CARTOGRAPHICAL SIGNIFICANCE OF A PROPOSED MAP UNIT IN THE NEW HONG KONG JUNIOR GEOGRAPHY SYLLABUS AND TEACHERS' OPINIONS ABOUT IT

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Characteristics of pre-teen vernacular perceptions and experiences of maps in Hong Kong

An earlier pilot study (Kwan, 1999) on the vernacular perceptions of pre-teenage children (11-12 year olds) and their experience of maps in Hong Kong, revealed that these children did not begin learning formally about maps until Secondary One in Hong Kong. Yet, they had already gained a reasonable amount of map experience by paying attention to the maps available in their surroundings. However, the children may not be sensitive enough to take note of, or pay attention to reading the maps carefully. This difference in awareness leads to the classification of these children into two broad groups: map users and non-map users. Children, who claimed to be map-users, preferred maps that provided a lot of information about an unfamiliar area. If given a choice, these children preferred to read map information in textual form first, rather than in symbolic or pictorial form. They preferred real maps that were used in real, outdoor situations, rather than hypothetical maps. Even children who claimed to be non-map-users admitted that at times they would consider using maps out of curiosity. The children seemed to be confused, however, regarding the elements that should be included on a map. They appeared to have some ideas about what maps are and what map usage is, but were unfamiliar with basic map elements, such as a 2-D plan view, proportion, location, symbolization and distribution (Gerber, 1984). This indicates the necessity for teachers to clarify the important elements of mapping with students when map lessons begin in secondary school.

Advice given to teachers from the findings of the pilot study

The findings of the pilot study suggested that teachers should seriously consider the use of real maps in classroom teaching and learning. At present, most Hong Kong teachers still use hypothetical simplified maps to introduce abstract map concepts (Kwan, 1994, 1999, 9; Stimpson, 1987) to pre-teenage children. This makes map learning unreal and difficult for students. As a result, many children lost interest and curiosity, despite having demonstrated their ability to understand real maps before beginning map lessons in secondary school (Kwan, 1999, 17). It follows, then, that teachers should also build on the knowledge that the children have already acquired, and utilize everyday map experience. This would enhance the understanding of abstract and sophisticated map concepts, and help students practice related map skills. To achieve this, teachers should incorporate maps encountered often in daily life into map work or geography lessons to stimulate the children to use and read these maps. The use of real and familiar maps, such as those which document home and school districts, enables the children to make meaning out of the maps, even though they may never have previously encountered the abstract and technical aspects of them (Kwan, 1995). The linkage and association of abstract map concepts with familiar environmental information (Spencer, Blades and Morsley, 1989) help the children to understand abstract and sophisticated map concepts. Such an association also enables them to develop meanings from these concepts more easily and hence, to use maps more readily (Kwan, 1999, 18). Teachers should also consider the greater and more effective use of map game materials, which can help pre-teenage children to learn by using abstract map concepts in a simulated situation (Kwan, 1999, 21). There may be scope for teachers to consider the use of peer-group learning to encourage idea exchange and interaction among the children so that they can learn about and understand abstract map concepts and practice mapping skills to enhance a genuine understanding of maps (Kwan, 1999, 22). If teachers can organize the map learning environment in such a way that the children see the practical need to utilize these map concepts and skills in their daily life situations, they are likely to learn about maps more readily.

Formal mapwork development in the Hong Kong Geography curriculum (1960 - present)

The learning and teaching of maps and related skills in Hong Kong are only dealt with formally in the secondary school curriculum (where pupils are 13+ years old), primarily in the subject of Geography and in some cases Social Studies. This section will briefly review the changing emphasis on teaching maps in the Hong Kong Geography curriculum from 1960 to the present. During this period, there has been a total of four Junior Secondary Geography curriculum documents (CDC, 1960,1975,1983 and 1998) produced for teacher reference. The review of the first three formal Geography curriculum documents (1960,1975 and 1983) shows that map work and its related skills were treated as

one of many topics in each of the syllabuses. Despite the obvious use of a map as a communicative tool to enhance geographical study, students never really got the chance to learn about mapping and use it as a practical life skill. Instead, they practised mapping skills with hypothetical maps. The subsequent omission of a separate map section in the 1983 curriculum document encouraged teachers to consider that mapping and its related skills were no longer important, despite the intention of the Educational Department to promote mapping as an integrative, rather than a separate tool for geographical study. However, the strategy of integrated map work teaching was left to teacher discretion. Such confusion explains why teachers in Hong Kong do not teach map work properly and, if they do, why they find it difficult to teach. The same applies to many students, in that they do not consider maps and map skills to be important in Geography. Many students who study maps and map skills at the junior secondary level refuse to study Senior Geography because they find the learning is alienated from the practical reality and so they do not see the importance and significance of learning about maps in Geography.

