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Curriculum Transformation in the Era of Reform Initiatives: The Need to Rethink and Re-conceptualize Content

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This article analyzes the complexity of transforming the curriculum ideals embodied in reform initiatives into syllabus documents, with a particular focus on the call for developing generic skills, values and attitudes. The central argument is that the transformation is fundamentally a conceptual endeavor requiring serious curriculum work which has to deal with issues concerning content selection, organization and framing. It entails a need to rethink and re-conceptualize curriculum content in view of curriculum ideals. Implications are discussed concerning the challenges of curriculum transformation in the current emergent curricular landscape in Singapore.

Keywords: curriculum design, curriculum content, transformation

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改革年代中的課程轉化：再思考與再概念內容

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本文分析教育改革背景中，理想課程轉化為課程大綱的複雜關係，特別關注在提倡提升共通能力、價值觀、態度三面向。本文認為課程轉化，從根本上說來，是概念性的工作，轉化的過程需要嚴謹的課程作業，包括內容選擇、組織、轉換。因此，課程轉化必須從理想課程的角度重新思考與重新概念化課程內容。文章也一併討論新加坡新的一輪課程改革中課程轉化面臨的挑戰。

關鍵詞：課程設計、課程內容、轉化

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Over the past 40 years Singapore has created a highly effective school system as indicated by the high levels of student achievement in mathematics, science, and literacy as indicated in international studies like the Trends in International Mathematics and Science Study (TIMSS) and the Progress in International Reading Literacy Study (PIRLS). The remarkable academic performance of Singaporean students, Hogan (2009) points out, is enabled by traditional pedagogical practices focused on the transmission of formal academic knowledge via conventional instructional strategies including direct instruction, memorization, and drill and practice. However, there has been a serious concern that the prevailing pedagogical practices, while effective in preparing students for examinations, cannot prepare them for the challenges of the 21st century—challenges that, according to the government, require Singaporeans to be critical and innovative thinkers, committed to life-long learning, and possess positive values and attitudes.

Since 1997 Singapore has attempted to reform classroom practices in the light of the perceived challenges of globalization and the emerging knowledge economy. The Singaporean vision for meeting the new challenges is encapsulated in the concept of Thinking School, Learning Nation, with its aim to develop future generations of thinking citizens, capable of making sound decisions, loyal to the country, and committed to life-long learning. In line with this vision, the Ministry of Education (MOE) issued the Desired Outcomes of Education focused on developing the full potential of children and making them responsible citizens. A plethora of reform initiatives have been implemented, which call for innovative, student-centered, and IT-enriched approaches to classroom teaching, with the intention to foster critical thinking, creativity, independent learning, positive values and attitudes in students. The school curriculum is viewed as the key agent in implementing the new policies (see Deng & Gopinathan, 1999; Gopinathan, 2007). Most recently, the Ministry put forth a new vision of national curriculum, the Curriculum 2015 (C2015), which is a response to the current rapidly changing context caused by globalization, changing demographics, and technological advancement. Foregrounding the importance of preparing students for life and work in the 21st century, policymakers have enumerated a

set of broad C2015 learning outcomes centered upon generic skills (such as critical thinking, communication, collaboration and management skills) and capacities (in terms of civic, information and media, technological and multicultural literacy). The creation of C2015, Hogan (2009) argues, signals a transition that the Singapore curriculum needs to undertake—a transition from the transmission of academic knowledge and skills to the development of 21st century skills and capacities.

This article analyzes the complexity of transforming the curriculum ideals or aims embodied in reform initiatives into syllabus documents, with a particular focus on the call for cultivating generic skills (including critical thinking, creativity, independent learning, problem solving, etc.), positive values and attitudes (such as curiosity, objectivity, and open-mindedness). In Singapore syllabus documents occupy a vital place in developing textbooks and instructional materials as well as in implementing educational policies and reform initiatives. The national curriculum is represented by a set of syllabi or syllabus documents which specify the contents to be taught for all school subjects from primary to pre-university levels.[1] Developed by the MOE, syllabi represent a direct authoritative translation of curriculum policies or initiatives. All school textbooks and related instructional materials are required to be developed in accordance with syllabus documents. Syllabus documents are also closely aligned with national examinations.[2] Furthermore, these syllabi are an important instrument for implementing educational policies or initiatives. They have to undergo review and revision every 6 years in the light of the changes to educational policies.

