PHYSICS TEACHERS AND CHINA'S CURRICULUM REFORM: THE INTERPLAY BETWEEN AGENCY AND STRUCTURE

by

Guopeng Fu

B.A., Chongqing University of Posts and Telecommunications, 2008
M.A., The University of British Columbia, 2010

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Abstract

This study explored how individual and collective agencies among physics teachers in a select high school were enabled and constrained in the context of the on-going curriculum reform in China. Human agency as used in this study was informed by five perspectives: Bandura’s Social Cognitive Theory; Giddens’ Structuration Theory; Giroux’s critical pedagogy; Seixas’ historical consciousness; and Davies’ feminist and poststructuralist perspective.

The study employed autoethnographical methods including observation, interviewing, the researcher’s and teachers’ reflective journaling, and data collection through the researcher’s involvement with various school activities which took place in one high school. The analysis of the data corpus employed portraiture and constant comparative method. The portraits of the researcher and selected teachers depicted their agencies in terms of origin, motivation, shape, and negotiation.

The findings included: 1) individual teacher agency was significantly influenced by history, currency, moral standards, and students; 2) collective agency was shaped by structural changes, leadership and modern technology; and 3) collective teacher agency created the demands for individual teachers’ professional development, a conducive culture for teacher collaboration, and concrete examples that teachers could constantly refer to, reflect upon, and learn from for reform implementation.

These results offer important insights for understanding how physics teacher agency is manifest in the on-going curriculum reform in China. Further, the study offers a clear understanding of the influences underlying physics teachers’ agency deployment as they engage with the curriculum reform process. Finally, this study’s findings justify a case for preparing
physics teachers on how to deploy both individual and collective agencies in the face of the complicated social structures and ultimately shed light on the desired curriculum decentralization in China.
Preface

The research reported in this dissertation was designed, conducted, and analyzed by the author with the guidance from the author’s supervisory committee. This research study obtained the approval of the University of British Columbia Research Ethics Board, the UBC Behavioural Ethics Board (UBC BREB Number: H12-01197).
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Dedication

To Ling.
Chapter one: Introduction

Background

The debate on whether agency or structure dominates human actions has lasted for more than one hundred years in the social sciences. The debates shifted from objectivism which favoured structuralism to subjectivism which favoured personal agency and then developed to a consensus of duality between agency and structure in the late 1980s in the field of psychology and sociology (Bandura, 2006; Giddens, 1984). Theorists in both fields have argued that agency and structure mutually shape each other, and they contend that human agency is both enabled and constrained by the surrounding environment. In the field of education, particularly in curriculum studies, theorist Henry Giroux (2001) framed human agency and structure as a dialectic relationship that presents and promotes critical pedagogy in schools. The notion of agency is often associated with resistance, change, innovation, and, in the educational context, reform. Fullan (1993) for example, contends that teachers should become change agents for school reforms.

Currently, China is experiencing a countrywide curriculum reform in their pre-collegiate education system. Reform policies and guidelines require high schools to transition from test-oriented education to an all-round education (Zhu, 2002). Reform policies and guidelines require individual schools and teachers to move from being “curriculum followers” to “curriculum creators” (Ministry of Education, PR. China, 2001). One key recommendation from the policies and guidelines is that teachers and schools become subjects and initiators of reform. Teachers, therefore, must draw upon their agency in transforming, negotiating and enacting practices that correspond to the reform requirements from national and local governments as well as within the
local context. Teachers are given more power in terms of designing school based and/or classroom based curriculum. Consistent with this transition from testing, the proposed reform mandates also recommend the implementation of student centered classroom and inquiry based approaches in physics teaching (Zhu, 2002). Such a recommendation implies a letting go of power from teachers because they are expected to step down from being the authoritative figure and become a facilitator in the classroom. In China, science teaching, in particular of physics, traditionally featured direct lecture and rote memorization pedagogies (Song, 2006). Thus, an important area of inquiry is how Chinese physics teachers are responding to these reform efforts, and how they are negotiating their roles as change agents within the typically conservative culture of Chinese physics education pedagogy.

Studies on teacher agency in an educational reform context are not uncommon (Kimber, Pillay, & Richards, 2002; Lasky, 2005; Schweisfurth, 2006). However, few studies focus on science teachers, specifically physics teachers. In addition, educational reform often occurs on a small scale and takes place within individual or several schools. Teacher agency is strongly connected to specific disciplines as the subject matter often influences teachers’ pedagogy, their attitudes towards teaching, and evaluation (Lasky, 2005). The extent of the reform varies in the authoritative powers, specificities of mandates, and resources to support such change. Most research on teacher agency attends to individual teacher agency. Research on teacher’s collective agency, which means teachers pool knowledge, resources, and skills to achieve a communal goal, is scarce. Pinar (2011) proposed that educational researchers study the disciplinarity of one’s field for knowledge advancement in that field. Systemic attention to the intellectual history and current circumstances is suggested to enhance such advancement. Thus, a study of physics
teacher agency and in its historical development within a large scale curriculum reform is necessary and will contribute to the existing literature on human agency and teacher agency.

**Research questions**

The purpose of this study is to assist Physics teachers as they monitor and evaluate complex factors in their choice of pedagogy. The following research questions guide this study:

In the context of the current Chinese curriculum reform, how do physics teachers:

1) exercise individual agency (how is it shaped by and produced the reform environment, and to what effect)?

2) exercise collective agency (how is it shaped by and produced the reform environment, and to what effect)?

3) negotiate the relationships between individual and collective teacher agency?

**Definition of key terms**

The following terms frame and appear throughout this thesis. I provide general definitions for these terms to enable readers to refer to these definitions as they read this thesis. A more detailed discussion of these terms appears in the body of the text.

- **Human agency:** the capacity to constantly recognize and evaluate the constitutions of surrounded social structures and to retain the possibilities to act upon the existing social structures.

- **Collective agency:** a group of agents pooling knowledge, resources, and skills together to achieve a communal goal (Bandura, 2006).

- **Structure:** “recursively organized sets of rules and resources, is out of time and space, save in its instantiations and co-ordination as memory traces and is marked by an ‘absence of the subject’” (Giddens, 1984, p. 25).
• System: the materialization of structure and consists of agents’ activities.

• Autoethnography: “research, writing, and method that connect the autobiographical and personal to the cultural and social. This form usually features concrete action, emotion, embodiment, self-consciousness, and introspection … [and] claims the conventions of literary writing.” (Ellis, 2004, p. xix)

**Significance of the study**

Chinese high school science pedagogy has been criticized as highly structured, stifling students’ creativity and interests in science (Erickson, Kang, Mitchell, & Ryan, 2009; Song, 2006). This study seeks to understand physics teacher agency and the possible engagement of physics teachers with “changing horizons” (Schwandt, 2000, p. 303) which may lead to substantial pedagogical change. Many reforms fail because teachers lack “the capacity to work through the new structures” (Fullan & Miles, 1992, p. 748) created by the reform. This study could help physics teachers adopt and adapt to the ongoing Chinese reform by understanding the notion of teacher agency. The analysis of teacher agency in a curriculum context will also inform professional development programs. Heavily influenced by a centralized socialist system (Zhang & Zhong, 2003), Chinese education is struggling to decentralize current curriculum practices (Hawkins, 2000; Liu & Dunne, 2009). This study may provide insight into how physics teachers can deploy their individual and collective agency in the face of the complicated social structures and thus shed light on curriculum decentralization. The systemic study of human agency through its intellectual history and current circumstances may advance understanding of the relationship between agency and structure.
Organization of the thesis

This thesis is organized in five chapters. Chapter one is the introduction which presents the background of this study, the research questions, definition of key terms, the significance of the study, and the thesis organization.

Chapter two is the elaboration of the theoretical framework and associated literature review. In this chapter, I first review the current definitions of human agency developed by theorists in the fields of psychology, sociology, critical theory, history, and a post-structural and feminist perspective. The historical development of human agency is selectively examined as discussed in psychology, sociology, and critical theory. The notion of human agency is then presented in light of the review of its historic development and present circumstances. Then, human agency specific to physics teacher agency in one particular high school in China, and the social structure specific to the current Chinese curriculum reform movement are explored. A review of the current empirical research in the field of education reveals how other researchers draw upon the notion of teacher agency to frame their particular studies. Such processes depict the current circumstances of teacher agency. I also discuss the theories of human agency and teacher agency and clarify the properties of teacher agency as discussed in this study. Finally, a discussion around the implications of such specifications is presented.

Chapter three discusses the methodology and methods used in this study. The first half of this chapter illustrates the research context which includes the on-going curriculum reform in China. I focus my attention on the shift in pedagogy and the process of curriculum decentralization in this reform. Then the school setting is introduced as well as descriptions of the research participants. The second half of chapter three discusses the methodologies and methods employed in this study. A review of methodology and methods from other studies are
first synthesized, followed by a discussion of these elements. An autoethnographical approach is employed as the research methodology, and interviews, teachers’ and researcher’s reflections, and classroom observation are the major research methods. I, then, outline and describe the data collection and analysis processes. This chapter concludes with discussions on ethical considerations.

Chapter four presents the results and discussions. It consists of two major parts: (1) portraits of individual teacher’s profiles and their stories and my research reflections including my researcher role; and (2) results and a discussion of the constant comparative approach. The portraits demonstrate selected teachers’ stories on their practice. Their agency is presented through these stories. In addition, my personal reflections as both a researcher and temporary schoolteacher offer first-hand experience of how my own agency was negotiated with students, the curriculum reform and within the broader context. The constant comparative approach generated themes and sub-themes for each research question. Such analysis complements the portraits and understandings of teacher agency. This chapter concludes with a discussion of the results.

Chapter five presents the study’s conclusion and implications. Then, results and discussions of this study are summarized, and implications for theory, practice, professional development, curriculum implementation, and future research are proposed. The chapter concludes with research limitations.
Chapter two: Theoretical framework and literature review

In this chapter, I first frame the notion of “human agency”. I review five theorists’ definitions of human agency in their respective fields (psychology, sociology, critical theory, history and from a post-structural and feminist perspective). I also examine the ways in which empirical studies in the field of education adopt and frame the notion of human agency. This section attempts to depict the current circumstances (Pinar, 2011) of human agency and also provides my own definition of human agency.

I then explore the historical development of human agency in psychology, sociology and critical theory in order to examine the origins of the current definitions of human agency. I also attempt to describe the intellectual history of human agency.

For the purpose of this particular study, human agency is presented through the lens of physics teachers’ agency as observed in one high school located in an inland city in China. Social structure references regarding the ongoing nation-wide curriculum reform in pre-collegiate education are discussed. The chapter concludes with a discussion of agency as physics teachers’ agency, structure within on-going Chinese curriculum reform, and the related implications.

Current definitions of agency in various fields

Many scholars have studied the notion of agency (Searle, 1983; Sztompka, 1994; Taylor, 1985; Wertsch, 1998). Different disciplines define human agency in similar ways. I selected the definitions of human agency in five different disciplines (psychology, sociology, education, history, and from a post-structural and feminist perspective) in an attempt to sketch a relevant contemporary notion of human agency. The development of human agency in these five fields
appears to reach a consensus that agency refers to human beings’ capacity to act intentionally and resistantly, and that such actions can shape and are constrained by social structures and contexts.

**Agency in psychology**

Psychologist Albert Bandura, spent much of his academic career theorizing human agency and related ideas through a psychological lens. Beginning with an individual’s self-efficacy (Bandura & Walters, 1963), Bandura’s human agency explains an individual’s internal factors that influence human action and learning such as self-evaluation and self-regulation. Such a perspective was considered provocative at the time, given that the mainstream empirical research in psychology found human behavior and learning to be determined primarily by external factors (Bandura, 1981). Later, Bandura (1986) developed Social Cognitive Theory which adopted a more holistic approach. Bandura depicted a comprehensive picture that analyzed human motivation and action within a social context. In his recent work, Bandura (2006) describes human agency as “the evolutionary emergence of advanced symbolizing capacity [which enables] humans to transcend the dictates of their immediate environment and make them unique in their power to shape their life circumstances and the courses their lives take” (p. 164). Human agency encompasses both an individual’s capacity and the social influence operating on that individual in which s/he is embedded. Yet the individual and the social structure are not two parallel and distinct structures. They are interactive and interdependent. An individual person or group creates social structures and social norms. In turn, the individual/group is shaped and constrained by social structures (Bandura, 2006).

Bandura (2006) contends that human agency originates from the constitution of selfhood in infants. Infants are born without any sense of selfhood and personal agency. Through observations of other people’s behaviors and outcomes, infants begin to realize that actions
might lead to effects in the sense that people can make things happen. Then infants begin to differentiate their own actions from others’ actions and acquire a sense of personal agency. During this process, both self-reflection of people’s (including their own) experience and social aspects such as language and their engagements in social life contribute to the construction of personal agency.

According to Bandura (2006), consciousness is constituent of emergent brain activities that have high-level functions. Although people cannot directly control neuronal activities, they exercise control through consciousness. By exercising reflective and deliberative conscious, one could function as an agent. Meanwhile, consciousness could function inwards to neural events that lead to action (Sperry, 1993). This perspective echoes with Kauffman’s (2008) analysis of agency. Emergence (in this case, consciousness), as a higher level of functioning, is created through the repeating interactions among units at the lay level. The emergence of more complex brain activities enable human agency to be informed by notions of values, morality, and ethics.