Kwan (1988, 71) found that Hong Kong Geography teachers tended to see map work teaching in schools as being unimportant since there were no explicit instructions on how to teach it. Therefore, teachers simply chose to teach in their own way. Though this was to some extent the original intention of the Curriculum Development Committee, this lead to confusion and obscurity. Some teachers maintained the old practice of a separate block of teaching where basic map work elements were taught within an intense period of about one or two months at the beginning of the Secondary One Geography curriculum. The map work elements were taught either as discrete topics or as mechanical manipulative conversion skills. Some teachers chose to teach map work on a regular basis, that is, one lesson a week or a cycle. Some ignored map work completely. Some claimed to have adopted integrated map work teaching, but what was done precisely in the classroom to enhance effective map teaching and learning remained unclear.

Integrated teaching and learning imply the use of maps as data sources for solving geographical questions (Boardman, 1976 and 1983; Catling, 1980; Slater, 1982; Winter, 1980). In order to make good use of the map as a geographical tool, students need to learn relevant map concepts, such as symbols, scale, grid location and direction, so that they can extract information from the maps to explain geographical phenomena. However, informal conversations with the inspectors at the Geography Advisory Inspectorate gave the impression that most teachers were still teaching map work as a separate topic, and not as a tool for geographical exploration. What they claimed was integrated teaching seemed to be merely the incorporation of a map topic into another unit of the Geography syllabus.

These teaching emphases made learning for pupils more difficult and hence students' interest and curiosity decreased. Eventually, pupils lost interest in taking Geography at the Senior level. This situation remained more or less the same until the 1998 revision of the 1983 Junior Secondary Geography syllabus. This newly revised syllabus, which highlights the importance of teaching Geography with an issue-based approach, was formally implemented in September 1999.

This version of the syllabus has two distinctive characteristics in relation to the teaching of and learning about map work:

- a clear statement about 'map skills' is included in an eight page section on "Guidelines of Teaching" which gives very clear specifications about what maps and map skills are, and how they should be handled in the Geography curriculum;
- a supplementary map unit on "Siu-ming Moving House" is prepared for teacher use in the form of curriculum support materials to go along with the 1998 revised Junior Geography syllabus.

The following section describes the cartographic significance of the map unit and the specified guidelines on map teaching in greater detail.

The supplementary map unit and its cartographic significance in the 1998 revised Junior Geography syllabus

Compared to the three earlier Geography curriculum documents, one of the key differences of the newly revised 1998 Junior Geography syllabus is that it contains a very explicit statement on how to teach map skills (Curriculum Development Committee, 1998, 53). Key words are in bold for emphasis:

- Being the **fundamental tool** of geographers, maps are the **most effective medium** for recording, analyzing and communicating information about places. The use of maps is not only limited to academic studies; there are plenty of opportunities to **use maps in daily life**: finding ways and locations, understanding international issues, planning holidays, etc. This makes map skills a **crucial life skill** that should be learned by all students. As such, it is necessary for Geography teachers to pay considerable attention to ensure their students are able **to master a reasonable level of map skills**.
- It is desirable that **map work be integrated into the relevant teaching and learning processes**. Although

some basic map reading skills may need to be taught separately, once students have acquired these basic skills, they should be encouraged to **apply them to the study of various landscapes**. Students should also be familiarized with a variety of maps drawn in different scales in a wide range of contexts. Equally important is that sufficient practice **in map work be provided throughout the years of study** so that map skills are enhanced with constant practice and consolidation.