This paper starts with an outline of key reform initiatives implemented in schools. This is followed by an examination of their transformation or translation into syllabus documents. Afterward, the article examines the kind of cur-

1 In the national curriculum school subjects are organized according to four broad categories: Aesthetics, Health and Moral Education, Humanities, Language and Literature, and Sciences.

2 There are three main types of national examination in Singapore: (1) primary school examinations (also called PSLE conducted at the end of primary education to assess pupils' suitability for secondary education and also to place them in appropriate secondary school courses); (2) secondary school examinations (called the "O" or "N" level exams conducted at the end of four or five year secondary school education); and (3) examinations for tertiary education (or the "A" level exams at the completion of 2 years of Junior College).

riculum work entailed in curriculum transformation at the syllabus level—concerning the formation or reformation of school subjects, with the formation of liberal studies as a school subject in Hong Kong as an illustration. The argument is that transforming curriculum ideals into syllabus documents has to do with the content selection, organization and framing. It requires a serious rethinking and re-conceptualizing of curriculum content in view of the curriculum ideals. The article concludes by addressing the challenges of curriculum transformation in the light of the latest vision of national curriculum for the 21st century—C2015.

Reform Initiatives in Singapore

As mentioned above, starting from mid-1990s a deluge of educational initiatives has been implemented in schools in response to the perceived challenges of globalization and the emerging knowledge economy, in terms of "preparing students for an era of innovation-driven growth, and frequent and unpredictable change in the economic and social environment" (Gopinathan, 2007, p. 61). The Government's reading of the challenges was that school leavers were required of entirely new sets of skills including ICT, critical thinking, creativity, problem solving, and life-long learning (Gopinathan, 2007). Under the overriding framework of Thinking Schools, Learning Nation and Desired Outcomes of Education, three major initiatives are at the forefront of the reform movement. One is the systematic introduction of information technology (IT) into the curriculum as represented by the Masterplan for Information Technology (IT-masterplan),[3] with an intention to enhance the IT skills and capabilities of school students. Another is the introduction of thinking skills into the curriculum, with the primary purpose of cultivating younger Singaporeans to think critically and creatively. The third is the introduction of National Education—a

[3] It has three phases. Phase one (1997-2002) focuses on the provision of basic ICT infrastructure and equipping teachers with a basic level of ICT competency. Phase two (2003-2008) emphasized strengthening the integration of ICT into the curriculum, establishing baseline ICT standards for students, and seeding innovative use of ICT among schools. Phase Three (2009-2014) focuses on strengthening students' competence, fostering in-depth learning and understanding, and tailoring learning experiences to a diversity of learners.

kind of citizenship education that is used as a means to socialize the younger generations through sensitizing them to the national needs, concerns and possibilities in an emergent global economy (Deng & Gopinathan, 1999; Gopinathan, 2007).

The three major reform initiatives are underpinned by other related innovations or initiatives including the introduction of interdisciplinary project work, the inclusion of various alternative modes of assessment, and a greater emphasis on processes rather than outcomes when appraising a school's performance. Two other initiatives include Innovation & Enterprise (emphasizing the cultivation of capabilities and attitudes pertaining to innovation, entrepreneurship, risk taking, resilience, team spirit, etc.) and Teach Less, Learn More (emphasizing the "quality" rather than "quantity" of teaching and the importance of rethinking the "what" and "why" questions of teaching and learning). The official curriculum (i.e., the syllabus) has been viewed as the key agent in implementing those initiatives. For each school subject there has been significant content reduction (10 to 30%) in the official syllabus. The MOE attempted to bring down the content so as to provide space for the teaching of generic skills, values and attitudes. Accompanying these initiatives are changes in the locus of management from the government to increasingly the hands of local school leaders and classroom teachers. Thus the school system has been diversified and flexible with the creation of alternative pathways (see Gopinathan, 2007; Gopinathan & Deng, 2006).