In Social Cognitive Theory, agency contains the following four core properties: (1) intentionality; (2) forethought; (3) self-reactiveness; and (4) self-reflectiveness. Intentionality is a shared intention as people live in the society with other people and includes action plans and strategies for realizing intentions. Forethought is “temporal extension of agency” (Bandura, 2006, p. 164). It is a sense of anticipation of outcomes and motivation for actions. Self-reactiveness refers to self-regulation, the ability to make choices and act upon the choices. It is also the bridge linking thought and action (Bandura, 1991; Carlson, 1997). Self-reflectiveness, which is also regarded as a metacognitive capability, is at the heart of the core properties. The ability to monitor, to examine, and to reflect is what makes human agency distinctive (Bandura, 2006).
There are three modes of agency in Social Cognitive Theory: (1) individual; (2) proxy; and, (3) collective agency. Individual agency is the capability to act, function, and resist individually. Proxy agency is exercised through social media. By influencing others who have access to resources, one can obtain expected outcomes. For example, a student may ask a librarian to search an article for her/him. Collective agency refers to a group of people who “pool their knowledge skills, and resources, and act in concert to shape their future” (Bandura, 2006, p. 165).

Social Cognitive Theory argues that an agent is produced by “the reciprocal interplays among intrapersonal, behavioral, and environmental determinants” (Bandura, 2006, p. 165), which is called triadic reciprocal causation (Bandura, 1999). Although Bandura did not fully explore the mechanism of the society, he does discuss agency within cultural contexts and a changing society. He recognizes the diversity of cultures and subcultures and rejects the generalization of culture in a broad sense such as collectivism or individualism. With the movement of globalization and the advancement of communication technology, cultures are hybridized and mixed. The notion of nation state is diluted by immigrations and international mobilizations. Thus, a person who is born in China cannot be simply characterized by Chinese culture. Or even within a culture, as culture is a “dynamic and internally diverse system” (Bandura, 2006, p. 174). Conversely, social network media connect people from all over the world. People from different countries unite to address social issues such as protecting the environment and through actions such as teachers’ strikes. The Occupy Wall Street Movement originated in New York in the United States of America (USA) and spread to Vancouver, British

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1 A movement began on September 17, 2011, protesting against social and economic inequities worldwide.
Columbia Canada partly due to the influence of Facebook. Cultures are resisted and reconstructed at the same time. Given that culture could shape human agency, the distinctiveness of a culture should be considered when studying human agency. However, research also shows that efficacy beliefs, as one important indicator of human agency (Bandura, 2006), influence performance attainments regardless of culture (Bong, 2001; Joo, Bong, & Choi, 2000; Shih & Alexander, 2000).

Social Cognitive Theory provides insight into individual’s intrapersonal and psychological characteristics in human agency. However, social structure and environment are not discussed in detail.

**Agency in sociology**

In sociology, there has been a debate on the dominance of human behaviour, whether human agency or social structure is more important. Such debates could be traced to two camps in sociology and philosophy (Giddens, 1982), also referred to as the structure-agency dualism (Shilling, 1992). One camp “devoted to the explication or analysis of action…treats human beings as reasoning, intentional agents, aware of and capable within the social environment which they help to constitute through their action” (Giddens, 1982, pp. 28-29). The other camp emphasizes institutions but understates the individual’s capacity. Social structure, organizations, and institutions were believed to overrule an individual’s internal capacity and thus are the primary source of action. Many theorists attempt to balance the social structure and human agency (Berger & Luckmann, 1967; Bourdieu & Nice, 1977; Giddens, 1984). For example, Bourdieu’s (1977) notion of *habitus* entails the mutual reproduction of “mental structure” and “the world of objects” (Sewell, 1992). Among them, Anthony Giddens’ (1979, 1982, 1984) Theory of Structuration is arguably the most recognized theory that conceptualizes human
agency in relation to social structure. Giddens (1982) considers the concept of human agency to consist of two components, capability and knowledgeability. Capability refers to the possibility that the agent “could have acted otherwise” (p. 9); knowledgeability refers to “all those things which the members of the society know about that society and the conditions of their activity within it” (p. 9). And:

[t]o be an agent is to be able to deploy…a range of causal powers, including that of influencing those deployed by others. Action depends on the capability of the individual to ‘make a difference’, that is, to exercise some sort of power… (Giddens, 1984, pp. 14-15)

Structure was conceptualized as “both the medium and the outcome of the practices it recursively organizes” (Giddens, 1982, p. 10), which according to Giddens is the duality of structure.

Giddens’ (1984) work centers on the notion of knowledgeability and capability. Knowledgeability refers to “things that the members of the society know about the society itself and the conditions of their activity within it” (p. 9). Capability refers to the possibility of acting differently. The core of knowledgeability is reflexivity, and the core of capability is power. In order to act otherwise, the agent must deploy power and exercise power through resources. Resources constrain and are produced by agents’ interactions. As power implies both dependence and autonomy, the power relations could be disrupted or transferred. Power entails some continuity as well as fluidity over time and space.

Giddens (1984) theorizes human action through a stratification model as follows: motivations of action → rationalization of action → reflexive monitoring of action. Motivation refers to the desire to exercise actions. It is a potential for action. Rationalization of action refers to the actors ability to “maintain a continuing ‘theoretical understanding’ of the grounds of their
activity” (p. 5). It is the competence of agents’ understanding of norms. Davies (2000) challenges the rationality of agents and argues that one’s subjectivity is sometimes “outside of or larger than those aspects of being that come under rational or conscious control” (p. 57) and finds that rationalization is concerned about whether actors can explain what they do rather than whether their actions are rational. In addition, the unconsciousness of actions is discussed within the motivation of actions. Giddens does not reject the unconsciousness and irrationality. Hence I consider Structuration Theory to also embrace irrational and unconscious actions.

Structuration Theory considers human action as a continuous flow of conduct. Hence reflexivity refers to “the continuous monitoring of action which human beings display and expect others to display” (Giddens, 1984, p. 3). Reflexivity is a process rather than a state and is “most deeply involved in the recursive ordering of social practice” (p. 3). Reflexive monitoring is “fundamental to the control of the body that actors ordinarily sustain throughout their day-to-day lives” (p. 9). Similar to Bandura, Giddens (1984) views reflexivity as the core of human agency.

The concepts of ‘structure’, ‘system’, and ‘duality of structure’ comprise the core of Structuration Theory. Structure refers to “the structuring properties allowing the ‘binding’ of time-space in social systems, the properties which make it possible for discernibly similar social practices to exist across varying spans of time and space and which lend them ‘systemic’ from” (Giddens, 1984, p. 17). In a sense, structure comprises the rules beneath social systems. It conveys historical development of such rules and the capability to expand into the future. Such rules are exhibited in the form of social system as well as human agents’ memories. Hence, system is the materialization of structure and consists of agents’ activities. The duality of structure refers to when social actions are produced and reproduced. Such productions are based on structure. In this process, the structure is also produced and reproduced. It is a recursive
process; the structure plays the roles of constraining and enabling. Thus, the notion of human agency in sociology reaches a consensus in terms of the relationships between the individual agent and social structure/context/discourse.

**Agency in critical theory**

In his understanding of critical theory, Henry Giroux (2001) frames the notion of human agency in the development of a theory of radical pedagogy. Dissatisfied with orthodox Marxism and its explanatory power for social evolution, Giroux draws upon the Frankfurt School and suggests a dialectical relation between human agency and social structure. Human agency must be “taken seriously” (Giroux, 2001, p. 111) to resist the over-emphasis of economy structures in reproduction theory, to bring hope to the frustrations that was created by Marxism (Pinar, Reynolds, Slattery, & Taubman, 1995). Giroux argues that people’s struggles occur within ideology, culture, and hegemony.

Although Giroux (2001) did not explicitly define human agency, his conceptualization of agency can be traced to his articulations of the relationship among agency, culture, ideology, and hegemony. Giroux states that “human agency always mediates through their (agents’) own histories and class- or gender-related subjectivities the representations and material practices that constitute the parameters of their (agents) lived experiences” (p. 156). Teachers should become “agents of cultural mobilization” (p. 68) who critically engage in the nature of their own self-formation and participation in the dominant society. Human action and social ideology are located in the following three areas: (1) the sphere of unconscious and the structure of needs; (2) the realm of common sense; and (3) the sphere of critical consciousness. Giroux appears to agree with Bandura (2006) and Giddens (1984) who find that agency involves the possibility to act differently and that such a capacity is shaped and enabled by the environment. However, Giroux
highlights the importance of critical consciousness in framing agency and structure and encouraging teachers and students to actively interrogate their personal histories and the discourses that enhance or constrain their actions.

**Agency in history**

Educational historian Peter Seixas (2004) discusses historical agency in developing the notion of historical consciousness. His view of agency emphasizes a historical perspective of agency that “necessitates a temporal dimension, memory or hindsight” (Seixas, 2001, p. 3). Seixas argues that agency consists of intention, action, and intended and unintended consequences. The past shapes present intention and actions through unconscious legacies such as traditions, habits, and rules, and historical consciousness “which, through analysis of the past and how it shapes the present, opens the possibility of historical agency in respect to the future” (p. 6). Seixas shares similar definitions of agency with psychology, sociology, and critical pedagogy in terms of intentionality and the mutual shaping relations between agency and structure. He underscores two valuable components to agency: 1) the historical/temporal dimension, 2) the importance of collective agency, which refers to ordinary people in the present collectively and intentionally participate in the making of history (Seixas, 2001). The notion of collective agency will be discussed further in a later section of this chapter.

**Agency in feminist and poststructuralist theory**

Scholar Bronwyn Davies (1991, 2000) challenges the humanist perspective’s definition and assumptions of agency and identity and develops a conception of human agency with a feminist and poststructuralist perspective. As the dominant social discourses are usually masculine and elite, the so called “free choice” is often pre-selected by the existing value systems in society which typically values rationality and considers identity as continuous. People
who are qualified as agents are usually ‘sane’ middle-class white adults. Davies’ work challenges such assumptions and rethinks human agency from a post-structural perspective which considers agency as “the discursive constitution of a particular individual… [who] as author of their multiple meanings and desires…[and can] go beyond the given meanings in any one discourse…and forge something new” (1990, p. 51). Informed by such positions and supported by feminist views, Davies argues that:

[a]gency is never freedom from discursive constitution of self, but the capacity to recognize that constitution and to resist, subvert, and change the discourses themselves through one is being constituted. It is the freedom to recognize multiple readings such that no discursive practice, or positioning within it by powerful others, can capture and control one’s identity. And agency is never autonomy in the sense of being an individual standing outside social structure and process. (2000, p. 67)

Davies’ definition of agency also agrees with that of Bandura and Giddens in the sense that it is the capacity to act otherwise and is not free from social structure.

Each of the above mentioned scholar’s notion of human agency was developed from rather different philosophical origins. Bandura’s (2006) notion of agency centered on an individual’s physicalistic and behavioural features of human agency. He traced the origins of personal agency from infancy to adulthood. Bandura described and analyzed how infants developed capacities of behaviour through engagement with environmental events and analyzed human agency through consciousness, brain activity, and neuronal processes.

Giddens (1982) developed the notion of agency in his Theory of Structuration which addressed the need for a “theory of the subject” (p. 8). Human agency “broke with positivistic standpoints in philosophy” and attempted to avoid “sliding into subjectivism” (p. 8). The Theory
of Structuration endeavoured to reconcile the dualism of subjectivism and objectivism as well as the dualism of agency and structure (Shilling, 1992).

Giroux (2001) frames agency in dialectical relations between agency and structure. Highly influenced by the Frankfort School, Giroux’s theory emerged from the relationships between “the particular and the whole, the specific and the universal” (p. 17). This point of departure has shifted from a positivist perspective which theorizes concepts from accepted facts. Such shifts create room for a historical perspective which explores the development between the individual and the context. The relationship becomes an evolving process and human action is not pre-determined by social structure or vice versa. In addition, critical theory tradition adds elements of self-criticism and engages social criticality into Giroux’s notion of agency. Thus, an individual’s actions are value laden. An individual’s autobiographic history, value system, and moral judgment are mediated through larger social norms and structures.

Seixas’ (2001) notion of agency (historical agency) entails two traditions. One is from a historical consciousness perspective. Historical agency within the realm of historical consciousness is defined as “the understanding that things change over time in very fundamental ways --- that worlds are made and unmade --- that ordinary people play a role in historical change, and that orienting oneself in relation to historical change is a central task for all people” (p. 17). The emphasis on “all people” and “orienting oneself into historical change” is influenced by critical thinking and collective memory respectively. The second tradition draws on Giddens’ (1984) definitions of agency and collective agency that originated from the dualism between agency and structure.

Davies’ (1991, 2000) definition of agency is informed by feminism and post-structuralism. Her feminist perspective seems to come from the critical theory tradition because
she renders transparent tacit and hidden assumptions (Aoki, 2005) ² of agent and identity. Her post-structural perspective challenges the singularity, continuity and rationality of identities, which resonates with poststructural philosopher, Judith Butler’s (1993) notion of identity:

Identifications are multiple and contestatory, and it may be that we desire most strongly those individuals who reflect in a dense or saturated way the possibilities of multiple and simultaneous substitutions, where a substitution engages a fantasy of recovering a primary object of a love lost---and produced---through prohibition. (p. 99)

Even though they originate from different theoretical origins, with conflicts sometimes existing among the different notions of agency, I consider such different/competing discourses as paradigm proliferation (Lather, 2006).