- Map skills should be developed with consideration of planning, **starting with elementary map skills** such as drawing simple sketch maps of **their familiar surroundings**. The process can then be extended to calculation and transformation (e.g. drawing of cross-section) and then **to more complex skills** such as generalization and **identification of patterns and relationships on maps**. Teachers should exhaust every possible chance in their teaching **to incorporate the practice of map skills**. This will ensure that by the end of the three-year study of Junior Secondary Geography, students will be well-equipped with the skills that are essential for the study of higher level Geography as well as **for practical use in their lives**.

These guidelines on map skills teaching demonstrate that the notion of a reasonable level of mastery of these skills is significant and that mapping is a crucial life skill. The application of mapping skills is a fundamental tool in learning Geography. The guidelines also show the importance of integrated map teaching and learning, from simple familiar to complex relational, and that this be made explicit to teachers to avoid unnecessary confusion. In addition, a supplementary map unit was written for teacher reference as part of the curriculum support materials to help put these suggestions into practice. Designed to provide teachers with examples to facilitate effective student learning, the cartographic significance of this map unit includes:

- the utilization of children's intuitive knowledge and their real life experience as the context for map learning;
- the formal inclusion, for the first time, of help with the appropriate handling of map concepts and skills;
- the use of map information to solve real life problems, such as finding one's way around districts, or deciding which housing unit to buy;
- the use of map concepts and skills to enhance inductive thinking and reasoning;
- the realization of map work as a living skill in the daily lives of children;
- the provision of a sound foundation so that children can use a map as a geographical tool for learning other geographical topics.

Instead of using hypothetical and unfamiliar maps, which children seldom see the relevance of understanding, this map unit demonstrates that the use of real and practical maps of familiar environments can enhance the conceptualization and understanding of map concepts such as map types, scales, locations, direction, distance and symbolization. This map unit further supports the claim that if a familiar environment is used and problem-oriented map tasks are set, this will gradually help the children to overcome the barrier of moving from textual to symbolic representation, from formal to informal operation, and from concrete to abstract map understanding. The suggestions recommended in the pilot paper were mostly adopted.

The survey

The newly revised Junior Geography (SI-3) and the curriculum support materials for the revised SI syllabus, which contained the supplementary map unit, were sent to all schools in Hong Kong in September 1998 for inspection and consultation. A six-page questionnaire was sent to 214 (50%) secondary schools in Hong Kong in early February 1999. The purpose of the questionnaire was to see if Geography teachers were aware of the existence of support material. If so, the teachers were asked to evaluate the educational relevance and significance of the map unit and to provide their views about map teaching and the map unit. In total, 101 questionnaires were returned, which represented a response rate of 47%. Of the 101 teachers who replied, only 77 claimed that they were aware of the arrival of the map unit in early September 1998. Out of these, 15 (just under 20%) claimed that they had read the map unit thoroughly, while 39 of them (50%) said they read the map unit only briefly. Fourteen (18%) admitted only reading part of the unit, while nine (12%) had not read the unit at all.

The rest of this paper discusses the following two questions that the questionnaire results helped to answer:

- For those teachers (68 out of the 77) who had read the map unit to some extent (i.e., thoroughly, partially, or briefly), what were their opinions?
- What was this group's view regarding different clusters of map characteristics representing their conception of teaching of and learning about map work? Did the teachers consider that such map characteristics were reflected in the map unit?

Teacher's opinions about the map unit

Table 1 shows the summary of teacher opinions (in percentage where **N**=68) about the map unit in general where **SA** is strongly agree, **A** is agree, **N** is neutral, **D** is disagree and **SD** is strongly disagree.

	STATEMENT OF OPINIONS ABOUT THE S1 MAP UNIT	SA	A	N	D	SD	TOTAL
a	Using real life experience as the context makes teaching of and teaming about maps more relevant to the lives of S1 students.	45.6	51.5	2.9	/	/	100
b	Examples used are relevant to our S1 students.	17.6	60.3	19.1	2.9	/	100
c	The content is well organized and systematic.	4.4	51.5	39.7	4.4	/	100
d	Level of difficulty is appropriate for S1 students.	2.9	57.4	30.9	8.8	/	100
e	Follow-up exercises consolidate the learning outcomes.	8.8	60.3	23.5	7.4	/	100
f	The range of map tasks in the map unit is adequate for developing a comprehensive set of mapping skills.	2.9	35.3	42.6	19.1	/	100
g	Objectives of the map unit meet the needs of S1 students.	4.5	53.7	38.8	3.0	/	100
h	Aims and objectives of map teaching can be achieved.	4.4	63.2	27.9	4.4	/	100
i	The map unit should stand alone in the S1 Geography syllabus.	4.4	26.5	30.9	29.4	8.8	100
j	The map unit should be integrated into the rest of the S1 or S1-3 Geography syllabus	26.4	44.1	25.0	4.4	/	100

