MAPPING THE WORLD: AN EDUCATIONAL REFERENCE WORK FOR HIGH SCHOOL STUDENTS

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Abstract: *The inception, preparation, production and marketing of an 8 volume general reference work Mapping the World is discussed. This library set, published by the American educational publisher Grolier Educational, is aimed at school children in Grades 5 to 10 (US high school, ages 10 to 15). The paper explores the difficulties in tailoring the material to this wide range of children's ages. It was important to ensure that the five authors brought their classroom experiences to the writing of the text. However, the content was not constrained by specific school curricula – the flexibility of creating a library-targeted general reference work was utilised in the determination of topics covered. A result of this is that the eight volumes are cross referenced in a very detailed manner, giving students, who will be expected to consult this work independently, trails of interest to follow in their own time. The promotion of independent working is further exemplified by a small number of tasks for students to perform, and also by a comprehensive list of further reading and relevant web sites. The paper presents the main themes of each volume and the subjects of individual page spreads. In a field such as mapping and with an early teenage audience in mind, illustrative material was of equal importance to the text. The inclusion of a mixture of commissioned, picture library and commercial sources proved to be the most difficult task in the production.*

EDUCATIONAL BACKGROUND

Presenting yet another educational resource to an already crowded publication marketplace requires both faith and commercial acumen. The publisher Grolier, headquartered in Connecticut (USA) has decades of experience in assessing the viability, content and method of presentation of a wide range of educational works, from on-line resources and digital textbooks to classroom worksheets and library support materials. Clearly, a full awareness of the prevailing educational norms and the nature of the commercial market is needed by such a publisher. The fragmented nature of educational governance in a federal nation can complicate the market further.

The over-riding issues, however, are the quality and the educational effectiveness of the work. It is vital that any such general work matches the educational requirements of the teacher and pupil in school. The aim of any resource used in the classroom can be defined in terms of its learning objectives. The classical taxonomy of Bloom offers a detailed description of such learning objectives (Bloom et al., 1964).

Learning objectives

Whilst Bloom's taxonomy addresses a wide range of educational methods, including the acquisition of key skills and social attitudes, it is the cognitive (or knowledge-based) elements which can be profitably examined when preparing educational resources for the classroom. There are six major hierarchical categories covering the simplest behaviour to the most complex. Knowledge involves recall of data and encourages the pupil to describe, define, identify, list, match, recall and reproduce facts. A further level up is comprehension when understanding and interpretation are introduced: the key words at this level are 'distinguish', 'explain', 'generalise', 'predict' and 'translate' known material. Application involves using concepts in new situations and implies ability to change, compute, demonstrate, manipulate, predict and solve data problems. Analysis is the fourth level incorporating deduction and selection (key words are 'compare', 'contrast', 'illustrate', 'infer'). Synthesis builds a structure or pattern from diverse elements and triggers categorisation, compilation, organisation, revision and summarising. The final level of education is evaluation, which can involve appraisal, critiquing, justifying and supporting.

School work should bring children to increasingly higher levels as they progress through their education. Knowledge is clearly essential from the beginning of a school career, but gradually comprehension and application are introduced and practiced. Educational resources must encourage such objectives. Pedagogical practice today would suggest that it is important to reduce the cognitive load of the student in this age of information explosion. Memorising knowledge is not essential; instead educators should be creating an environment that fosters deeper understanding. The goal should not be

for students to leave the classroom with all they need to know in life; rather, students to be given tools for lifelong learning and motivation to do so.