However, the introduction of reform initiatives does not seem to be accompanied by a fundamental change to the official curriculum. Policymakers and curriculum developers do not seem to have fully recognized the importance and complexity of transforming reform initiatives into the school curriculum—issues that are to be discussed in what follows.

Transformation into syllabus documents

I now discuss how the curriculum ideals embodied in reform initiatives are transformed into syllabus documents, with a particular focus on the need to

cultivate generic skills, positive attitudes and values. While new programs or learning experiences have been introduced to schools as a result of reform initiatives, the school curricular structure has remained largely unchanged. Students are required to take traditional academic school subjects including languages, humanities, arts, mathematics, and sciences. They are required to participate in programmes or learning experiences such as community involvement, service learning, civic and moral education, and Nation Education.

In other words, academic school subjects constitute the primary context for the cultivation of generic skills, positive attitudes and values. All syllabi have been substantially revised in view of the Desired Outcomes of Education, and according to the requirements of reform initiatives. The MOE has used an "infusion" strategy for "transforming" curriculum ideals into syllabus documents. Generic skills, values and attitudes are infused into syllabi, which are supposed to be taught alongside the content knowledge of the existing school subjects. Furthermore, content knowledge, generic skills, values and attitudes are framed in terms of learning outcomes that students are to demonstrate at the end of a particular stage of learning.

This way of transforming curriculum ideals into syllabus documents can be illustrated by the Lower Secondary Science Syllabus for express and normal (academic) students.[4] In the syllabus the curriculum content is organized around six themes, namely (1)science and technology, (2)measurement, (3)diversity, (4)models and systems, (5)energy and (6)interaction, each of which is further organized into several topics. Curriculum content is viewed to consist of three broad domains: (a) knowledge, understanding and application, (b) skills and processes, and (c) ethics and attitudes. The second and third domains contain the generic skills, values and attitudes to be "infused" into the official curriculum. These three domains are largely independent, the description of which can be found in Table 1.

[4] In Singapore secondary school students are streamed into three different courses: Express, Normal (Academic), and Normal (Technical) based on the result of the Primary School Leaving Examination (PSLE).

Table 1. Description of the Three Domains of Content

Knowledge, Understanding and Application of	Skills and Processes	Ethics and Attitudes
• Scientific phenomena, facts, concepts and principles • Scientific vocabulary, terminology and conventions • Scientific instruments and apparatus including techniques and aspects of safety • Scientific and technological applications	Skills • Using apparatus and equipment • Posing questions • Observing • Classifying • Comparing • Communicating • Inferring • Formulating hypothesis • Predicting • Analysing • Elaborating • Verifying • Generating Possibilities • Defining the problem Processes • Planning investigation • Creative problem solving	• Curiosity • Creativity • Objectivity • Integrity • Open-mindedness • Perseverance • Responsibility

The three domains of content are supposed to be "contextually linked" to three aspects of science in relation to modern day living: (a) the personal (using scientific and technological tools and resources and making informed decisions in everyday life); (b) the social (engaging in scientific discourse concerning social and moral issues and understanding the role and impact of science and technology in society); and (c) the environmental (understanding and being concerned about environmental issues created by science and technology). Through linking curriculum content with these three aspects in the curriculum, curriculum designers believe that students can be inculcated with the "spirit of scientific inquiry."

Furthermore, the three domains of content are framed in terms of learning outcomes. For each theme, the syllabus starts with a brief introduction that suggests how the three aspects of science can be incorporated into classroom

teaching, together with key inquiry questions. It then lays out the learning outcomes organized according to the topics of the theme, with respect to the three domains of content. Table 2 shows how the syllabus translation of the theme "energy."