Although both Social Cognitive Theory (Bandura, 2006) and Structuration Theory (Giddens, 1984) consider the relationship between agency and structure as interdependent and interactive, Social Cognitive Theory focuses more on thoughts regarding the psychological features of agency whereas Structuration Theory places more weights on the social relations, the constitutions of social systems, and the relations between social systems and actors. Despite the similarities, psychology pays closer attention to human agency while sociology centers on social structure and its relationship with agency. In addition, a perspective of agency informed by historical concerns necessitates examining the agency of ordinary people rather than heroic individuals. In attempting to reconcile agency and structure, the point of departure for Social Cognitive Theory is agency whereas Structuration Theory approaches issues from social

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² In chapter one of this book, Aoki differentiates three paradigmatic orientations: empirical-analytic, critical-theoretic, and situational-interpretive orientations. Here, I draw upon his description of critical-theoretic orientation.
structure. I identified few discrepancies between the two theories. Thus, I consider the two theories as complementary and adopt both for my research purposes.

I must clarify the notion of “duality” in both Social Cognitive Theory and Structuration Theory. Although Bandura (2006) claims that Social Cognitive Theory rejects the duality of human agency and social structure, his notion of duality is fundamentally different from Giddens’ explanation of duality in Structuration Theory. Bandura’s understanding of duality refers to human agency and a disembodied social structure. The relationship between the two is parallel. Giddens’ notion of duality, on the other hand, is created in opposition to dualism, which refers to the conflicts between objectivism/subjectivism; micro/macro; social/individual. “[t]he constitution of agents and structures are not two independently given sets of phenomena, a dualism…” (Giddens, 1984, p. 25). Giddens’ notion of duality refers to “the structural properties of social systems are both medium and outcome of the practices they recursively organize” (p. 25). Bandura’s understanding of duality is similar to Giddens’ notion of dualism yet different from his notion of duality. In this study, I use the term duality as defined by Giddens.

In addition, Giddens and Bandura use the term collective agency in different ways. For Giddens, collective human agency is “what produces and reproduces social structures that then act as constraints to human agency in the future” (Seixas, 2001, p. 5). Bandura defines collective agency as a group of people who act together through coordination (Bandura, 2006). Collective agency in Giddens’ sense refers to “ordinary people” while Bandura specifies certain groups of people. In this study, I use Bandura’s conception of collective agency.

Giddens (1984) views agency and structure as evolving through a recursive process whereas Bandura sees intrapersonal, behaviour, and environment as a triadic reciprocal causation. Giddens holds that action and structure carry a sense of continuity, which opposes
Davies’ (2000) argument that identity consists of fragmentations, contradiction, and discontinuity. Giddens’ understanding of continuity leans towards historical and geographical consistency whereas Davies’ fragmentations focus on the micro-level (at the individual or specific discourse level).

The question of whether an individual agency is continuous must be addressed. Bandura argues that because people project themselves into the future. Their identities and agency are shaped by goals, aspirations, and social commitment. In addition, individuals are historically situated into socio-cultural contexts as well as their personal autobiographical process. In this sense, human agency itself is a source of continuity throughout one’s life. Davies (1990) argues from a poststructural perspective that one’s subjectivity can be contradictory because subjectivity is constituted through discourses at a certain point in time. Thus a person’s identity can also carry a sense of fragmentation, contradiction, and discontinuity.

I attempt to encompass the conflicts between continuity and discontinuity of self in framing human agency. A person’s identity is constituted through multiple, and sometimes contradicting discourses, and such discourses have historical and cultural origins. At a certain point of time, multiple discourses might be conflicting, but each discourse carries historical continuity. The complex interplays of personal and social factors are reflected through a person’s action. Subjectivities encompass the complexity at a certain point of time, but action reflects a sense of unity in a person’s life history. Even though individuals occasionally may not act as they customarily would, those irregular actions are often understandable if more contextual information is provided. I believe the fragmentation of subjectivity is embodied in “not acting like oneself” and the unity of self is reflected in the range of “understandable” actions.
I attempt to construct the notion of agency in this study by synthesizing the multiple definitions of agency and taking into account the distinctive nature of the research context. Thus, I present in the next section the ways in which other educational researchers adopt and frame the notion of human agency in their specific research projects.

Agency in educational empirical research

In this section, I review the empirical research literature in the field of education. By examining others’ conceptions of agency, the traditions they espouse, and what conclusions they draw, I attempt to absorb the brilliance, address the discrepancies, reveal the limitations and most importantly, generate the definition of human agency and structure for this particular study. Considering the large body of literature on human agency, this review focuses only on empirical studies of teacher agency. Although the literature on student agency (Mirón & Lauria, 1998; Scardamalia & Bereiter, 1991; Sharma, 2008; Wintrup, Foskett, & James, 2009), meta-cognition (Anderson & Nashon, 2007; Georghiades, 2000; Rickey & Stacy, 2000), teacher reflexivity (Elliott, 1994; Levine, Gallimore, Weisner, & Turner, 1980), and teacher efficacy (Gibson & Dembo, 1984; Tschannen-Moran, Hoy, & Hoy, 1998; Tschannen-Moran & Hoy, 2001) are important concepts related to teacher agency, the purpose of this review is to examine how empirical research draws upon the notion of teacher agency rather than encompass the related concepts of teacher agency. This section explores the concept of teacher agency in depth rather than engaging with a broader range of related concepts.

Empirical research in the field of education draws on various traditions and definitions of agency. Giddens’ and Giroux’s conceptions of agency are among the most often utilized conceptions of agency in the field of education. Sloan (2000) draws upon Giddens (1984) and characterizes teacher agency as the ability to act otherwise. The study examined how teachers
exercised their agency around the implementation of a state test in Texas. Teacher agency is defined as “the ability to carry forth an action or a mode of action” (p. 4). In a later study, Sloan (2006) reports the confrontations and negotiations between teacher agency and accountability explicit curriculum policies. He continues to draw upon Giddens’ conception of agency as well as Giroux’s radical pedagogy. Sloan suggests that, “teachers are active agents who critically appropriate the artifacts of accountability-related curriculum policies and mandates and produce self-authored actions” (p. 126).

Given that teachers are “active professionals” in their work, Turnbull (2005) presents the notion of professional agency and a model to promote professional agency through the analysis of six student teachers’ practice using Giddens’ conception of agency. She suggests factors that both contribute to and detract from professional agency. Professional agency is presented as “the capacity of the student teacher to effectively apply appropriate professional knowledge, skills, understandings and dispositions in professional practice contexts” (p. 25).

Using agency as a central notion of school development, Frost and Durrant (2002) “developed a conceptual framework to help teachers plan, track and assess the impact of their development work” (p. 141). Drawing on Giddens’ notion of agency, agency is defined as “exercise leadership and to experience the satisfaction of having a significant impact on professional practice and ultimately on the quality and outcomes of students’ learning” (p. 144).

Critical theory tradition has profoundly influenced the field of education. Giroux’s radical pedagogies offer implications for practices. Educators Lane, Lacefield-Parachini, and Isken (2003) strive to staff schools with competent teachers who have the capacity to teach as well as to reform and empower. With the aim of developing novice/student teachers as transformative urban educators, Lane and her colleagues study how novice teachers with strong critical
orientations collaborate with guiding teachers in urban schools. As change agents, novice teachers “need to develop feelings of ‘ownership’ so they feel empowered to transform the urban educational setting rather than feel defeated by it” (p. 56). Meixner (2006) also uses terms such as “empowerment” and “resistance” to frame agency in her narratives of how students engaged with LGBTQ (Lesbian, Gay, Bisexual, Transgender, Questioning) literature and reflected upon the institutional inequities and violence.

Aligning with Davies (2000), Klein (1999) contends that using a post-structuralist perspective to understand the constitution of subjectivities may generate agency for pre-service and in-service teachers in early childhood math education. Agency “involves recognizing how subjectivities are variously constituted through discourse and taking the steps to interrupt discourses that function in oppressive ways” (p. 91).

Goodson and Numan (2002) studied teacher’s life history and work history in order to reveal the differences between how British and Swedish teachers respond to professional development in the context of increased marketization of the public service. Teacher agency is one of the important attributes they examine. The authors described teacher agency as decision making and as a catalyst for reform. They take a historical position on agency and find that teachers’ professional practice is closely linked to their personal lives.

Educational researcher and scholar Sue Lasky (2005) employs a sociocultural lens to explore at teacher agency. She explicitly distinguishes her notion of agency from both Giddens’ and Bandura’s conceptions of agency when she states that “priority is given to the social contexts and cultural tools that shape the development of human beliefs” (p. 900). Agency in this perspective is defined as “the ability to influence their lives and environment while they are also
shaped by social and individual factors … it places primacy on the ways cultural tools actually shape human cognitive functioning and the possibilities for action” (p. 900).

Schweisfurth (2006) studied teacher agency and curriculum structures in Ontario schools but did not offer definitions of agency. Yet he does imply that agency is about teachers doing what they believe is important within the given constraints.

Reviewing the existing empirical research reveals that Giddens’ conception of agency is most often used in those studies concerning teacher agency in structural transitions such as curriculum reforms, state-wide tests, and professional development. Giddens’ conception of agency offers an analytical tool to interpret the relationship between individual actions and social changes. Giroux’s notion agency provides teachers a practical means with which to critically engage with inequities they have identified in their practice. His understanding of radical pedagogy is often utilized to address inequities and violence perpetrated on marginalized classes and ethnic groups and on those who are oppressed because of their gender or sexual orientations. Few research studies utilize conceptions of agency that take into account psychological and historical perspectives.

**Definition of human agency in this study**

In this study, I investigate physics teacher agency in the current Chinese curriculum reform. Giddens’ notion of agency and his related educational research offer insightful strategies to examine the reform context and teachers’ interactions with the reform. The psychological perspective probes the internal properties of human agency and adds comprehensive analysis to the construction of agency. The historical perspective believes that human agency lies in ordinary people rather than heroes and situates agency in its historical context. The feminist and poststructuralist perspectives expand upon human agency to include all people, not just
economically and socially privileged groups. Therefore, I define human agency as the capacity to constantly recognize and evaluate the constitutions of surrounded social structures and to retain the possibilities to act upon the existing social structures.

In this definition, the relationships between agency and structure are recursive and carry a sense of historical development as agents constantly evaluate and recognize surroundings based on knowledgeability. In this sense, knowledgeability (Giddens, 1984) is defined as everything members of a society know about that society and the conditions of their activity within it. Human agency is highly contextual. In addition, the capacity for potential action upon the existing social structures does not necessarily involve actual action. Agents should be aware of the entailments and consequences of their actions and could decide whether or not they should take such actions. Therefore, I frame agency in a way that does not necessarily associate with action but with the constant evaluation of the changing social structure. Human agency lies in the possibility to act, resist, and subvert the surrounding environment. When I discuss factors that enable or constrain human agency, I refer to factors that could enable or constrain people’s capacity to recognize and evaluate the social structures in which they reside. The interplay between agency and structure refers to the engagements between an individual’s evaluations or actions and the social structures. Human agency involves both intrapersonal properties such as awareness and consciousness.

As I have defined agency for the purpose of this study, I now situate agency within multiple historical contexts and seek to reveal the possibilities of knowledge advancement through divergence, complements, dispersions, and ruptures (Lather, 2006). I intend to celebrate the multiplicity of the historical and philosophical origins and depict a comprehensive picture of human agency. As Todd (2009) states, “[i]n both Irigaray and Arendt’s eyes, it is pluralism and
difference that need to be made meaningful in creating possibilities for a better future” (p. 16). Lather (2006) adds that troubling the closure is to “keep us moving in order to produce and learn from ruptures, failures, breaks, refusals” (p. 45). In addition, by examining the intellectual history and present circumstances, one could contribute to the complicated conversations in his/her specific-discipline and thus advance the disciplinarity (Pinar, 2011).