RESOURCES FOR LEARNING

In addressing such needs, books can encourage students and schoolchildren to investigate and enquire for themselves; or they can provide information and resources for teachers to adapt to individual needs. The former style of book is open-ended, with limited structure, informal and flexible, and presents a variety of approaches: they are likely to be workbook or activity books. The latter are 'closed', with more structure, a set design/layout, and greater guidance given to pupil and teacher: they are more likely to be 'textbooks' which could be used by the teacher as substitute material for their own lessons. In this sense, such books can stifle creativity (Chapman and Wurr, 2000), yet they are widely used. It is possible to 'de-construct' geography textbooks and further criticize their 'hidden agendas' and prevailing prejudices (Bennett, 1996), but (despite the enormous increase in use of Information and Communications Technology (ICT) in the teaching of geography and related environmental and social studies) such textbooks can still be regarded as the most valuable resource in the school classroom (Waugh, 2000).

The place of encyclopaedias and library reference works in this classification is difficult to define. These volumes possess some of the properties of a good 'activity book' – they point out connections between subjects, they encourage further reading and they stimulate independent research. They also offer some of the characteristics of a textbook: closed, accessible to a wide range of students, and attractively presented. In general, there appears to be scope to expand the use of encyclopaedias in educational work: "encyclopaedias are often underused, especially for instruction purposes. Patrons rarely ask for them by title and few instructors assign or even encourage their use by students" (Kawula, 2003, p512). Single-subject encyclopaedias such as the volumes described here may improve this situation.

CREATING THE VOLUMES

Commissioning

The works described in this paper (Grolier, 2002) were commissioned by an American client from a specialist educational and reference publisher in Oxford, UK: there was no contact between the author(s) and the client. An editor was appointed - a university academic and subject specialist - who was responsible for the overall balance and consistency, and who also wrote four of the eight volumes. Other contributors were sought from the local high school community - four geography teachers with considerable experience as educators and examiners of children aged 11 to 18. Each wrote one further volume.

The brief indicated that eight hard-back volumes were to be prepared which together would cover a range of topics addressing mapping in its widest sense. The volumes were to be similar in layout and presentation. There are 48 pages in each volume, presented mainly as double-page spreads covering one subject. Occasionally subjects can occupy four or six pages. Figure 1 (showing the common back cover of each volume) shows the titles published: as can be seen these general titles deal with the background to cartography, related mapping tasks, practical application, and institutional issues. These were agreed with the Oxford publisher, who liaised with the experienced American representative.

Content

Figure 2 indicates sample contents of a couple of volumes, determined by the editor. These individual topics are intended to stand independently: there is no intended sequential narrative in the volumes, although there are obviously linkages among many of the sections. No close connection with any educational curriculum was sought. The content was expected to appeal to school children from grades 5 to 10 (ages 10 to 15). The text, therefore, had to be relatively simple in terms of vocabulary and also convey some sense of excitement about the subject. The intention of all authors was to present material which would be supported by illustrations, would illustrate concepts with real world examples, and would try to explain difficult issues from first principles. Children were expected to read this work in small bursts: the volumes are not intended to be read from page one directly to the end.

It is expected that use of these volumes by children will be the result of tasks set by teachers and awareness-raising in the classroom and library. In order to maintain interest and explain some difficult concepts, there are a very small number of 'exercises' which give the child explanations of how certain products (e.g. cross-sections, or plane table surveys) can

be easily produced. However, differentiation - the recognition and possible assessment of the varying intellectual levels of the readership - was not regarded as an aim of the series. This work is not intended to lead to any form of testing or summative grading.