Table 2. The Learning Outcomes of the Theme "Energy"

Theme	Energy
Introduction	Students should appreciate that energy is necessary for all living and non-living systems. Energy makes changes and movement possible in our daily lives. Living things obtain energy and use it to carry out life processes. There are many forms of energy and one form can be converted to another. It is our responsibility to show care and concern for living things and the environment as we use energy in its different forms every day. In this theme, we examine different forms of energy such as kinetic and potential energy, light and electricity, and the processes of photosynthesis and respiration in plants. Key inquiry questions in Energy include: • How can we harness energy to improve our quality of life? • Why must energy be conserved?
Topic 1 - Energy Forms & Use-Energy Forms & Conversion: Learning Outcomes	
Knowledge, understanding and application	• State what is meant by energy • Describe different forms of energy (e.g., kinetic, potential, light and sound) and how energy changes from one form to another
Skills and processes	• Infer that energy is conserved and can be transformed from one form to another
Ethics and attitudes	• Show an appreciation of the need for Singapore, which has no natural resources of her own, to conserve energy
Topic 2 - Energy Forms & Uses — Light: Learning Outcomes	
Knowledge, understanding and application	• Explain how reflection is affected by a smooth and rough surface • Sstate the characteristics of the image formed by a plane mirror • Describe the effects and uses of reflecting surfaces (e.g., plane and curved) • Describe some effects and consequences of refraction • Describe the dispersion of white light by a prism • Explain how we see the colour of objects in
Skills and processes	• Compare the speed of light, sound and common moving objects • Investigate the effects of reflection and refraction in practical activities and make inferences through observations in everyday life
Ethics and attitudes	• Show an appreciation of scientific attitudes such as creativity and perseverance in measuring the speed of light to a high degree of accuracy

Notice that most outcomes are specific and demonstrable, with an emphasis on student performance. Through framing content in terms of outcomes, curriculum designers create a body of indicators to measure the effectiveness of classroom teaching.

Infusing generic skills, values and attitudes into curriculum content and framing curriculum content in terms of learning outcomes are two essential features of the approach to transforming curriculum ideals into syllabi adopted by MOE. These two features can be found in a wide range of syllabi at different school levels, such as mathematics (primary) syllabus, geography (lower secondary) syllabus, English language (primary and secondary) syllabus, literature in English (pre-university) syllabus, social studies (lower secondary normal [technical]) syllabus, and history (lower secondary) syllabus, among others.

To a large extent, these two essential features reflect an embrace of what is called the outcome-based education (OBE) developed in the US by Spady and colleagues in the 1980s and 1990s (Spady, 1994). When planning a formal curriculum, outcome-based educators start by determining the knowledge, competences, attitudes, and qualities they want students to be able to demonstrate at a particular stage or level of schooling. OBE is a "technocratic" model that can be traced back to the Tyler Rationale which speaks for the centrality of precise objectives and indicators in curriculum development and evaluation (Tyler, 1949). OBE is inextricably connected with issues of accountability and evaluation. "The driving force behind outcome-based programmes," Brady (1996) states, "is the desire of governments to improve the quality of schooling in a way that can be evaluated overtly" (p. 12).

However, the stipulation of curriculum content in terms of outcomes is basically incompatible with the vision of developing generic skills and learning abilities needed for the 21st century. There is a tension between the curriculum aims of developing creativity, critical thinking and problem solving capacities on the one hand and the language of content in terms of specific, demonstrable outcomes on the other (Carlgren, 2005). The former calls for an embrace of uncertainty, diversity, and openness in educational journeys. The latter, however, implies an acceptance of certainty, uniformity, and closure. "To define education

as a set of outcomes decided in advance of teaching and learning," McKernan (1993) argues, "conflicts with the wonderful, unpredictable voyages of exploration that characterize learning through discovery and inquiry" (p. 347). Furthermore, a preoccupation with infusing generic skills, values and attitudes into curriculum content entails a dualism between knowledge on the hand and skills, values and attitudes on the other—a dualism that is essentially untenable. According to Dewey (1916), knowledge—whether of school mathematics, science, or history—is a special kind of human experience inextricably associated with special abilities, ways of thinking, attitudes and dispositions of mind.