I have presented five scholars’ definitions of human agency in their respective fields and discuss how the notion of human agency is utilized and framed in empirical studies in the field of education. These presentations depict the current circumstances of human agency. In the following section, I review in depth the historical development of human agency in psychology, sociology, and critical theory. I neither review the development of human agency in feminism/post-structuralism nor in history although I endorse both Davies’s (2000) and Seixas’ (2001) notions of agency. Davies’ contribution to agency explicitly re-defines the agent’s identity rather than the constitution of agency. Davies’ concern is for who the agents are rather than what agency is. Thus, Davies’ notion of agency is beyond the scope of this thesis. Seixas (2001) discusses the “four orientations towards historical agency” as the historical development of historical agency. Three of the orientations originate from sociology-philosophy, critical theory, and post-structuralism respectively. The one orientation which originates from the discipline of history is Carlyle’s (1966) “Great Men” which positioned historical agency in exceptional individuals, heroes/heroines, and leaders rather than ordinary people. Hence, a review of the historical development of agency in history would overlap with my review of agency in sociology and critical theory.
Historical development of agency

In psychology

Before Bandura proposed Social Cognitive Theory, the field of psychology underwent several paradigm shifts (Kuhn, 2012). I start with the behavioristic principles conceived by Skinner and then include the work of others in the field of behavior psychology. Watson (1924) defined behaviourism as “a natural science that takes the whole field of human adjustments as its own. It is the business of behavioristic psychology to…predict and control human activity” (p. 11). Despite the variety of branches of behaviorism, in general, behaviorists found that every physical action including thinking and feeling should be considered a behavior. In addition, behaviors or activities, rather than human consciousness should be the subject matter of psychology; psychological patterns can be modified through the changing of behavior; and such change was exerted through external factors (i.e. the environment). According to Skinner’s theory (1965; 1991; 1992), human behavior, especially the learning of language is shaped through the process of stimulus, response, and reinforcement. He experimented with rats and pigeons to verify this framework. Skinner invented the Operant Conditioning Chamber which he used to study animals’ response to certain stimulus. For example, when a rat pulled a lever, it would receive food. Each time the rat repeated this behavior, it received food. Subsequently, the rat learned that pulling the lever resulted in food. Hence, pulling the lever is the stimulus, food is the response, and the reward of the repeatedly pulling the level is reinforcement. In real life, behaviourism finds that culture shapes/models people’s behavior and thus people’s personality as well. Consciousness “is neither a definable nor a usable concept; that it is merely another word for the ‘soul’ of more ancient times” (Watson, 1924, p. 3). Therefore, behaviourism is also considered as deterministic in the sense that one’s personality was determined by the culture in
which he/she was immersed. In sum, a person is merely a product of culture (Bargh & Ferguson, 2000).

Bandura (2001) summarized behavioristic principles as embracing “…an input-output model linked by an internal conduit that makes behavior possible but exerts no influence of its own on behavior” (p. 2). Human beings, in this sense, have little “free will”. They are shaped and controlled by external stimuli. As in the case of consciousness, the notion of human agency takes up little space in behaviorist beliefs. Behaviourism has fully abandoned the metaphysical terms such as “soul” and “consciousness”.

Behaviorism eschewed the notion of “consciousness” because before the advent of behaviorism, the field of psychology was dominated by Introspective Psychology (Watson, 1924) which studied consciousness in laboratory settings. Prior to Introspective Psychology, the field of psychology was mainly associated with religious, church, and super-natural powers such as the notion of “soul”. Introspective Psychology brought psychology into the lab and thus became disconnected from the church. The field of psychology shifted from a pseudo-science to science. Instead of using the term ‘soul’, the word ‘consciousness’ was used to indicate non-material objects (Watson, 1924). However, behaviourists believed that consciousness was merely a replacement of soul and did not entail a broader/different/deeper meaning than the word soul. Early in the 20th century, behaviorists were no longer content with ‘introspections-the study of what’s going on inside’. They could no longer work with the intangibles and the unapproachable. They made the decision to steer the field of psychology towards the natural sciences, to study the concrete, approachable, and observable such as an organism’s speaking and doing-behavior.

Note that the advent of behaviourism was around 1910. I emphasize this date for three reasons: 1) examining the development of human agency in psychology; 2) comparing with and
contrasting to the development of human agency in sociology in a similar period of time; and 3) most importantly, locating such development within a greater social setting and trying to understand how the contemporary philosophical trends influence such development.

In the 1910s, major science discoveries were made in physics, chemistry, medicine, and other natural science subjects (e.g., the wireless, radium, insulin). Such discoveries were made in different areas of science, but they followed a similar methodology which was to isolate elements and make observations and formulate laws, to gather facts, verify data, and examine by logic and mathematics. Perhaps inspired by or maybe even envying the accomplishments in the natural sciences, behaviorists eliminated all subjective terms such as perception, sensation, desire, and purpose from their vocabulary (Watson, 1924). Of course, human agency, which is associated with will and autonomy, was also rejected by behaviourists.

**From behaviorism to cognitive science**

“The first 100 years of experimental psychology were dominated by two major schools of thought: behaviorism and cognitive science” (Bargh & Ferguson, 2000, p. 925). The shift from behaviorism to cognitive science in the mid-20th century was considered a paradigm shift (Kuhn 2012). The distinction between these two schools of thought is their belief around “mediating internal constructs and processes” (Bargh & Ferguson, 2000) such as perception, judgment, and motivation. As noted above, behaviorism rejected such terms whereas cognitive science considered internal constructs and processes as fundamentals to their field (Block, Flanagan, & Guzeldere, 1997; Lachman, Lachman, & Butterfield, 1979).

There are several major shortcomings of Behaviourism which include the fact that findings were based on experiments conducted on rats and pigeons in simple isolated environments such as a box. From these experiments behaviourists made generalization about
human behaviours in complex environments. Their model failed to explain higher processes such as speech production and language behavior (Skinner, 1992), not to mention other human behaviors (Bargh & Ferguson, 2000; Chomsky, 1959). Bandura (1999, 2001, 2006) claimed that the advent of computers resulted in behavioristic principles going out of fashion; for “if the computers can perform cognitive operations that solve problems, regulative thought could no longer be denied to humans” (Bandura, 2001, p. 2). With the development of multiple operations in computational models, the linear model was used to interpret higher order processes by behaviorism (Skinner, 1992) was dismissed.

Scientists and psychologies then shifted their focus entirely on internal constructs. Ulric Neisser’s (1967) book *Cognitive Psychology* which was considered the “manifesto of the cognitive revolution” (Bargh & Ferguson, 2000, p. 928) contended that higher mental processes were located in the mind itself, instead of outside, in the environment. For Neisser and his followers, there is “a little man in the head” who made executive decisions for human actions. In other words, human agency did exist and was entirely controlled by an individual’s judgment, desire and subjectivity. In this view, human agency was disassociated with the environment. Carlson (1997) argued that consciousness played a central role in the cognitive regulation of action and the flow of mental events. “A functional consciousness involves purposive accessing and deliberative processing of information for electing, constructing, regulating, and evaluating courses of action” (Bandura, 2001, p. 3). In this sense, a human being has the internal capacity to take actions through conscious thinking, assessing, and reflecting, (e.g. human agency). Note when cognitive psychology emerged and flourished in the 1960s and 1970s, there was a shift from entirely external, environment determinism, objective, and observable to entirely internal, subjective, and environmental determinism.
Social cognitive research combined behaviorism and cognitive science. It adopted behaviorism’s belief that “the higher order responses of the human being can be directly put in motion by environmental stimuli” (Bargh & Ferguson, 2000), and also embraced the internal psychological processes as mechanisms of human actions. Social cognitive research was considered an attempt to bring both cognitive science and neuropsychology (which is the micro-level studies focusing on cells, organism, and body) to modern psychology which is the macro-level studies focusing on human behavior, development and adaptation.

**Agentic perspectives in Social Cognitive Theory**

Bandura developed Social Cognitive Theory in which he emphasized both a “social” aspect which is the external environment drawn from behaviorism’s heritage and the “cognitive” aspect which is the internal cognitive mechanism from cognitive science. This perspective stood in contrast to behaviorism in terms of a denial of the linear model of higher processes. Instead, the Social Cognitive Theory contended that human cognition was dynamically influenced by multiple operations simultaneously and interactively. In contrast to cognitive science which considers cognitions as being disembodied from interpersonal life, purposeful pursuits, and self-reflectiveness, Bandura’s (2001) agency is not considered disembodied with immaterial entities that exist apart from neural events. Human progress was made through a complex world in which people “make good judgment about their capabilities, anticipate the probable effects of different events and courses of action, size up sociostructural opportunities and constraints and regulate their behavior accordingly” (p. 3). Therefore, intentionality, forethought, self-reactiveness, and self-reflectiveness are the core properties of human agency.

Although Social Cognitive Theory encompasses neuropsychology at the micro-level, it does not share the reductionism that some neuropsychologists believe. Reductionism, simply put,
suggests that all the complex and varied things and processes can be explained/reduced to a common set of same elements (subatomic particles?) and there exists, in principle, a theory of everything (Nagel, 1998).

Bandura (2006) differentiates the ontological, epistemological, and methodological reductionism in psychology. Ontologically, mental events are physical entities and processes rather than immaterial ones. Epistemologically, the “ultimate law” governing high-level psychological mechanisms is at the atomic and molecular levels. Methodologically, research at the fundamental level will explain higher and more complex psychological phenomenon at other levels. The human agentic perspective in Social Cognitive Theory appears to have adopted ontology reductionism but abandoned epistemological and methodological reductionism. Perhaps it is not possible to understand a system governed by its own principles by reducing it to another level nor is it feasible to grasp the emergence from a self-governed system by studying rudimentary processes. In other words, “how the neuronal machinery works and how to regulate it by psychosocial means are different matters” (Bandura, 2006, p. 169). Borrowing Bunge’s (1977) analogy, the emergent properties of water such as fluidity and transparency cannot be explained through studying oxygen and hydrogen atoms. Therefore, Social Cognitive Theory adopted multiple theoretical frameworks to promote study across biological, psychological, and social structural levels.

Under the umbrella of Social Cognitive Theory, human agency is associated with both internal cognitive mechanism and the external environment. Bandura studied how personal agency was formed in infants. The identity of self was socially constructed through the interaction with environment including “sociocultural, political, familial, and occupational aspects of life” (Bandura, 2006, p. 170). Overtime, a person constructs his or her self-
identify/uniqueness through moral and value commitments and realizes such identify through planning, reflecting, and acting. As such, people envision themselves beyond the present and into future and shaped the self and environment to achieve the continuity of personal identity. Therefore, human agency is neither merely “a product of intrapsychic autobiographical process that preserves a sense of selfhood over time”, nor just “constructed from one’s social identity” (p. 170) such as other people’s perceptions and social labels.

Social Cognitive Theory describes internal personal factors such as cognitive, affective and biological events, behaviors, and the environment as “triadic reciprocal causation” (Bandura, 1999, p. 23). These three all “operate as interacting determinants that influence one another bidirectionally” (Bandura, 1999, p. 23). It is important to note that Bandura first developed Social Cognitive Theory was in 1986, and as recently as 2006, he was writing on human agency through a social cognitive lens.

Bandura elucidated core properties and modes human agency as well as moral and fortuity agency (Bandura, 1986, 1991, 1997, 1999, 2001, 2006). As this section only focused on the development of the general idea of human agency in psychology, the entailments of human agency in Social Cognitive Theory will be discussed the next chapter.

The notion of agency has been connected to a human being’s internal properties since the founding of psychology. In the early 20th century, behaviorism dominated the field of experimental psychology and rejected any internal cognitions including human agency. The sense of determinism by external environments and the worship of objectivity resulted in a smaller space for agency’s existence. Due to the advent of cognitive science in the mid-20th century and the related focus on internal processes, mechanism, and consciousness, the notion of human agency was driven by internal dispositions. From the 1980s to present day, human agency
has been informed by Social Cognitive Theory which encompasses both internal and external factors. Although human agency is primarily considered a kind of inner property, it is influenced by both internal and external factors and has “triadic reciprocal relations” with behavior and the environment.

**In sociology**

The debate between structure and agency has existed for a long time in sociology. Interestingly, such debates seem to hold similar stances with the debates/development in psychology, from objectivism to subjectivism and to a more comprehensive approach. However, the debate between structure and agency (objectivism and subjectivism) does not seem to follow a chronological sequence as is that case with the debate in psychology. Instead, the structure and agency camps co-existed for a long time and were gradually replaced by a third perspective which encompassed the macro- and micro-; external and internal; as well as objectivity and subjectivity. The debate between structure and agency, simply put, was a debate between “what is the social world made of?” Is social structure or human agency the primary determinant of human behavior? Such debate was called dualism by Anthony Giddens (1984) who proposed a Structuration Theory which pillared the duality of social structure and agency.

**Objectivism and human agency in sociology**

Emile Durkheim, also known as “the father of sociology”, (Calhoun, Gerteis, Moody, Pfaff, & Virk, 2012) first introduced the notions of externality and constraint in his book *The rules of sociological method*, published in 1895:

A social fact is every way of acting, fixed or not, capable of exercising on the individual an external constraint; or again, every way of acting which is general throughout a given
society, while at the same time existing in its own right independent of its individual manifestations. (Durkheim, 1895, p. 13)

Durkheim claimed that social phenomena can only be explained by other social facts (Calhoun et.al, 2012), i.e. scientific basis. He contended that social facts are external to individuals (Durkheim, 1895) and “methodologically, sociologists must strive for objectivity by studying social facts as things” (Calhoun, et.al. 2007, p. 136). Observations must be made as impersonal as possible. “The determining cause of a social fact must be sought among the antecedent social facts and not among the states of the individual consciousness” (Durkheim, 1895, p. 13). In addition, social facts have coercive power on people and could control people’s behaviour.

Durkheim was categorized as a structural functionalist. Giddens (1976) interpreted Durkheim’s work as “[his] treatment of the ‘externality’ of social facts, and the ‘constraint’ which they exert over actors’ conduct, embodied an attempt to provide a theory of the relation between action and the properties of social collectivities” (p. 93). Because subject and social object were divided in this sense, structure only appeared as “a source of constraint on the free initiative of the independently constituted subject” (Giddens, 1984, p. 16). Structure is closely connected to the dualism of subject and social objects.