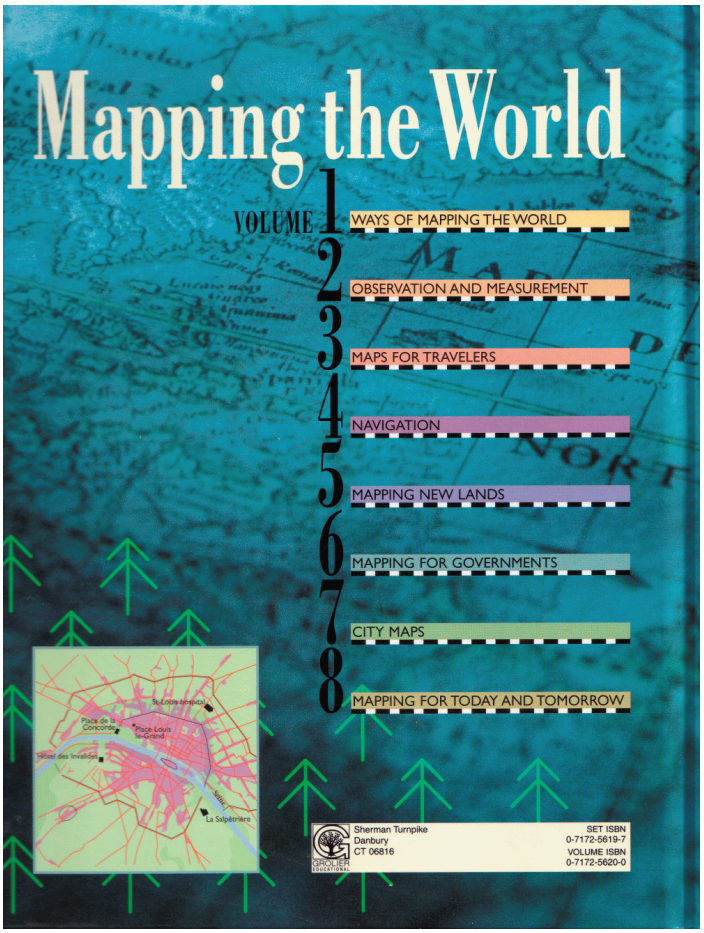


Figure 1: Back cover of each volume, showing titles

Volume 1: Ways of Mapping the World
About this set; The earth from space; Your neighborhood from the air; Your schoolroom from above; Photographs and maps; Generalization; Making symbols; Map materials through history; The earliest maps; Trying to explain the universe with maps*; Maps of ancient civilizations*; Three-dimensional mapping*; Maps of invisible things; Your worldview; Glossary; Further reading and web sites; Set index; Picture credits.

…

Volume 8: Mapping for Today and Tomorrow
About this set; Digital mapping*; Geographic information systems; Applications of GIS*; Storing image data in GIS; Raster images from space+; Mapping the stars and planets*; Modern geological mapping; Mapping the microscopic and sub-microscopic; Visualization; Virtual environments; Mapping on the web; Glossary; Further reading and web sites; Set index; Picture credits.

double page spreads except * (4 pages) and + (6 pages)

Figure 2: Example contents of volumes

Linkages and supplementary material

What is important is to ensure the attention of the pupil to the topic introduced. Therefore, linkages were regarded as important and each double-page spread has a note of related topics covered in other volumes (Figure 3). A comprehensive index, covering all eight volumes appears in each. In addition, further references are given as an appendix to each volume. These tend to be web-sites and other popular textbooks which the pupil could well find in the library. A further supplementary section in each volume is a glossary which defines some ideas and words appearing in italics in the text (Figure 4).

All of these components are explained in a section entitled ‘About this Set’ which is included at the start of each volume: this is intended to give the reader the confidence to follow particular topics across the volumes and the ability to use these supplementary items - glossary, index, further reading, linkages.

Illustrations

Clearly, illustrations are as important as the text for this age group. The illustrations had to be chosen to link to the text and had to be designed to introduce some difficult topics. The publishers had considerable experience in dealing with commercial image libraries, and a picture editor was appointed to search for and negotiate the use of copyright material. Most of the existing images used were photographic illustrations which were of a general nature. Some had been used in other works from the same publisher and were chosen for their attractiveness; some were more specific photographs which required careful captioning.

Illustrations were also chosen from the library of the publishers themselves. As producers of historical atlases, they had a range of customised maps of historical events which could be used for illustrative purposes. In some cases, pictures were commissioned artwork from previous volumes and there were also pictures and diagrams specially created for this work. In a few cases, web images were modified and presented; in one case, maps from the editor's own research work was used.