Table 1: Teacher's response to questions about the map unit

Apparently, the detailed description of how maps and map skills should be taught in the newly revised syllabus was successful in gaining the attention of the teachers, so much so that an overwhelming majority (97%) agreed that the use of real life experience could make map learning more relevant to S1 students. Also, 78% of respondents considered that the examples used in the map units were relevant to S1 students. Statements c, d, e, f, g and h refer to the teaching and to the objectives of the map unit. In general, they only obtained agreement or support from 50-70% of the teachers. Also, only three to nine percent of teachers expressed strong agreement to the way in which the map unit is organized, taught and assessed, which does not indicate whole-hearted support. This implies that, though teachers agree that life experience and real life examples are of critical importance to teaching and learning, quite a substantial proportion of the teachers do not regard the unit itself as having clear aims and objectives, and that the teaching methods are in doubt. In terms of how the map unit should be dealt with in the S1 geography syllabus, 70% do not support the idea that the map unit should stand alone. Rather, they think that it should be integrated into the rest of the S1 or even up to the S3 syllabus.

The results of the request for teachers to comment openly about favourable and unfavourable aspects of the material support revealed their views regarding the map units. Below are the most frequent favourable comments:

It is useful for daily life and real life experience to help to make map study more realistic. It helps to arouse interest and to convince students that what they learn in the classroom is applicable to daily life. The students learn to be involved in problem solving and decision making. Students are more interested and eager to learn and the questions/ tasks are set to cater for classes of mixed ability students.

The unfavourable comments related to the inadequate coverage and insufficient drilling of the manipulative map skills. Below are some of the more frequent unfavourable comments:

The map concepts are not emphasized in detail. Not every map skill is touched upon. Details of statements, scales, representative fractions, grid reference and types of bearing have not yet been mentioned. Practice of each aspect of map skills is not adequate. More consolidation, background knowledge and skills are required. The basic map reading skills should be taught separately before this integrated unit is used with the S1 students.

Among the 68 teachers who indicated they had read the map unit, only three said they that would use the map unit as presented. Fifty-three respondents indicated that they would only use part of the map unit and would make modifications before its use. The rest of the teachers were not sure if they would use it or not.

Teachers' conceptions of teaching and learning characteristics of map work and how this is reflected in the map unit

A total of 34 map characteristic statements, divided into six clusters of conception in mixed order, were given to teachers to indicate their degree of agreement (where A is agree, P is partially agree, D is do not agree and N is not sure). They were also asked to indicate whether they thought that each map characteristic statement was reflected in the map unit (where R is reflected). The 34 map characteristic statements were adapted and modified from Boardman (1983), Catling (1980), Gerber (1979; 1985), Gerber and Wilson (1989), Kwan (1994) and Ralph (1985). Table 2 shows the summary of the teachers' opinions (in percentage where N=68) on the six clusters of conception and their associated map characteristics statements.