For Durkheim, the primacy of action is social structure rather than individual’s consciousness. Human actions are motivated by moral ideals in the society. Social phenomena are all moral phenomena, and moral phenomena are considered norms. Thus, actions are regarded as conduct towards norms and conventions (Giddens, 1976). Human agency, the capability to act otherwise, has little space to exist in such a theoretical framework. The
motivations of human actions are depicted as the social character of the act itself. Thus, human action is in a sense more reactive and pre-determined than active and initiating.

When discussing social structure, it is difficult to avoid the school of structuralism. Originating in Saussure’s work on linguistics (Saussure, 1959), structuralism considers structure as patterns of social relations. The structural properties of language, in Saussure’s sense, are the underlying relations that are reflected by surface speech. The language people use in a society is manipulated by its social codes and conventions (i.e. structure). As language plays such a critical role in social life, most structuralists and post-structuralists adopted the notion of structure from Saussure. Structure, which preserves a similar connotation of “constraint” in Durkheim’s sense, refers to “a dialectical relation between presence and absence” (Giddens, 1982, p. 33); “underlying codes have to be inferred from surface manifestations” (Giddens, 1984, p. 16).

Similar to functionalism, structuralism is also characterized by objectivism, appearing as an external constraint that operates on and guides human actions. An individual’s free will is often muted or ignored in structuralist writing. It is important to note that Saussure’s work on linguistics (i.e. the origin of structuralist) is produced from 1906 to 1911. Although Saussure’s structuralism was criticized and abandoned in linguistics by the second half of 20th century, structuralism flourished in anthropology, psychology, and sociology.

Although Foucault is often categorized as a “structuralists” or “post-structuralists”, he disavowed such claims and distanced himself from structuralism and post-structuralism (Dreyfus & Rabinow, 1983). The notion of discourse does share assumptions with structuralism in that discourse being an autonomous rule-governed system. Foucault abandons the notion of human agency as he considered both discourse and the speaker as constructed objects (Dreyfus & Rabinow, 1983). His work on knowledge, power, and discourse exemplifies how culture/society
normalizes individuals through “increasingly rationalized means, by turning them into meaningful subjects and docile objects” (p. xxvii). Meanwhile, Foucault abandoned the notion of “self-normalizing practice”, which refers to individuals’ “willingness to accept and internalize questionable limits on what we can know about ourselves and how we might act as a natural or inevitable condition” (Pignatelli, 1993, p. 412), seems to imply the possibility of acting otherwise. Foucault’s sense of agency is embedded in his project on freedom (Foucault, 1988). For him, freedom is to interrogate the fundamentals and essentials of modern life and open up different possibilities. As Pignatelli (1993) states:

Foucault does want to preserve the possibility of agency and choosing to be otherwise, of moving against a life constructed through, and regulated by, a normalizing mode of discourse-practice. But, in the face of a form of governing that remains shrouded in the naturalistic garb of the everyday and stubbornly invisible, he also wants us to be aware of what is at stake if we choose to remain silent and inattentive. (p. 419)

It is interesting to note that Foucault’s major works were produced during the 1960s through to the 1970s.

As expected, human agency has limited space in the camp of objectivism. Individuals are considered products of the social structure and thus are governed by society’s codes. Individuals have few opportunities to perform actions driven by free-will. However, with the development from functionalism, structuralism, to post-structuralism, human agency appears to attract more attention in the objectivist literature. In the next section, subjectivism in sociology, represented by phenomenology, interpretivism, and hermeneutics, is reviewed by tracing the development of human agency.
Subjectivism and human agency in sociology

Influenced by Edmund Husserl and Max Weber, Alfred Schutz is considered one of the most influential phenomenologists in sociology (Giddens, 1976). His principal work, *Phenomenology of the social world*, was first published in German in 1932. Here, he suggests that social relations and other social forms are applied by actors in their daily life. Actors have a stock of knowledge of which they can use pragmatically in dealing with various situations (Schutz, 1967). For Schutz, the social world is “essentially only something dependent upon and still within the operating intentionality of an ego-consciousness” (Schütz, 1982, p. 37). The actors are those who build and maintain all social relations from Schutz’s perspective. Although the constitution of the objective world is unresolved in Schutz’s project, agency is definitely the primacy of human behaviors.

Influenced by Schutz’s and Wittgenstein’s work, Garfinkel (1991) posits that ethnomethodology originates from social life as a series of actors’ performance as oppose to “external” rules and conventions (Giddens, 1976). However, he is more interested in how “the genesis of the objective meanings of action” are reconstructed by actors in day-to-day life. Although Garfinkel starts from Schutz’s phenomenology which is mostly subjective, he does pay attention to the objective consequences being constructed by actors. Agency is still the dominant determinant of human action but the connections between the actions and objective rules are being raised and ultimately considered in ethnomethodology. Garfinkel’s major works (Garfinkel, 1991, 2002; Garfinkel & Rawls, 2006) were first published in the 1960s and 1970s.

Both Schutz and Garfinkel conclude that social relations can be understood only through the study of a layman’s daily life, i.e. human actions are meaningful; 2) social relations are constructed by social actors; and 3) the “stocks of knowledge routinely drawn upon by members
of society to make a meaningful social world” are not scientific (Giddens, 1976, p. 53). The importance of subjectivity is acknowledged in their writings, and they “emphasize the contribution of human subjectivity to knowledge without thereby sacrificing the objectivity of knowledge” (Schwandt, 2000, p. 292).

**Human agency in Structuration Theory**

By reviewing the debates in social theory, Anthony Giddens develops the Theory of Structuration in which he attempts to reconcile the objective and subjective dualism in social theory. He scrutinizes the texts of both subjective and objective camps in sociology and analyzed the shortcoming and contributions of both camps in his 1976 and 1982 works. For a theory of the subject without completely sliding into subjectivism, Giddens outlines the elements of the Theory of Structuration in his 1984 book, *Constitution of Society: Outline of the Theory of Structuration*. Structuration Theory is presented as being opposed to structuralism and positivistic standpoints whereas structuralism and functionalism which consider subjectivity as “dissolved into the structure of language” (Giddens, 1982, p. 8), Structuration Theory argues that the dissolving of subject must at the same time recover that subject “as a reasoning, acting being” (p. 8). Structuration Theory also distances from subjectivism because it fails to recognize the centrality of power in social life which sustains the social norms and rules (Giddens, 1976).

Agency in the Theory of Structuration consists of two components, capability and knowledgeability. Capability implies the “possibility that the agent could have acted otherwise” (Giddens, 1982, p. 9). However, agents generally exercise as a routine tacit feature of everyday behavior. Capability is only the possibility of doing rather than doing. Knowledgeability refers to “all those things which the members of the society know about that society and the conditions of their activity within it” (p. 9). Knowledgeability associates with unconscious actions and
unacknowledged conditions/unintended consequences of actions. In sum, actors in a society usually act under their knowledgeability which is unacknowledged rules and conventions in the society from the actors’ perspective. However, actors have the capability to reflect on the unacknowledged rules and act otherwise.

Structure in Structuration Theory not only has the function of constraint but also enables human actions. The structure is not external to human action. Agency and structure are not two independent social sets. They are interdependent, in Giddens’ words, ‘duality’. Structure refers to “recursively organized sets of rules and resources, is out of time and space, save in its instantiations and co-ordination as memory traces and is marked by an ‘absence of the subject’” (Giddens, 1984, p. 25). Structure is in a sense hidden and abstract, whereas a social system, ‘the recursive implications of structure’ is more concrete and on the surface. Social systems refer to “the situated activities of human agents, reproduced across time and space”. Thus, through the connection of social systems, the “structural properties of social systems are both the medium and outcome of the practices they recursively organize” (p. 25). The instantiations and co-ordinations as memory traces, i.e. knowledgeability, not only make structure from external to internal, but also involve time and space in structure and thus situate human action into historical and social contexts. Meanwhile, social systems are produced and reproduced by agents’ activities. Through capability, the possibilities of reconstituting social systems and in turn structure always exist in agents’ daily activities.

The historical development of human agency in the field of sociology blended competitions and reconciliations of objectivism and subjectivism. In the following section, the development of human agency is situated in a critical theory framework.
In critical theory

Giroux (2001) does not focus his work on the constitution of agency even though he took the notion of agency seriously. Agency is introduced in his work where he aligns it with structure in order to generate a dialectic relationship through which agents (school teachers and students) could resist the existing ideology or hegemony in schools as well as in society.

Giroux (2001) categorizes Reproduction Theories into two positions, social reproduction and cultural reproduction. Giroux selects Althusser’s (2001) and Bowles and Gntis’ (2013) works to examine theories of social reproduction. The social reproduction camp shared the beliefs that schools serve as a site to produce not only labors for capital accumulation but also consciousness, dispositions and values. Cultural reproduction theories, according to Giroux, “begin precisely at the point where social reproduction theories end” (p. 86). The major theorists are Bourdieu (Bourdieu & Nice, 1977) and Bernstein (2003). They focus their work on the development of theories that link culture, class, and domination. The “principles underlying the structure and transmission of the cultural field” are given priority over economic and social inequity. The criticism on theories of reproductions focuses on “the one-sided determinism, their somewhat simplistic view of social and cultural reproduction, and their often-ahistorical mode of theorizing” (Giroux, 2001, p. 77).

Giroux heavily draws on the Frankfurt School because the ideas departed from orthodoxies of traditional Marxism which privileged the struggle between classes and economic status. The Frankfurt School’s work focuses more on ideology and culture in which schools play a more important role in becoming critical agents. Also, The Frankfurt School “provides a major challenge and a stimulus to educational theorists who are…tied to functionalist paradigms based
on assumptions drawn from a positivist rationality” (Giroux, 2001, p. 34). Both the Frankfurt School and Giroux criticize positivism as there is little room for agency to exist.

Giroux (2001) disavows the objectivity and predeterminations in positivism and the Reproduction Theory that developed from traditional Marxism. He is also critical of the liberal version of schooling for it is rooted in self-serving individualism and anchored in a discourse that attempts to find universal principles. Even though the liberals make connections among school, power, and society, they fall into, as Giroux states, “a one-sided idealism” with overemphasis on human will, cultural experience and the construction of a happy classroom. Human agency was part of this camp.

The development of agency in critical theory seems to move from orthodox Marxism to a juxtaposition of subjectivism and objectivism that Giroux considers to be both culturalist and structuralist traditions. Pointing out the failures in both traditions, Giroux (2001) frames a dialectical relation that centers on the evolving process of agency and structure. Because the structuralist tradition has been briefly discussed in the sociology section and in the work of Althusser in this chapter, I now review the culturalist tradition.

Raymond Williams (1983) and E. P. Thompson (1966) are the two major theorists in the culturalist tradition. According to the culturalists, Marxism misconceives the connotations of culture and thus fails to developed consciousness, experience and human agency. They find that traditional Marxism reduces culture into “a reflex of the economic structure” (Giroux, 2001, p. 124). In addition, culture simply equates to bourgeois art and values and is detached from

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3 I concur with Giroux’s interpretation of The Frankfurt School criticism of positivism in which agency is suppressed.
everyday life. The culturalists posit consciousness and experience of human subject as the point of reference and unavoidably fall into the dualism of agency and structure.

The major work of Marx appears in the 19th century, and the Frankfurt School emerges in the 1920s. The Frankfurt School was dissatisfied with the notion of historical inevitability, the primacy of the mode of production in shaping history, and the primacy of class struggles. Thus, it developed theories of self-criticism and consciousness and transferred the centrality from economic to subjectivity, culture, and ideology. Unlike in psychology and sociology, such transfer is not a sheer turn from objectivism to subjectivism. The Frankfurt School, which is sometimes referred to as neo-Marxism, still carries some orthodox Marxism traditions. The Frankfurt School balanced the reproduction and resistance in its theories and brings hope to the pre-determinism. “Its attempts to link social structures and human agency to explore the way they interact in a dialectical manner represent a significant theoretical advance over functional-structuralists and interactional accounts” (Giroux, 2001, p. 99). Meanwhile, the culturalists and the structuralists, who both originated in the 1960s, offer important elements to a dialectical perspective between agency and structure. Working from the Reproduction Theories in the 1970s, Giroux advances theories of resistance and claims room for agency in the reproduction of social ideologies. The Frankfort School, culturalist and structuralist traditions, and reproduction theories become the theoretical basis for Giroux’s radical pedagogy.

Giroux (2001) posits agency and structure in “a theory of ideology so as to treat dialectically the role of the individual and group as producers of meaning within already existing fields of representation and practice” (p. 156). The agency and structure are both the medium and outcome of ideological discourses and practice. Ideology functions as the constraints and motivators of human agency. A theory of production needs to be integrated with theory of
reproduction. Human agents produce meanings through texts, films, and curriculum, and these meanings are distributed through organizations of society. Neither individual’s self-creation nor social structure is solely responsible for the generation, maintenance, and transformation of meanings. It appears meanings are generated through the interactions between human agency and social structure as a starting point. With regard to the current study, it is possible to say the broader meanings of the reform process began with teachers’ interactions with policy mandates, school administration, and peers.