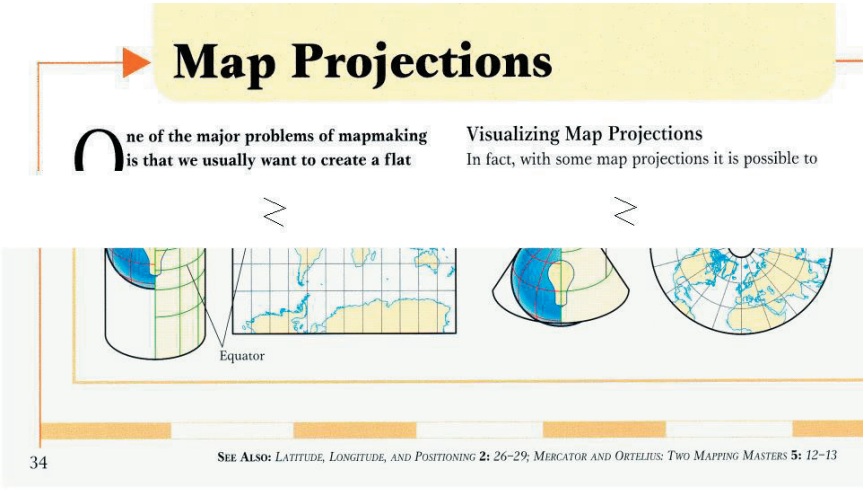


Figure 3: Linkages to other topics are stressed on each page

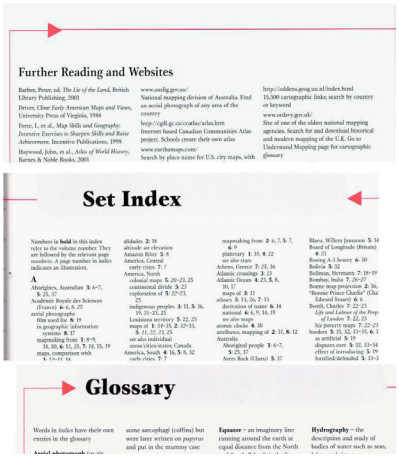


Figure 4: Common sections: further reading, index, glossary

Further specific issues

As indicated, the target audience for this work was primarily defined by its age (10 to 15 years); but both text and illustrations also had to make some concessions to its nationality. The role of geography as a discipline for widening one's worldview, and the UK source of the authors and production team themselves, had to be balanced against the need for American examples, giving some familiarity to the school children using it. The metric system of measurement was used sparingly, although its advantages in terms of calculation were demonstrated in a subtle way. The more detailed examples of map work relied on USGS map series, which have no copyright fees associated with them (although a British Ordnance Survey 1:50,000 extract which does attract significant reproduction costs was also included). It should be noted that (despite the excellent work done by J. Kerski in the USGS Education program: see http://rockyweb.cr.usgs.gov/public/outreach/) the level of USGS topographic map use in the American class-room is somewhat limited, and it may be that the extract shown and annotated in Figure 5 is the closest that some children will have come to maps produced by their own national mapping agency.