On the whole, transforming the curriculum ideals into syllabus documents has not been accompanied by serious curriculum work—work that has to do with the matter of how knowledge content can be conceived, selected, arranged and framed in view of the need to develop generic skills, attitudes and dispositions. Formalized curriculum-making seems to be ignored in favor of assessment and accountability enabled by a body of indicators or learning outcomes (Karseth & Sivesind, 2010). As a result, a serious effort of rethinking the content of the school curriculum is largely lacking. To appreciate the significance of this matter, it is necessary to look at the kind of curriculum work involved in the formation of a school subject or course of study.

Curriculum work and syllabus construction

Transforming curriculum ideals into syllabus documents has to do with three kinds of curriculum, (1) the abstract or ideal, (2) the analytic or technical, and (3) the enacted, each of which results from curriculum making at a particular level.

The abstract curriculum is represented by curriculum ideals at the intersection between schooling, culture, and society. It embodies a conception of what schooling should be with respect to the society and culture. Curriculum making at this level "typifies" what is desirable in social and cultural orders, what is to be valued and sought after by members of a society or nation (Doyle, 1992a, 1992b). It frames what should go on in a school or school system in terms of broad goals and general approaches to education (Doyle, 2008). It helps set the

frame of reference for the development of syllabi and curriculum materials.

The analytic curriculum is embodied in syllabus documents and related curriculum materials. Curriculum work at this level translates or transforms the expectations and ideals embodied in the abstract curriculum into operational frameworks for schools, thereby bridging the gap between the abstract curriculum and the (enacted) classroom curriculum (Westbury, 2000). This curriculum is characterized by an array of school subjects, programs, and courses of study provided to a school or a system of schools. The process of constructing a school subject or a course of study involves "framing a set of arguments that rationalize the selection and arrangement of content [knowledge, skills, and dispositions] and the transformation of that content" for school and classroom use (Doyle, 1992b, p. 71). Each school subject contains a "theory of content" with respect to both the ideals and expectations embodied in the abstract curriculum and the activities of teaching and learning (Doyle, 1992b).

The enacted curriculum is characterized by a cluster of events jointly developed by a teacher and a group of students within a particular classroom (Doyle, 1992a, 1992b). Classroom curriculum work involves transforming the analytic curriculum embodied in curriculum documents and materials into instructional events. It involves further elaboration of the programmatic curriculum, making it connect with the experience, interests, and the capacities of students (Westbury, 2000).

From the above perspective, the formation or reformation of a school subject is at the heart of transforming curriculum ideals into syllabus documents. It has to do with the matter of content selection, organization and framing in view of curriculum ideals or aims. This requires rethinking and re-conceptualizing content if the curriculum aim is to help students develop critical thinking, broadened perspectives, positive values and attitudes rather than merely to transmit content per se.

To illustrate this point, I look beyond the Singapore context to examine the formation of liberal studies—a core school subject in the new senior secondary curriculum in Hong Kong—using as an analytic frame the above three types of curriculum. There are two reasons why liberal studies is chosen for discussion.

First, liberal studies is particularly constructed for the purpose of helping students develop generic skills, positive values and positive attitudes. Second, the formation of liberal studies embodies a promising approach to curriculum transformation in the 21st century. The current international discourse on curricular change stresses the importance of a student-centered approach to content organization, and of creating opportunities for learners to develop a broad knowledge base and generic competencies (cf. Rosenmund, 2006). This, as will be seen, is evident in the construction of liberal studies.