	CLUSTERS OF CONCEPTION AND THEIR RELATED MAP CHARACTERISTICS STATEMENTS	DEGREE OF AGREEMENT				MAP UNIT
How to teach map work?		**A**	**P**	**D**	**N**	**R**
a	Using real life experience as the context in the teaching of map work helps S1 students to understand abstract map concepts better	88.1	11.9	/	/	77.7
c	The teaching of map work should be integrated into a range of learning contexts	73.1	25.4	/	1.5	46.2
g	Students learn more effectively with simplified maps of real places.	67.2	25.4	4.5	1.5	52.3
s	Use of a small-scale map is a starting point for teaching map work in schools.	22.7	42.4	28.8	6.1	21.2
t	Students can learn effectively with maps of hypothetical places.	9.1	56.1	22.7	12.1	13.6
x	Using maps, rather than reading maps, is the best way to teach map skills to students as it relates maps directly to the reality.	48.4	46.9	1.6	3.1	34.4
z	Map work should be the first topic taught to S1 students, so they can master map reading skills in the learning of other geographical topics.	38.8	37.3	14.9	9.0	20.9
Expectation of what a student can do after learning map skills		**A**	**P**	**D**	**N**	**R**
b	After learning map skills, students will have the ability to locate a place.	46.3	46.3	3.0	3.0	53.8
e	The learning of map work enhances students' thinking ability so as to improve their problem solving techniques.	43.3	50.7	4.5	1.5	47.8
f	After learning map work, students will nave the ability to make generalizations or inferences about places.	25.4	56.7	9.0	9.0	25.4
j	Students are able to select appropriate maps to solve spatial problems after learning map work.	31.3	47.8	13.4	7.5	31.3
m	After learning map work, students will be able to find a route between places.	40.3	55.2	1.5	3.0	47.8
Map Concepts		**A**	**P**	**D**	**N**	**R**
h	Arrangement of places is a map concept to be taught to students.	30.3	48.5	7.6	13.6	24.3
w	Symbolism is a map concept to be taught to students.	65.7	32.8	/	1.5	44.7
v	Proportion is a map concept to be taught to students.	38.8	44.8	9.0	7.5	22.4

dd	Orientation is a map concept to be taught to students.	44.8	47.8	4.5	3.0	29.9
if	Plan view is a map concept to be taught to students.	55.2	43.3	1.5	/	40.3
Map Skills		**A**	**P**	**D**	**N**	**R**
i	Finding out direction is a map skill to be taught to students.	85.1	14.9	/	/	53.7
k	Scale conversion is an important map skill to be taught to students.	62.7	25.4	10.4	1.5	28.4
q	Map reading is an essential life skill for all students to master because maps are encountered in our daily life.	67.2	31.3	/	1.5	47.7
r	Making generalizations from maps is a map skill to be taught to students.	50.5	39.4	3.0	7.6	28.8
ee	Identifying symbols on maps is a map skill to be taught to students.	75.9	24.1	/	/	41.4
gg	Using grid reference to locate places on maps is a skill to be taught to students.	74.6	23.9	/	1.5	32.9
Purpose of Teaching and Learning Map		**A**	**P**	**D**	**N**	**R**
d	A map is an effective medium for analyzing information about places.	68.2	28.8	1.5	1.5	48.5
n	A map is an effective medium for recording information about places.	49.3	47.8	3.0	/	34.3
v	A map is an effective medium for communicating information about places.	47.8	44.8	3.0	4.5	26.9
l	Making a map is a special skill developed solely from Geography.	28.4	32.8	32.8	6.0	19.4
p	Drawing a map is a special skill developed solely from Geography.	26.9	32.8	34.3	6.0	9.0
u	Reading a map is a special skill developed solely from Geography.	33.3	37.9	21.2	7.6	19.7
bb	Interpreting a map is a special skill developed solely from Geography.	31.3	38.8	23.9	6.0	20.9
hh	An important part of map interpretation is the ability to visualize the environment that is represented on the map.	58.2	40.3	/	1.5	25.4
S1 Students' Prior Knowledge of Maps		**A**	**P**	**D**	**N**	**R**
o	S1 students possess some knowledge of maps before the first lessons of S1 Geography.	25.4	38.8	25.4	10.4	13.5
aa	S1 students have no idea of what maps are before the first lessons of S1 Geography.	16.7	27.3	42.4	13.6	6.1

Table 2: Teachers' opinions on clusters of conception

Most of the teachers who responded to this part of the questionnaire indicated agreement to the three conceptions related to the teaching and learning map work characteristics:

- the expectation of what a student can do after learning map skills;
- the teaching of map concepts;
- the teaching of map skills.

Please refer to Table 2 page for more details.