POST-PRODUCTION ISSUES

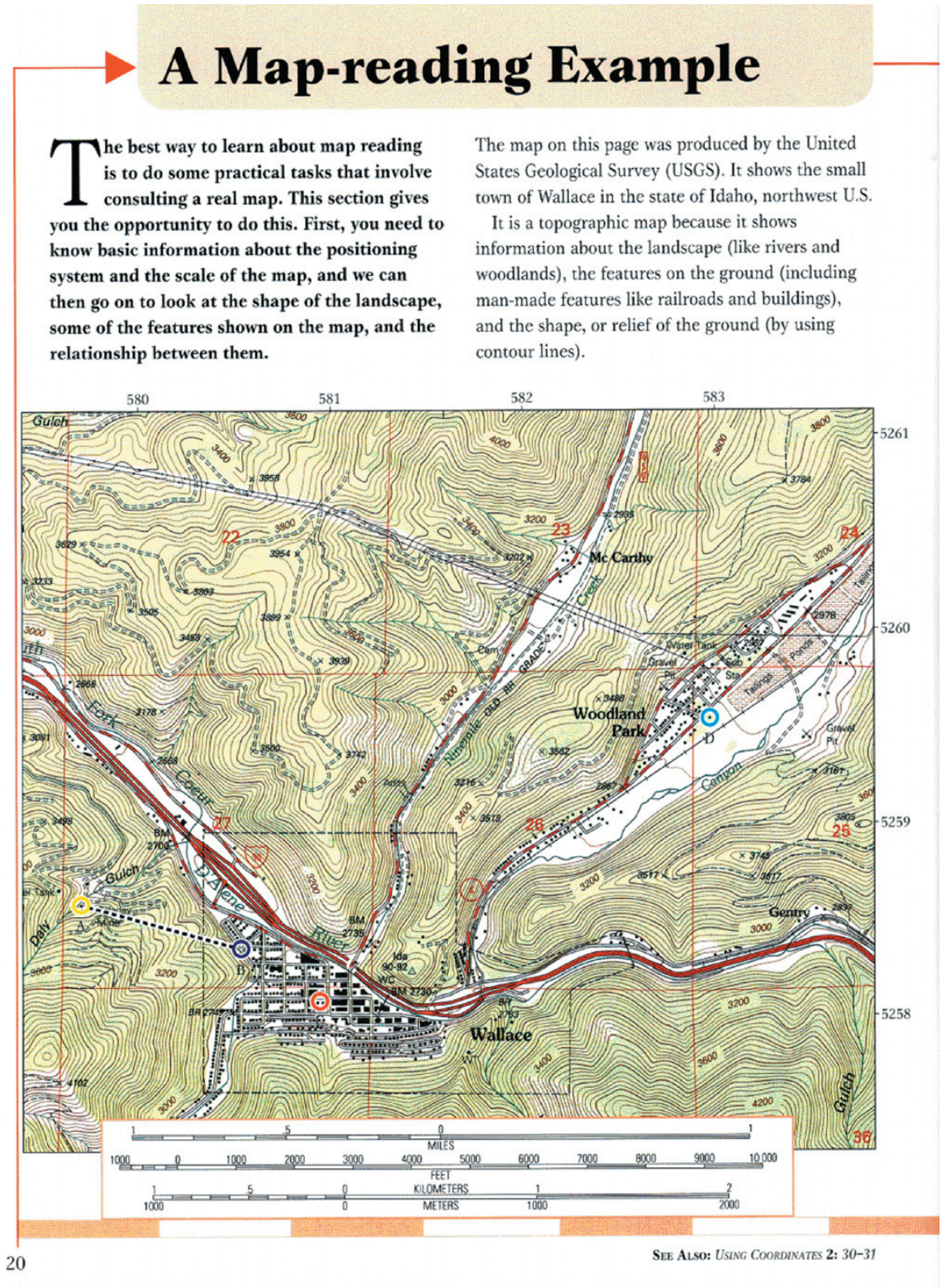
Sales and marketing

Once the final text and layout had been agreed with the authors, editors and the UK publisher, the project was signed off and the various contributors received their fee. No royalty payments were included in the contract, so effectively the project was then handed over directly to the American publisher Grolier for whom the work was created. All marketing and promotion has relied on Grolier through its parent company Scholastic Inc. (which has a number of other print and on-line brands and imprints).