The critical theory tradition encourages agents in social institutions to reflect upon their specific situation with regard to history, culture, and ideology and thus make transparent the underlying social structures and improve social conditions. In this regard, Giroux associates agency with resistance, reform, subversion, and reconstruction. Such a discourse posits agency with action and a hope of positive consequences from the actor’s perspective. The emphasis on action and resistance opens a body of literature in fields such as education and history. In education, Giroux and McLaren (1986) call for educators to become transformative intellectuals and extend radical pedagogy to gender and race issues. In history, scholars seek historical agency among disenfranchised groups such as workers, African Americans, and women (Davis, 2002; Genovese, 1974; Green, 2000; Scott, 1974; Thompson, 1966). Historical agency refers to actions embedded in the past that influence the present political actions. Historical agency is the force against the “technological/bureaucratic/capitalist society, which poses the greatest challenges to human freedom in the 21st century” (Seixas, 2000, p. 14). Giroux’s work articulates a notion of agency by associating agency with critically examining agents’ situations, empowering disadvantage groups, and resisting social structures.
The contributions from the critical theory tradition, however, also become a disadvantage in the framing of agency. In developing a radical pedagogy, Giroux proposes that teachers and students become critical agents and educators become transformative intellectuals to critically examine self-formation and hidden structures and thus make changes based on such critical engagements. While other scholars consider the faults of Giroux’s agency such as the neglect of either the complexity of agency within social and psychological determination (McNeil, 1981; Smith, 1988) or human subjects are simply reluctant to change (Senese, 1991), I consider the shortcoming to be the overemphasis on the consequences of action rather than on the action itself. Transformation indicates purposeful/expected consequences of certain actions, which implies a linear development of the dialectical development between agency and structure. Giroux considers that, through the dialectical evolvement between agency and structure, a consequence, i.e. an improved ideology aligning with agent’s intention would be achieved, no matter individually or collectively. Admittedly, actions lead to consequences. Consequences are unpredictable, discursive, evolving, shifting or even counterproductive. Sometimes short-term, appealing consequences may turn out to be a long-term disaster or vice versa. Dialectical relations do not seem to guarantee a pre-determined result. Rather, they seem more suitable for a descriptive tool to understand the relations between agency and structure. The complexities of agency, structure, and the interactions are overlooked in Giroux’s radical pedagogy, and the consequences of such complexities contain uncertainty, unpredictability, adjustment, adaptions, and evolvement.

**What does the history of human agency tell us?**

This review of human agency situates human agency in its historical context and answer the question: From where do the current definitions of human agency come? In this section, I
stitch together the threads of human agency in psychology, sociology, and critical theory through situating the three disciplines in a larger social-historical context.

The philosophical and methodological development of psychology and sociology are markedly similar throughout history even though psychology and sociology are two independent disciplines. Behaviorism in psychology and functionalism in sociology were established in the advent of 20th century. Both state that the world objectively exists and can be studied through neutral observation, logical thinking, experimentations, and mathematics. Even though human beings are important research objects in both disciplines, behaviorism and functionalism dissolve human’s subjectivities into either behaviors or social relations that can be studied through objective approaches. When the forefathers of behaviorism (Skinner, Watson) and functionalism (Durkheim) built these fields, their focus was on how to objectify the research methodology so the discipline might become a branch of “science” and thus flourish. Stimulated by the achievements in science in the early 20th century (the wireless, radium, insulin), some psychologists and sociologists reconsidered their research methods and methodologies, and turned to scientific approaches, the “then-dominant philosophy of positivism” (Schwandt, 2000, p. 295). They joined the Modernist movement which beginning with the 16th century’s scientific revolutions to the quantum revolution of the 20th century. In addition, led by Bacon, Bunyan, Comenius, Descartes, and Leibniz, this movement was also characterized by methodization, which featured scientific, rational, and normed (Trueit, 2012).

The problem with such an approach is that behaviorists and functionalists attempted to achieve ontological objectivity through methodological objectivity. By studying behaviors and social relations as concrete and objective, they hoped to reduce the concept of human consciousness to an aspect of behavior or social relations or completely invalidate it. However,
as human beings are a major part of psychological and social research, human subjectivities cannot be fully eliminated through objectifying the research method. Studying behavior and social relations cannot explain the subjectivity of being human.

Critical theory is more of a perspective than a discipline. It interprets the world through a set of ideas and beliefs. Its influence has spread to various disciplines. Originating from the Frankfurt School, critical theory, loosely speaking, refers to “the nature of self-conscious critique and to the need to develop a discourse of social transformation and emancipation that does not cling dogmatically to its own doctrinal assumptions” (Giroux, 2001, p. 8). The Frankfurt School emerged in the 1920s and 30s from the theoretical baggage of orthodox Marxism in the sense of human emancipation. Orthodox Marxism, developed by Karl Marx and Friederiche Engels in the latter half of 19th century, is based on the materialism of historical development perspectives (Marx & Engels, 1970). Marxist epistemology and ontology are based on objectivies. Even though proletarian resistance is revealed and encouraged in Marxism, individual agency and consciousness are buried through class struggles. Individuals fall into either proletarian or bourgeoisie dichotomies while individual consciousness is diluted by class interests and superstructures. Methodologically, traditional Marxism advocates dialectical materialism which departs from Hegelian dialectics:

My dialectic method is not only different from the Hegelian, but is its direct opposite. To Hegel, the life-process of the human brain, i.e., the process of thinking, which, under the name of “the Idea,” he even transforms into an independent subject, is the demiurgos of the real world, and the real world is only the external, phenomenal form of “the Idea.” With me, on the contrary, the idea is nothing else than the material world reflected by the human mind, and translated into forms of thought. (Marx, 1995, p. 24)
Marx clearly stated that ideas or thoughts had little room in his methodological beliefs. Meanwhile, the dialectical approach differentiates itself from the positivist approach in terms of prediction, observation, experimentation, and explanation. Along with sociology and psychology in the late 19th century, positivist traditions seem to have a legacy of traditional Marxism, especially with regards to the elimination of subjectivities. Methodologically, traditional Marxism offers an alternative approach (dialectics) to look at social relations.

Then, in the mid-20th century, scholars in both psychology and sociology turned to subjectivism (human science) due to their dissatisfaction with a positivist research approach. Such dissatisfaction “arose in the reactions of neo-Kantian German historians and sociologists in the late 19th and early 20th centuries” (Schwandt, 2000, p. 295). They argue that human sciences are fundamentally different in nature and purpose from the natural sciences. Ontologically speaking, human science is different from natural science and, methodologically, human science should employ different research approaches. As opposed to positivism which offers causal explanations, human science understands social phenomena through daily life. By acknowledging that human action is inherently meaningful or “intentional”, subjectivism employed interpretivist approaches or phenomenology. The cognitive scientists in psychology and phenomenologists in sociology fully steered their research direction towards subjectivity. Such approaches, however, consider subjectivity and objectivities as two separate worlds juxtaposing each other in social life. Due to such shortcomings, scholars shifted their focus to resolving the dualism of objectivism and subjectivism.

The Frankfurt School is committed to penetrating the objective appearance of the world and revealing underlying social relations. In fact, Frankfurt School theorists have not just criticized traditional Marxism, they have attempted to resolve the crisis resulting from a misuse
of instrumental reason, which concerns the broader science community and human societies in general (Giroux, 2001).

From a broader historical and social perspective, positivism, instrumental rationality, and traditional Marxism encounter the unresolvable human subjectivity in the forms of memory, self-consciousness, and human will. The Frankfurt School theorists developed a dialectical relation between the particular and the universal, i.e. individual and structure. Culture is not neutral; it carries the historical development of society and politics and forms in everyday life. Instead of concealing human subjectivities into class struggle and material production, The Frankfurt School developed a theory of consciousness and psychology. Most importantly, the transcendent element and the prediction for an unfulfilled future placed action and consequences in the center of critical theory. However, the Frankfurt School did not shift to subjectivity. Rather, it created space for subjectivity in a dialectical relation between human agency and social structure. In the 1980s, Giroux drew upon the Frankfurt School philosophy to develop radical or critical pedagogy. During approximately the same period, Bandura and Giddens framed their theories of agency and structure.

The burgeoning of subjectivism has not resulted in an abatement of objectivism. The competitions and debate between the two camps have lasted for decades. Even in the objectivism camp, subjectivity still exists and vice versa. In the 1970s, structuralists like Foucault and Garfinkel (via ethnomethodology) began to address the possibility of resolving structure and freedom, or human actors and social constitutions. A short while later, from the late 1970s to the 1980s, Bandura, Giddens, and Giroux started to conceptualize the relationship between human agency and social structure. I have discussed the specificities of Bandura’s Social Cognitive Theory, Giddens’ Structuration Theory, and Giroux’s Radical Pedagogy in previous sections.
These three theorists consider the relationship between agency and social structure as interdependent (recursive). From the vantage point of psychology, Bandura’s Social Cognitive Theory thoroughly describes the development of human agency as a psychological property but discusses the external factors simply as “environment”. He describes the relationship between agency and environment simply as agency produces the environment and is shaped by the environment. Whereas Giddens, a sociologist, systematically analyzes the constitution of social relations and shrewdly connects time and space to human actors’ memory and thus placing agency into historical and social contexts. The Structuration Theory is robust in explaining social relations but weak in theorizing the properties of human consciousness. Giroux does not pay as much attention as Bandura and Giddens do to the constitutions of agency and social structure. His interest lies in the transformations that individual or groups can exert on social conditions and ideologies. I consider Giroux’s overemphasis on the consequences of actions as a major shortcoming of his theory. Therefore, I tend to adopt the psychological traits of agency from Social Cognitive Theory and the social constitution and the relations between actors and structures from Structuration Theory.

**Physics teacher agency and the Chinese curriculum reform**

In this study, I define human agency as the capacity to recognize and evaluate social structures and to construct the possibilities to act upon, subvert, and resist these existing social structures. I study how high school physics teachers’ agency respond to the current national curriculum reform in China. I explore physics teachers’ intentions, forethought, self-reactiveness, and reflexivity in implementing the curriculum. Reflexivity, which is considered by Bandura as the most distinctive core of agency and by Giddens as the deeply involved feature of knowledgeability, call attentions in studying of agency. Teachers’ power, reflected by available
resources will also be examined in the research. In addition, different modes of agency, specially the mechanism between individual agency and collective agency are studied to further explore the triadic interplays among individuals, groups, and social context. The specificity and uniqueness of local cultures will emerge during the data collection process and be presented in the discussions. The social structure of the study centers on the national curriculum reform, especially on the policies regarding to the decentralization of curriculum administration and guidelines on physics education (this part is discussed in next Chapter three). Even though I frame agency and structure as if they are separated, in fact, physics teacher agency and curriculum reform are studied as a complex system. Neither agency nor structure is discussed without the other. The recursive process of agents’ actions and social structure thread through the entire study. The notion of agency does not only pertain to actions. It also contains intrapersonal features such as reflexivity and autobiographical stories. The study also pays attention to the evolvement of the system, how the system dynamic within the participant school respond to and adapt to changes initiated by physics teachers, and how the system is shaped by physics teacher agency. As Giddens framed it, human action is the instantiation of social structure and personal development encompassing time and space. Hence, not only are individual’s autobiographical features important to the research, the historical development and the broader social context essential in understanding the local system are as well.
Chapter three: Methodology and methods

In this chapter, I depict the research context in which Chinese curriculum reform occurs through a discussion of research methodologies and methods. The data collection and analysis procedures are then outlined, followed by a discussion of ethical considerations of the study.

Research context

The study of agency is impossible without the study of social structure. The on-going Chinese curriculum reform in pre-collegiate education started in 2001 is the most important social structure with regard to high school physics teachers’ daily practices as the reform is nation-wide and all-encompassing, I focus my attention to shifts in pedagogy and the process of curriculum decentralization. Shifts in pedagogy do not refer to teachers’ actual classroom practices in the classroom but are concerned with the implementation of curriculum reform. It is classroom implementation that the curriculum authorities expect. Shifts in pedagogy closely relates to teacher agency which involves intention, decision makings, actions, and reflections in their professional lives. I consider the decentralization of curriculum administration to be concerned with a teacher’s power and it reveals the rationale behind the current policies and requirements on “empowering teachers” and “teachers becoming curriculum designers”. Teacher power refers to the available resources that teachers deploy and exercise (Giddens, 1984). This is a core concept in studying teacher agency. Thus, shifts in pedagogy and curriculum decentralization become the focus.

The curriculum reform in China is triggered by a crisis: the examination-oriented education enslaves students’ creativity and underlines competition rather than collaboration and communication among students and teachers (Zhong, 2006). The examination system is often
deemed as the sources of difficulties that the reform faces. In addition, both students and teachers have been long burdened by expectations of test grades and have developed strategies to cope with the exam-oriented education system (Dello-Iacovo, 2009; Guan & Meng, 2007). Teachers may face the challenges of re-assess and negotiate the various requirements and demands generated from the examination-oriented education as well as the curriculum reform. The required transition from emphasis on competition to more collaboration may influence teacher agency in the context of this study.

**The current Chinese curriculum reform**

Physics teacher agency is embedded within the complex socio-cultural environment that enables and constrains teachers’ professional practices. In this section, I describe the reform mandates and recommendations that are concerned with teachers, teaching, and curriculum implementation.