The formation of liberal studies: An example

The introduction of liberal studies as a secondary school subject was inextricably connected with curriculum reform for the 21st century in Hong Kong. Since September 2009, the government has implemented what is called the "3+3+4" academic structure—accordingly, there are three years lower secondary, three years senior secondary, and four years normal undergraduate education.[5] This represents a structural response to the changing social, economic, and political contexts in terms of globalization, a knowledge-based economy, and an increasingly close tie with the mainland China. Aligned with this new structure is the new senior secondary (NSS) curriculum that consists of: four core subjects (Chinese, English, mathematics, and liberal studies), elective subjects (e.g., physics, chemistry, and humanities) and other learning experiences (moral and civic education, community service, aesthetic and physical activities).

As an integral part of the NSS curriculum, liberal studies is a compulsory school subject for all senior secondary school students.[6] In terms of the abstract curriculum, the aim of the subject is to enhance students' social awareness, broaden their horizons, cultivate positive attitudes and values, and develop critical thinking and life-long learning abilities (i.e., learning to learn)—qualities that

[5] The past system comprised of three years of junior secondary, four years of senior secondary, and three years of normal undergraduate education.

[6] This is a modification and extension of the ASL liberal studies. ASL stands for the advanced supplemental level. In the past curriculum ASL liberal studies was offered as an elective school subject to approximately 10 % of senior secondary school students.

are believed to be essential for facing the challenges in the 21st century. To this end, curriculum content is viewed as a resource for helping students develop these qualities rather than as a corpus of facts, concepts, skills and values for transmission. Furthermore, there is a special way of selecting, organizing, and framing content in line with the central curriculum aim or ideal and in support of students' knowledge construction via the employment of issue-inquiry and cross-curricular approaches to classroom teaching. This represents the theory of content in liberal studies to be illustrated below.

With respect to the analytic curriculum, the content of the subject is selected and organized by way of a "student-oriented approach, with the intention to "help students understand themselves, and their relations with others and the environment in which they live" (CDC & HKEAA, 2007, p. 4). Three broad areas of concern are identified, including self and personal development, society and culture, and science, technology and the environment. These three areas are further divided into six modules including: (1) personal development and interpersonal relationship; (2) Hong Kong today; (3) modern China; (4) globalization; (5) public health; and (6) energy technology and the environment. Each module starts with a prologue which lays out related concepts for teaching and learning, and is organized around a few themes, each of which is framed in terms of key issues and related issues for inquiry. For each theme, the framework suggests related values and attitudes that teachers are supposed to help students develop. Table 3 below illustrates the way content is arranged and framed for the module energy technology and the environment.

The above way of arranging and framing content is intended to facilitate issue-inquiry and cross-curricular approaches to teaching and learning, with an intention to encourage students' participation in knowledge construction. Those key and related issues are supposed to arise within various contexts that are familiar to students. Students are supposed to participate in knowledge construction activities, using their existing knowledge to construct new understanding. Those issues are intended to be controversial to encourage students' critical thinking. Most of the issues are intended to be cross-curricular or interdisciplinary, the examination of which requires drawing on differing perspectives, ways

Table 3. Content Selection, Arrangement, and Framing in the Module "Energy Technology and the Environment"

