials. One reason is that the requirements for teaching publications are inherently higher than those for general publications; the second is that since each item of thematic material must accurately correspond to a spatial point on the map, it cannot be completed without high accuracy and precision. Many geography and history teaching maps require continuous update and maintenance of thematic materials. For example, the population and economic conditions of countries and regions in the world change every year, requiring updates to thematic materials. The third special link is map content design. Map design has its unique complexity compared to text design because it includes base map design, thematic content design, grasp of logical relationships, overall design, and many other design aspects.

5. Complexity of Reprint Maintenance Process for Teaching Map Publications

The complexity of reprint maintenance for teaching map publications is mainly reflected in the frequent changes in current data leading to much content for revision, the semester rhythm of textbooks leading to high revision frequency, and the diversity of compilation and publishing links leading to large investment. Current data changes in real-time. Changes in base map data include changes in world national territories and divisions, and changes in national administrative divisions at all levels; changes in thematic data include updates of thematic data over time, such

as population data, socio-economic data, etc. This change in current data leads to much content needing modification during reprinting. First, due to the rapid change of current data, the revision content is extensive and the frequency is high; second, the existence of maps leads to revision work where "a slight change affects the whole body." For example, if the national boundary of a certain country changes, every regional map and world map containing this national boundary needs to be modified accordingly. Textbooks have a fixed time rhythm of two semesters per year, leading to teaching map publications requiring a stable reprint revision process twice a year. Due to the diversity of reprint process links for teaching map publications, involving the cooperation of various personnel such as editors, cartographers, designers, publishers, and management, a large amount of various human resources needs to be invested. In addition, the high cost of material expenses and electronic data storage and retrieval brought about by the large amount of revision will also bring a large amount of capital investment.

6. Conclusion

The editing and publishing of teaching map publications have significant particularities distinguishing them from ordinary books. First, the special attributes of teaching map publications determine that editorial staff must have interdisciplinary knowledge reserves and long-term experience accumulation. They must not only be proficient in editing and publishing business but also master cartography, geography (history), pedagogy, aesthetics, and computer-aided mapping technology. Therefore, relevant publishing units need to gradually cultivate a stable team of professional teaching map editors over a relatively long period. Second, the political and educational attributes of teaching maps require publishing units to establish strict quality control mechanisms to ensure the accuracy of national territory and sensitive information. Finally, the contradiction between the periodicity of textbooks and the timeliness of geographic information makes the update and maintenance of teaching maps a long-term and arduous task, requiring continuous resource investment and technological innovation. These factors inevitably lead to significantly higher editing and publishing costs for teaching map

publications compared to ordinary book publications.

Facing the trend of digital transformation in education, traditional paper teaching maps are facing challenges and opportunities from emerging forms such as interactive electronic maps and AR/VR maps. Future teaching map publishing should further explore the integrated development of paper maps and digital resources, building a new "paper-digital integrated" textbook system. This not only requires editors to update their technical concepts, shifting from single planar mapping to multi-dimensional spatial data visualization, but also promotes the transformation of publishing processes towards digitization and intelligence. By establishing structured geographic information databases, "one-time production, multiple releases" can be achieved to adapt to the personalized needs of different teaching scenarios.

In addition, with the development and changes in new curriculum standard concepts, the function of teaching maps is shifting from simple knowledge display to supporting inquiry-based learning. Editing and publishing work needsto pay more attention to user (teacher and student) experience, designing more inspiring map-reading guidance and interactive links to stimulate students' active thinking and interest in exploration. While adhering to political and scientific nature, we must continuously improve the expressiveness and interactivity of maps to better serve the educational goal of cultivating core competencies.

At the same time, the rapid development of artificial intelligence technology has brought new opportunities for the compilation of teaching maps. Using deep learning algorithms for automatic generalization of map elements, intelligent configuration of annotations, and adaptive style transfer will greatly improve compilation efficiency and intelligence levels. However, this also poses challenges to the subjectivity of editors—how to maintain the "unique temperament" and "sentiment" of maps with algorithmic assistance is a subject that future map editing and publishing workers need to think deeply about. The role of editors is shifting from simple processors to "knowledge service providers" and "product managers," requiring keener market insight and more comprehensive project management capabilities. Only by fully recognizing and following its

editorial publishing laws, and courageously innovating and changing, can we create high-quality teaching map publications that withstand the test of time and teaching practice, providing solid support for the high-quality development of geographic education.

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