There appears to be more diversity in terms of conceptions about the teaching of map work. Again, teachers expressed

overwhelming support for the first conception of how to teach map work. The majority agreed that the use of real life experience and integration into a meaningful context enhance student understanding of abstract map concepts. However, there are different degrees of agreement with respect to the use of different map scales, different map types (real or hypothetical) and different ways of teaching (as a separate unit/topic or as an advanced organizer) to allow students to master maps for subsequent use in other geographical topics. This is reinforced by the teacher's conception of the purpose of maps as an effective medium of recording, communicating and analyzing spatial information. However, a substantial proportion of teachers did not see map making, reading, interpreting and drawing as being important in Geography. The conceptions of S1 students' prior knowledge of maps, before having begun the formal learning of map skills in high school, are particularly diverse. It would be much more interesting to assess the questionnaire findings in more depth to determine the relationship between the conceptual preferences and agreements, and the level of familiarity the teachers have with the map unit.

In terms of asking the teachers if all these map characteristics and map conceptions are reflected in the map unit, the teachers did not seem particularly impressed. This suggests that, although teachers seemed to be aware of the importance of integrated map teaching as a skill for understanding different landscapes and environments, they still prefer to teach in the conventional way, placing much emphasis on individual mapping skill manipulation. This impression was supported by the open comments given by the teachers regarding the unfavourable aspects of the map unit. The teachers still want to make sure that individual map skills are fully mastered before used in other aspects of geographical learning. As a result, the concept of map integration to the overall study of Geography remains a concern. This also explains why only a small percentage of the teachers said they would use the map unit as is.

Conclusion

There is, in fact, a lot more to say about the results of this survey. However, certain points emerge from the brief analysis of the two questions. Teachers are aware of a new way of looking at map work teaching and learning by relating this to real life situations and experiences. The teachers, however, have difficulty discarding familiar and traditional methods of instructing specific map skills. They are reluctant to adopt alternative methods and a lively manner that would allow students to appreciate the important use of map work fully as a significant and effective geographical communicative tool. Teachers are still very reluctant to use the children's prior map knowledge and experience to enhance subsequent effective learning. Hence, if the teachers are using old criteria to judge the merit of the map unit, it is no surprise that the majority of the teachers consider that many map statement characteristics are not reflected. This is despite the fact that the proposed map unit actually represents a very substantial breakthrough, compared to earlier map teaching materials.

References

Boardman, D. (1983). Graphicacy and geography teaching. London: Croom Helm.

Boardman, D. (1976). Graphicacy in the curriculum. Educational Review, 28: 118-125.

Catling, S.J. (1980). Map use and objectives for map learning. Teaching Geography, 6(1): 15-17.

CDC (1960). A geography syllabus for anglo-chinese secondary education (Forms 1-3). Hong Kong: The Education Department.

CDC (1998). Geography syllabus for secondary schools (Secondary 1-3). Hong Kong: The Education Department.

____(1998). Curriculum support materials for the revised S1 geography syllabus. Hong Kong: The Education Department.

____(1983). Syllabus for secondary schools: geography (Forms 1-3). Hong Kong: The Education Department.

____(1975) An 'interim' syllabus for junior secondary geography (Forms 1-3). Hong Kong: The Education Department.

Gerber, R. V. (1985). Designing graphics for effective learning. Geographical Education, 5(1): 27-33.

____(1984). Skills book for secondary schools. Brisbane: The Jacaranda Press.

____(1979). Development of competence and performance in cartographic language by children at the concrete level of map-reasoning. Ph.D. Thesis. Brisbane: University of Queensland.

Kwan, T. (1999). Pre-teenage children's vernacular perception and experience of maps in Hong Kong. International Research in Geographical and Environmental Education, 8(1): 5-25.

____ (1994). Teachers' perceptual understanding of map work and their styles of mapwork: teaching at forms 1-3 in Hong Kong. Asian Geographer, 36:94-103.

Ralph, B. (1985). Maps, graphs and statistics - a checklist of key skills. Geography Bulletin, April: 58-62.

GTANSW. Stimpson, P. G. (1987). Improving the graphical ability of children and the teaching of map work. The Geography Bulletin, 17: 60-66. Hong Kong: The Education Department.

Wilson, P. (1980). The map reasoning development of pupils in years 3, 5 and 7 as revealed in free recall sketch maps. PhD Thesis, Ohio: Ohio State University.

Winter, E. A. (1980). A course to understand maps. Tasmania: The Education Department.