The current Chinese curriculum reform was officially launched in June 2001 when the Ministry of Education (MOE) of People’s Republic of China issued two documents titled: *Outline of Curriculum Reform of Basic Education (trial version)* and *Curriculum Standards of 18 Compulsory Subjects* (Ministry of Education, PR. China, 2001). Two years earlier in 1999, the Central Committee of the Communist Party of China and the State Council jointly promulgated *the Decision on the Deepening of Educational Reform and the Full Promotion of Quality Education* which are considered as propellants of the reform. The current curriculum reform in China is the eighth basic educational curriculum reform since the establishment of the People’s Republic of China in 1949. It involves changes in all subjects in the pre-collegiate education system. The reform includes: changes of curriculum goals, structure, and content; teaching and
learning approaches; and assessment and administrative structures, which can be “overwhelming for educators at all levels” (Erickson, Kang, Mitchell, & Ryan, 2009, p. 180).

The Ministry of Education (MOE) set six aims for the curriculum reform:

1. Changing the curriculum from focusing on knowledge delivery to helping students develop a positive learning attitude. Transforming the process of learning basic knowledge and skills to learning how to learn and forming value.

2. Changing the curriculum structure from over emphasis on subject matter, too many subjects, and lack of connections to a more balanced, comprehensive, and elective curriculum structure.

3. Erasing the difficult, outdated, partial, and redundant curriculum content, to enhancing the connections between the curriculum content and the students’ lives and developing understanding of modern technology, caring about students’ learning interests and experience, selecting content and skills that are necessary for life-long learning.

4. Changing from an over-emphasis on memorization of facts and mechanical training to: encouraging students to actively engage in learning, and cultivating students’ capacity to acquire and understand information; nurturing students’ ability to analyze and solve problems, communicate and cooperate.

5. Changing the assessment system from focusing on selective functions to making the system facilitate students’ well-being and teachers’ improvement of their teaching practice.
6. Changing the over-centralized curriculum administration to implementing a three-level (nation, local, school) curriculum administration by enhancing the flexibility of the curriculum to suit the local, school, and students’ situations. (Zhu, 2002)

The six aims constitute the “skeleton” of the reform. They are the principal guidelines. With these general aims, educational researchers, policy makers, educators, administrators, and teachers develop and recommend “blood and flesh” on the skeleton which are concrete policies, guidelines, pedagogies, and evaluations of the reform.

Aims number four and number six directly influence the exercise of teacher agency. Aim four plans to change students’ ways of learning and expected learning outcomes. This aim implies changes in ways of teaching and how teachers view their classroom. Physics teachers have faced many dilemmas in adopting the new curriculum including: implementing student-centered approaches and students’ ability to fully appreciate curriculum content without much instruction from teachers; lessening control in the classroom and following the mandated curriculum content; trusting students’ ability to learn and competing with other teachers; and negotiating between lab practice and knowledge gaining (Fu, 2010). This study focuses on how selected physics teachers make decisions and exercise their decisions and why they make such decisions facing the multiple dilemmas in their practices. In other words, the study looks at the recursive process as well as the results of teachers’ actions. “Results” of teacher’s actions are considered as part of the process.

Based on aim four, educational researchers and local government recommend a student-centered teaching approach. How teachers monitor and evaluate this reform mandate and make their choice on pedagogy is a focus of this study. Conversely, why does the MOE make number four as one of the principal reform aims; and what are the historical and political backgrounds
that motivate MOE to encourage a transformation from a teacher-centered to student centered approach? To answer these two questions is to address “where is the social structure coming from” in this study. In the next section, I answer these two questions by examining the motivations and assumptions of the current curriculum reform.

Aim number six is shifting from over-centralized curriculum administrations to three layers of curriculum administration. Instead of using a nation-wide unified curriculum, the MOE only provides guidelines for each subject and does not designate unified textbooks in the on-going curriculum reform. It is the local education department/bureau’s responsibility to develop curriculum and select textbooks for each subject. Schools have the responsibilities to develop a small portion of “school-based” curriculum that fits the specificities of local conditions as well as meet the unique needs of different students (Zhu, 2002). The three-level curriculum administration intends to preserve some consistency throughout the country as well as open up space for curriculum creation and improvisations.

The responsibility of developing the school curriculum falls onto individual teachers as teachers are well aware of the specific needs of students and classroom dynamics. With more responsibility, more “power” is supposed to be conferred upon teachers. Teachers are no longer curriculum deliverers, and curriculum is not considered as fixed and static. Teachers are expected to participate in the decision making of school curriculum development. They have the authority to adjust and change the curriculum based on students’ distinctiveness. One of the research imperatives then becomes the investigation of how teacher agency, the capacity to act and resist, is exercised when more “freedom” is given. What is the transition from curriculum deliverer to designer? The demand for decentralizing curriculum administration is a major social structure
that influences teacher agency. Hence, I analyze the origins of this social structure as well by reviewing the history of decentralization of curriculum administration in China.

The general aims of the curriculum reform were applied to high school physics and the resultant reform mandates are described in the *Full-time High School Physics Curriculum Standard* (the standard) (MOE, 2003), the national curriculum guideline for textbook writing, curriculum development, teaching, learning, and evaluation. In the Curriculum Standard, physics knowledge is no longer the sole center of physics curriculum. Knowledge, scientific methods, and values are equally important. The Standard stresses students’ active learning and inquiry. Students are to play leading roles in physics classes, and teachers play supporting roles. The process of inquiry is viewed as more important than finding the correct answer. Teachers are encouraged to explore students’ thoughts, pay attention to what students already know, and monitor their thinking process. The new curriculum considers that knowledge is built through the interactions among teachers, students, and textbooks and emphasizes physics knowledge applications such as interdisciplinary applications and role of physics in the students’ daily lives. In the guideline, knowledge is not static and is no longer passed directly from teachers to students. Instead, students take more responsibility for their learning and knowledge is generated through discussions and debates. Teachers are encouraged to develop school-based physics curriculum by connecting physics to the local environment and highlighting physics applications in daily life.

Although teachers have more power in creating the school-based curriculum, they continue to hold power in the classroom as they still control the class and shape student learning. How physics teachers make decisions and take actions in their professional practice in negotiating the gaining and losing of power in the new curriculum reflect how teacher agency
plays under the current Chinese curriculum reform. The review of the historical development of shift in pedagogy and decentralization reveal the motivations and broad historical and social context of the current curriculum reform.

**The history of pedagogical shift and decentralization**

Francisco J. Varela (1999) claims that the world we know is “enacted through our history of structural coupling, and the temporal hinges that articulate enactions are rooted in the number of alternative microworlds that are activated in every situation” (p. 17). Giddens (1984) also argues that the knowledgeability in human agency entails an appreciation of time and space. The agent’s knowledge that informs decision making is developed and shaped by social structure and norms. The social structure and norms are produced and reproduced through the agent’s actions.

Such a recursive process thus carries a sense of time and geographical realms. Human actions are embedded in actors’ personal history, and personal history is embedded in a broader history of culture and society. Therefore, understanding the history is crucial for understanding the current social structure. In the last section, I briefly depicted the current reform context in China which is the key social structure of the study. In this section, I review the history of shift in pedagogies and decentralization on curriculum administration juxtaposing the assumptions and motivations of the current reform as well as the domestic and international influences on the reform. The aim is to provide an in-depth picture of why the reform intends to decentralize the curriculum administration and implement student-centered classroom in general and in physics education.

**Shift in pedagogy**

The current curriculum reform has proposed a pedagogical shift. A change from rote memorization of facts to nurturing students’ interests and encourage active learning. The focus
shifts from learning outcomes to learning process. The center of teaching switches from how to deliver knowledge, to how to cultivate a better learner. According to Chinese education scholars and government officials (Guan & Meng, 2007; Zhu, 2002), Chinese pre-collegiate educational system had several problems regarding teaching and learning before the reform. The guiding cognitive approach in the previous curriculum was outdated. There was: 1) a need for transition from rationalism and empiricism to constructivism; 2) the previous curriculum overlooked students’ leading role in learning and their overall development; 3) teaching methods were outdated and distorted with teaching content; and 4) evaluation emphasized summative assessment rather than formative assessment, and quantitative was preferred over qualitative approaches and focused on subject-matter evaluation rather than a comprehensive evaluation.

The existing problems are closely associated with the examination-oriented education in China. The examination-oriented education has been embedded in Chinese culture and society for more than 1,000 years (Dello-Iacovo, 2009). The highly hierarchical and centralized examinations were the major stepping stones to becoming officials and members of the ruling class in ancient China. Confucian classics were the prescribed texts. Teachers were the representative of Confucian classics and thus were irrefutable and authoritative. Teachers were the center of class (Thøgersen, 1990). Rote memorization and recitation were the standard teaching methods (Pepper, 2000).

Although Confucianism and the examination system were under fierce assault in the Cultural Revolution and the Great Leap forward movements (1960s-1970s), Chinese education inherited the exam history and revived it in the late 1970s. The examination-oriented education was welcomed in the 1970s to 1980s but was soon criticized for promoting elitism, teaching for examinations, only valuing students’ academic performance, assigning excessive homework, and
rote learning (Dello-Iacovo, 2009). Students’ health was jeopardized physically and mentally. Thus, in the 1990s, the government proposed *suzhi jiaoyu* as a means to address the plagues in exam-oriented education. *Suzhi jioayu* are often translated as “quality education”, “competence education”, “essential qualities oriented education”, “all-rounded education” and “character education”. The word *suzhi* in Chinese refers to the person who is well rounded, skilled in various realms, moral, and nationalistic (Dello-Iacovo, 2009). The word *suzhi* not only carries a sense of being skillful and knowledgeable but also contains a sense of superior moral and spirit. It does not emphasize a specific skill or ability but stresses the wholeness of a person.

In practice, education authorities propose to reduce students’ work loads, alter rote memorization as the main teaching method, and cultivate students’ creative and independent thinking skills. Student centered approaches are introduced to schools in the form of cultivating students’ curiosity, making students active learners, developing sense and skills of inquiry, encouraging collaboration and communication, increasing hands-on experience, and relating textbook to daily life. Thus, the pedagogical shifts are leaning towards a more human-centered approach as opposed to the knowledge-centered approach. The ultimate goal is to achieve national strength. “Practical skills and innovative ability have been identified by the leadership as areas which need to be improved in order to raise China’s global competitiveness” (Dello-Iacovo, 2009, p. 242). In other words, the pedagogical shifts aim to nurture students through a more humanistic approach and ultimately enhance the country’s power.

**Decentralization**

Before reviewing the history, it is necessary to define the word “decentralization” in the Chinese context. As Arno, Torres (Arno & Torres, 2003) and Hanson (1998) note, there is no absolute decentralized education system. It is always a mixture between centralization and
decentralization. The processes are fluid and changing over time. The word decentralization always co-exists with centralization. Hence, one must clarify whose decentralization and decentralization of what. Decentralization only makes sense within the context. Hanson (1998) defines decentralization as “the transfer of decision-making authority, responsibility, and tasks from higher to lower organizational levels or between organizations” (p. 112). Hanson proposes three kinds of decentralization:

1. Deconcentration typically involves the transfer of tasks and work, but not authority, to other units in the organization.

2. Delegation involves the transfer of decision-making authority from higher to lower hierarchical units, but that authority can be withdrawn at the discretion of the delegating unit.

3. Devolution refers to the transfer of authority to an autonomous unit that can act independently, or a unit that can act without first asking permission. (p. 112)

In the case of the Chinese education system, three kinds of decentralization exist at the same time (Hawkins, 2000).

What is the history of decentralization from centralization? One may consider the domination of Confucianism in China as centralization. Chinese culture as well as ancient Chinese education were shaped by three ideologies/wisdoms: Taoism, Confucianism, and Buddhism (Zhang & Zhong, 2003). The forefather of Confucianism, Confucius (551-479BC) developed “six classics”: the Book of Poetry/Songs, the Book of History, the Book of Rites, the Book of Music, the Book of Change, i.e. I-ching, and the Spring and Autumn Annals, as curriculum content. However, the “six classics” were not part of the official curriculum at that time. They only represented one among hundreds of schools of ideology. Confucian ideology and
Confucian classics became orthodox when Dong, Zhongshu proposed “dismiss the hundred schools, revere only the Confucian as dominant ideology” and was accepted by Han Wu emperor in Han dynasty (205BC–8AD). Then, Confucian classics became the only formal official curriculum. In the following 1800 years, Buddhism and Taoism rose and fell. Confucianism remained in the dominant position until the Mid-19th century. Confucianism’s domination in ancient Chinese education could be considered as the earliest centralization of curriculum administration in the sense that the entire country used one set of “standard textbooks”. Chinese culture carries a strong heritage of centralization in political structure as well as in education.

Strictly speaking, the centralization of education started in 1949 with the founding of the People’s Republic of China (PRC). The Chinese Communist Party led the formation of PRC with support from the former Soviet Union and the guidance of Soviet Socialism ideology. Thus, the entire country was rebuilt as Soviet Union’s centralized model.

Socialistically planned economy is the mode of production in this social system… Under this system, education was regarded simply as social superstructure, so it had no independence and could function only as the mouthpiece of economics, the loudspeaker of politics, and the defender of culture. (Zhang & Zhong, 2003, p. 262)

Education is a means of political indoctrination and maintaining political loyalty (Ngok, 2007). All schools and education institutions were under the direct and strict control of the nation. Curriculum administration, as part of education, was also centralized. The central authorities developed unified lesson plans, syllabi, and textbooks. Teachers and school administrators did not participate in the decision making around curriculum development.