Prologue	Energy technology enhances the efficiency of energy utilisation, and this inevitably invites us to use more energy. Our dependency on energy affects scientific and technological development. Such interaction also has an impact on social development: the use of energy affects the environment and the changes in our environment alter our views on the use of energy. Therefore, the use of energy, social development, and scientific and technological development are mutually interdependent. They pose a challenge to the balance of the ecosystem and our living environment. Sustainability has become a crucial goal in dealing with environmental development. In this module, students will be asked to evaluate issues concerning energy technology and the environment from a variety of perspectives, informed by scientific, technological, environmental, historical, social and cultural data. They will develop an awareness of the complex interrelationships and interdependencies involved. It is hoped that recognition of the impact of science and technology on our lives will lead to empathy for living things, a love of the environment, an understanding of the need for sustainable development for our society, country and the world, and to nurture responsible global citizenship.
Theme 1: The influences of energy technology	
Key issue	How do energy technology and environmental problems relate to each other?
Related issues	How does the development of energy technology affect the exploitation and use of energy? To what extent does the development of energy technology create or solve environmental problems? What are the implications of environmental change on the development of energy technology? How do energy problems affect international relationships, and the development of countries and societies?
Related values and attitudes	Betterment of humankind; respect for evidence; interdependence
Theme 2: The environment and sustainable development	
Key issue	Why has sustainable development become an important contemporary issue? What is the relationship between its occurrence and the development of science and technology?
Related issues	How do science and technology match with sustainable development? What are the constraints? How do the living styles of people and social development affect the environment and the use of energy? What responses could be made by the public, different sectors, and governments regarding the future of sustainable development?
Related values and attitudes	Responsibility; caring for the living and non-living environments; betterment of humankind; sustainability; simplicity

of thinking, and values from various school subjects and other learning experiences. Curriculum designers assume that the content—when classroom teachers arrange, frame, and translate it into instructional activities in a way that is consistent with the inherent theory of content in liberal studies—has the potential to broaden students' perspectives, enhance their social awareness, and develop their generic skills and capacities (Deng, 2009).

Rethinking and re-conceptualizing content

This paper has argued that transforming curriculum ideals into syllabus documents has to do with the (re)formation of a school subject or course of study. At the heart of the formation is a theory of content—a special way of selecting, arranging and framing content—that can "imbue" curriculum content with "educative" potential in view of curriculum ideals or aims.

To call attention to such a theory of content is to argue that transforming curriculum ideals into syllabus documents requires a serious rethinking and re-conceptualizing of curriculum content, if the curriculum aim is to broaden students' perspective and to develop their critical thinking, positive values and attitudes. Three points can be made. First, curriculum content needs to be viewed as an important resource for widening students' horizons, and developing critical thinking, attitudes and values rather than merely as a set of facts, concepts and principles for transmission or delivery. The content of a school subject—be it mathematics, history or geography—contains not merely a body of facts, concepts and principles. It is inextricably associated with particular ways of thinking, values, and dispositions of mind (Dewey, 1916). In other words, knowledge content possesses the potential for developing generic skills, values and attitudes—pertaining to critical thinking, problem solving, cross-disciplinary thinking, etc..

To disclose the potential, curriculum developers need to conceptualize or re-conceptualize content in a way that can open up opportunities for the development of generic skills, values and attitudes. This requires going beyond the "surface" content to its substantive, disciplinary and cross-disciplinary dimen-

sions. The three "faces" of content, identified by Joseph Schwab (1973) in the "practical 3" paper, are useful for analyzing the laden curricular opportunities embodied in content. The first face is the purport conveyed by the content, which could be used for the development of positive values and attitudes. For instance, the purport of a short story could be a moral dilemma, which could render opportunities for moral development of the learner. The second face concerns the originating discipline from which content derives, standing for "a coherent way of bringing a body of principles, methods and problems to bear upon some inchoate mass in order to give it order and meaning" (p. 515). Access to those principles, methods, and ways of knowing, Schwab believed, is access to ground for critical thinking, problem solving, and certain dispositions of minds. The third face concerns certain the access disciplines that need to be brought to bear on the content in order to reveal its full complexity and sophistication. This allows the content to be opened to different types of questions, different perspectives, and different ways of thinking derived from diverse disciplines or school subjects.

To a certain extent, the formation of liberal studies implies a Schwabian way of conceptualizing or framing content for potential. As indicated earlier, content is viewed as a resource for broadening perspectives, developing critical thinking and positive values and attitudes. It is framed in terms of important concepts, themes, issues for inquiry, and values and attitudes. Through viewing and framing content in this manner, curriculum designers make it possible for content to be investigated from multiple perspectives with different kinds of questions, hence yielding manifold opportunities for students to widen their horizons and develop critical thinking, values and attitudes. In other words, curriculum designers conceptualize content in view of substantive, disciplinary and cross-disciplinary aspects. They imbue content with "educative" potential with respect to curriculum aims or ideals.