The complete set retails for $269 (US) and is only readily available in North America. The print run and sales figures are commercially sensitive and unknown. The volumes have not had a particularly high profile in the intended library market, although they are still 'in print' and available on the academic lists of Grolier. The marketing material directed towards both teachers and librarians introduces the set as follows:

> "Mapping the World teaches students the history of maps, how to use them, and how mapmaking has developed - from Aboriginal song lines, to everyday maps such as subway and bus charts, to building plans and environmental mapping by satellites.
>
> "Use the star maps in Volume 4 to teach astronomy ... Historical maps in Volume 5 teach explorers and exploration ... Volume 8 supports technology curriculum ... Introduce readers to the concept of mapmaking, important person-

alities, and the history of mapping ... Discuss the different purposes for which maps are made ... Explain the latest approaches to cartography and imaging techniques ... Encourage students to carry out practical exercises in mapping and observation.



A Map-reading Example

The best way to learn about map reading is to do some practical tasks that involve consulting a real map. This section gives you the opportunity to do this. First, you need to know basic information about the positioning system and the scale of the map, and we can then go on to look at the shape of the landscape, some of the features shown on the map, and the relationship between them.

The map on this page was produced by the United States Geological Survey (USGS). It shows the small town of Wallace in the state of Idaho, northwest U.S.

It is a topographic map because it shows information about the landscape (like rivers and woodlands), the features on the ground (including man-made features like railroads and buildings), and the shape, or relief of the ground (by using contour lines).

SEE ALSO: *USING COORDINATES* 2: 30–31

Figure 5 Example 1:24,000 USGS map sheet for map reading exercises (relying on annotation)

"Set Features: Hundreds of full-color photographs, diagrams, and drawings ... Dozens of maps, 48 pages per volume, 384 total pages, 8 x 10 (size in inches)... Full set index in every volume ... Builds map skills: Teaches kids how to use maps ... Explains how maps work and why."

Reviews

Reviews have been generally favourable with some interesting comments from the (non-subject specialist) reviewers which indicate how some educational professionals see the subject of cartography:

> "The greatest problem with this set is one that comes from the nature of the subject itself. The fact that a map results from an integration of so many processes means that a study of maps does not lend itself to alphabetic, encyclopaedic entries or a neat, linear progression of study. To obtain maximum benefit, the user of this set will probably need to integrate information from multiple entries in the same volume or entries in several volumes" (in Dillon, 2003). This, of course, is exactly how the authors suggest that the set be used.

One reviewer suggested that "although this set fills a need, is nicely arranged, and has an appealing layout, it is somewhat weak on content" (Anon., 2002). This opinion is arguable, but may well be a perception resulting from the wide range of ages and abilities for which these volumes are intended. As with most educational material, the intellectual level of the content will be towards the median ability and will inevitably appear restrictive to some students.

Glisson (2002) in a School Library Journal review states:

> "A few exercises are included, some of which are advanced, such as 'Creating a Cross Section'. The text can be quite technical at times as in the discussions of 'Geographic Information Systems' and 'Mapping the Microscopic and Submicroscopic'. The captioned graphics are outstanding, showing Columbus's map of Hispaniola, which may be the first map made of the New World; a 1546 world map; a da Vinci map of Imola, Italy; an 1851 pictorial view of London; and more. Students tend to think of maps as being used to help us get around; through these volumes their understanding of them will be greatly expanded."

Postscript

The Oxford publishers responsible for this library set operates, like all such 'book packaging' companies in an international marketplace with very low profit margins and high publishing and (especially) copyright costs. The company had been owned by a holding company since May 2000, but was sold back to one of its original directors in August 2003. By November 2003 it was up for sale again, having ceased production with the loss of 19 jobs. In February 2004 a larger publisher, the Brown Reference Group (www.brownreference.com), acquired the business. Although there has been some disposal of titles, Mapping the World is still being published, and may yet achieve the 're-printing' status at which the client begins to re-coup some of the expenditure on such a volume. The educational resources market-place is competitive and dynamic: it is hoped that Mapping the World will take its place as an interesting, valuable and worthwhile introduction to cartography for school children in the years to come.

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