Furthermore, in liberal studies framing content in terms of key and related issues that arise from various political, social and physical contexts can facilitate students' construction of knowledge and development of certain attitudes and dispositions of mind. Carlgren (2005) argues that curriculum developers need to

frame content in different contexts to create opportunities for students to participate in knowledge formation processes. Various abilities and dispositions could be formed the responses to experiences in different contexts. For example, in biology plants can be framed in a traditional science laboratory setting, where students are required to be engaged in the practice of collecting and drying up different kinds of plant. Plants can also be framed in an ecological context, with a task that requires students to analyze and construct an ecological system. Carlgren explains:

> To collect and dry up plants is a kind of practice. In biology teaching alternative contextualizations could be considered—such as construction and analysis of ecological systems or gardening. Such alternative framings would result in other abilities and dispositions to act while at the same time they may be about the same plants … There is a change from knowing in terms of classification and taxonomical thinking to knowing the functions of different plants in the eco-system, which may be a way of knowing more in accordance with the needs to develop dispositions for a sustainable society. (Carlgren, 2005)

By participating in knowledge construction activities in different contexts, certain ways to explore and relate to the world are developed, which are expressed as abilities, dispositions and values.

Concluding remarks

This paper has discussed the complexity of curriculum transformation in the context of reform initiatives in Singapore. The central argument can be stated as follows: transforming initiatives concerning the promotion of generic skills, positive values and attitudes into syllabus documents is not merely a technical endeavor—in terms of enumerating sets of learning outcomes. It is fundamentally a conceptual undertaking which deals with content selection, organization and framing. It entails a rethinking and re-conceptualizing of curriculum content in view of the aims or ideals embodied in the initiatives. Curriculum content, when conceived and framed in certain ways, can open up opportunities for developing generic skills, positive values and attitudes.

The argument takes on greater significance in the current emergent curriculum landscape characterized by the vision of C2015 mentioned at the beginning. How could C2015 learning outcomes be transformed into syllabus documents? How could school subjects be (re)formulated in a way that supports the cultivation of 21st century skills and capacities? Transformation must deal with issues pertaining to content selection, organization, and framing in view of both the new learning outcomes and classroom practice. It demands a serious rethinking and re-conceptualizing of curriculum content that is to be contained in syllabus documents. As Hogan (2009) points out, the success of the above transition depends on how well Singaporean policymakers and curriculum developers are able to "re-conceptualize the relationship between knowledge, teaching and learning–indeed, school subjects" in ways that support the cultivation of 21st century skills and capacities. This presents a significant challenge for policymakers and curriculum developers—as far as curriculum transformation is concerned.

Curriculum transformation entailed in the development of syllabus and instructional materials involves "constructing a set of often-technical arguments that rationalize the selection and arrangement" of content and the "transformation, through simplification, elementarization, and representation" of that content into forms suitable for classroom use (Doyle, 2010). To do this, curriculum developers have to conceptualize or theorize content with respect to curriculum aims or ideals and classroom practice. Through conceptualizing or theorizing content, curriculum developers allow content to yield "educative" opportunities for students. This important curriculum work has been under-investigated and under-theorized in the field curriculum studies. I hope that there will be more research in this area.

The paper has not discussed how curriculum initiatives are transformed into textbooks and into classroom practices. Further investigations are needed if we are to more fully understand the challenges of curriculum transformation. In addition, it is important to emphasize that syllabi cannot in themselves achieve curriculum aims or ideals set at the policy level. The success and effectiveness of syllabi will depend on other settings of policy and practice, including teacher

education, teachers' professional development, instructional resources, and the examination system, among others (see Luke et al., 2008). In other words, curriculum transformation at the syllabus level would not be successful without corresponding changes in those settings.

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