In the late 1970s, China launched an economic reform featuring market-oriented economic system. On the Third Conference of the 11th National Congress of the Chinese
Communist Party in 1978, President Deng, Xiaoping and Chinese policy-makers set economic construction as the paramount goal of social development with “reform and opening up” as the theme (Ngok, 2007; Zhang & Zhong, 2003b). “Socialism market economy” became the new economy mode as opposed to Maoist centralized economy mode. With the shift of economic mode, the function of education has switched from political indoctrination to developing a socialist market economy (Ngok, 2007). The previous educational system was inadequate for economic development (Hawkins, 2000). Meanwhile, the central government realized that the state alone was unable to satisfy people’s increasing demand for education due to the over-centralized system. It was impossible for the state to serve the various and complex educational needs from different regional areas with limited capacity and resources. In addition, the centralized system smothered the initiatives and enthusiasm of local government and individual institutions (Ngok & David, 2004).

In May 1985, the Chinese central government promulgated a series of general policy guidelines and began a process of educational reform. The general guidelines proposed to link education to economic reforms, implement the nine-year compulsory education, decentralize finances and management, expand vocational and technical education, and increase the number and quality of teachers (Chinese Communist Party Central Committee, 1985). Many scholars show great interest in the finance decentralization in this reform (Cheng, 1994; Hawkins, 2000; K. Ngok, 2007; L. K. Ngok & David, 2004; Tsang, 1996, 2000). There are two characteristics of the finance decentralization: 1) decentralize the financing structure; and 2) diversify the financing sources (Liu & Dunne, 2009; Tsang, 1996). The central government transfers a large portion of funding responsibility on different levels of local governments. The local governments can retain most of their revenues and use the money for local expenditures (Cheng, 1994).
Meanwhile, the central government opens-up and encourages private agencies, enterprises, non-government organizations and other sectors of the community to participate in education.

Despite the finance decentralization, the central government still retained the control of curriculum for pre-collegiate education during the 1985 reform. Although there were some flexibilities in “non-core” subjects’ curriculum such as art, music, singing, P.E., and computers (Hawkins, 2000), the central educational authorities (MOE, formerly State Education Commission) kept control in core subjects and “areas where they have a particular interest such as moral-political education” (Hawkins, 2000, p. 449). Such control, I assume, was inherited from the Mao-era in which education was a means to maintain political loyalty. In 1992, the State Education Commission drafted a nation-wide curriculum framework. The curriculum was principally carried out by the central authorities, but some components were co-authored with local authorities (State Education Commission, 1994).

Although the curriculum administration in the 1985 reform was mainly controlled by the central authorities, the decentralization in finance created possibilities and prepared the curriculum administration decentralization. The new funding mechanism changed many Chinese people’s perceptions on school and on the notion of “state”. As the central government released the funding responsibility, they also gave up a sense of ownership over schools. Schools were no longer state’s schools; instead, they became communities’ schools or people’s schools (Cheng, 1994). Due to their financial involvement, private sectors, enterprises, and other organizations demanded more “stakes” in decision making including curriculum development. The former centralized social system consolidated a culture of respecting the state and the authorities. In the old system, the Chinese Communist Party Central Committee and the central government’s authority and respect came from allocating resources. Now such authorities and the culture are
undermined by the school finance decentralization. Hence, people’s perception of “state” gradually shifts from obedience and respect to ownership and entitlement. With the increased sense of entitlement, people request more power and authority on decision making in education.

In the current curriculum reform, decentralizing curriculum administration has become one of the reform guidelines. But what drives the Ministry of Education to propose decentralizing curriculum administration as a guideline remains an unsolved question. In order to answer this question, I draw upon Aoki’s (2005) critical evaluation of curriculum X:

1. What are the perspective underlying Curriculum X? (What are underlying root interest, root assumptions, and root approaches?)
2. What is the implied view of the student or the teacher held by the curriculum planner?
3. At the root level, whose interests does Curriculum serve?
4. What are the root metaphors that guide the curriculum developer, the curriculum implementer, or the curriculum evaluator?
5. What is the basic bias of the publisher/author/developer of prescribed or recommended resource materials?
6. What is the curriculum’s supporting worldview? (p. 145)

According to political documents from the central government and the Ministry of Education (MOE) (China State Council, 1999; Ministry of Education, PR. China, 1999), there are three demands/motivators for “a new curriculum reform” (Guan & Meng, 2007). First is the demand of international competition. International competition is becoming more fierce. Human capital plays a key role in determining the ultimate success of such competition. People’s innovation and creativities have generated enormous wealth. With the notion of “knowledge
economy”, China’s education is required to reform accordingly. Second is the demand of coping with technology. The rapid popularization of information technology and the Internet has impacted instructional tools, classroom arrangement, and knowledge delivery modes, which changes the traditional educational philosophy, educational concepts and the overall system of school management. Third is the demand to unload the student workload burden. Students in the pre-collegiate system were under excessive physical and mental pressure which was generated from exam-orientated education. The new reform aims to “liberate” students.

Why do these three demands rather than others become the stimulators of the reform? The second generation leaders transited the primary political center from interclass conflict (in Mao Zedong era) to economy construction on the Third Conference of the 11th National Congress of the Chinese Communist Party in 1978. Since then, policy making in every aspect of China places economic development as the top priority. Such a decision was made with the assumption that bourgeois hegemony was no longer the principal social issue. The principal task of the Chinese government has become improving people’s living standard by providing adequate food and clothing. In order to prioritize economic development, the central government developed two major policies: (1) “reform and opening-up” and (2) “science and technology is the primary productive force”. Reform refers to the change from a planned economy model to a market economy model within the country. Whereas opening-up refers to an open Chinese market where international investment in China is invited and Chinese companies are encouraged to go global. China has been experiencing a rapid transformation in economy and social structures which is the background of the current curriculum reform.

Therefore, I argue that the demands of winning international competition and of coping with modern technology came from the two principal policies “reform and opening-up” and
“science and technology is the primary productive force”. It seems the primary interest/motivation of the curriculum reform still centers on the development of the economy. Decentralizing curriculum administration could stabilize the decentralization in education financing by endowing more power to financial stakeholders. Stabilizing the finance decentralization conform to the market-oriented economy model and thus contribute to economy development in general. However, a locally designed curriculum aims to fit with local culture, social contexts, and students in different communities. Thus nurturing “human capitals” who could help China win “international competitions”. Therefore, the major drive for curriculum administration decentralization is the development of Chinese economy.

**International influence**

Pepper (2000) claims that the Chinese model of education is a fusion of traditional imperial methods and modern Western schooling. With reconstruction, education fully drew upon the experience of Western education ideas in the early 20th century (Zhang & Zhong, 2003). With the founding of PRC in 1949, the former Soviet Union’s educational model was fully adopted. The “reform and opening-up” policy in 1978 encouraged international inputs in China as well as Chinese outputs to the world. A number of education works from England, Japan, America, and the Soviet Union have been translated into Chinese. The translations have promoted Chinese scholars’ enthusiasm for participating in international conversations (Zhang & Zhong, 2003). Meanwhile, China has sent scholars to study abroad to bring back cutting edge ideas and innovations. With the policy “science and technology is the primary productive force”, the development of science disciplines was given top priority in the 1980s -1990s. In order to catch the latest trends in science education, science educators in China drew heavily on theories and methods from Western countries. While reading the reform guidelines, one can detect the
traces of Western thought such as a student-centered approach, constructivism in science education, and action research in teacher empowerment, although such theories are not acknowledged. For example, the reform guideline requires a transition from rationalism and empiricism to constructivism (Guan & Meng, 2007). Zhu (2002) encourages teachers to employ action research for pedagogical development. However, they do not explicitly claim which scholar they drew upon. As Dello-Iacovo (2009) points out, “[Chinese] education reformers have attempted to learn and borrow from Western educational methodologies without committing themselves to the conceptual bases which underpin them” (p. 243). Therefore, teachers are exposed to mandates for teaching using “foreign approaches” without knowing why. Another point worth noting is that the “reform and opening-up” policy was promulgated under the umbrella of “centering economic development”. The learning about and exchanges with the world were limited to economically superior regions. The learning of educational ideas and models are meant to follow those of economic development.

**Summary**

Even though the pedagogical shifts, decentralization, and international influence are reviewed in three sections, the three processes are not separate; they are intertwined through complex networks. The process of decentralization is influenced by pedagogical shifts and internationalization in Chinese education. Finance decentralization in education may be the direct cause of curriculum administration decentralization, but it is not the only cause of curriculum administration decentralization. I am hoping to depict a comprehensive picture of the reform context related to teacher agency so that readers can grasp the whole idea rather than several parallel processes. The reform context is meant to be understood and analyzed as a whole rather than separated by procedures, phenomena, and aspects.
I hope to trace the history of decentralization, pedagogical shifts, and international influence with a historical consciousness (Seixas, 2004) in mind as “history is invoked to provide context, meaning, and continuity, and…to nourish wisdom in making decisions in the present about the future” (p. 3). I am hoping to achieve the “full awareness of the historicity of everything present and the relativity of all opinions, and thus the breaking of the hold of tradition” (p. 8).

The educational reforms in China are mostly driven by the needs for economic development which translates to national development. In other words, the needs for national and economic development are not mutually exclusive. Although China’s GDP has surpassed Japan as the world’s second largest economy in 2010, China per capita GDP is one tenth of Japan. As former premier Wen, Jiabao said at the 65th United Nations (UN) conference, “China remains as a developing country”. Around 150 million Chinese people live below the UN’s poverty line (Wen, 2010). Developing the economy still plays the most important role in improving living standards and eliminating poverty. With the policy centered on economic development, educations will stay serving the function of enhancing economic construction and winning international competitions. However, thirty years of economic development also generated a series of problems such as increasing the gap between the rich and poor, social injustice, government corruption, and environmental pollution. Due to the strengthening economy and the on-going problems in society, the function of education will gradually switch to nurturing the growth of human beings and addressing social and environmental injustice. The emergence of caring for student’s growth in recent Chinese education policies is an indication of such a transition.
With the further decentralization in education, the Chinese government’s authority will be further weakened. People’s awareness of ownership will be strengthened. Multiple education stakeholders such as teachers, administrators, parents, students, and community members will dilute such authority and will require and ultimately gain more autonomy. Although teachers and administrators may take some time to adjust to greater autonomy, such a process is irreversible with the further financial decentralization in education (Liu & Dunne, 2009).

Frequent international exchange will provoke the internationalization and localization of education in China. Education stakeholders will realize that they can neither fully adopt foreign ideas and methods nor can they fully abandon traditional wisdom because of the specificities of the socio-cultural contexts. Internationalization will play the role of invoking ideas while localization will play the role of appropriating such ideas into practice.

It is interesting to note that these transitions and international influences took place over the past thirty years, a very short period. A large portion, if not all, of in-service teachers have experienced and witnessed the changes in China. Both individuals and the social structure carry legacies from the past and negotiate the past with the present. The history preserves its continuity as well as disruptions. It is important to be aware that the historical legacies of the structure are crucial to understanding teacher agency in their daily practice.

The school

The high school where I conducted this study is located in a major city in mid-east China and is one of the major schools in the area. Students are from grades 10 to 12. The school’s level of student achievement, teacher competence, and funding rank highly among the top 30 senior high schools in the city. The school has two campuses, which is not unusual as most key high schools have more than one campus. The main campus, which is larger, is located in a suburban
area while the annex campus is located in an urban area and has a relatively small campus. Usually, students on the main campus have a high academic achievement based on their high school entrance exams. The main campus students maintain if not promote the key school’s status and reputation. The annex campus recruits students who are underachievers in their exams but are willing to pay for a better high school education. This is an example of how schools cope with the financial decentralization discussed in the last section of this chapter. According to participating teachers, educators on both campuses have similar teaching competencies. Teachers are assigned to different campuses based primarily on their personal preference for either campus.

The main campus is a boarding school. Most students live on campus from Monday to Saturday and can visit their home on Sunday. Each grade has seventeen classes. A class refers to a cohort of students who remain in one classroom throughout the year. Teachers of different subjects come to the classroom and deliver their lectures. The first twelve classes are regular classes. In the regular classes, the first six classes are called “main body class” in which teachers use teaching strategies that are proposed by the reform. Students are the “main body” of class. Classes seven to twelve are traditional classes. Teachers still use traditional lecturing in these classes though such pedagogy is not required. Teachers can choose their way of teaching for classes seven to twelve, but most teachers still hold on to traditional teaching approaches. Classes thirteen to sixteen are Olympiad competition classes. Students are trained for mathematics, physics, chemistry, and biology Olympiad competitions respectively. Students in these classes follow the same curriculum as in their non-competition subjects but progress more quickly through the coursework and engage in more in-depth study in their competition subjects. Class seventeen is called international class. Students in this class aim to study in international
universities. Class seventeen offers English competence test training such as TOEFL (test of English as a foreign language), IELTS (international English language test system) and information sessions for applying for international universities. Each class has sixty to seventy students enrolled as shown in Table 1.

Table 1. Class types on the main campus

<table>
<thead>
<tr>
<th>Class #</th>
<th>Class type</th>
<th>Pedagogy</th>
<th>Major purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-6</td>
<td>Main body class</td>
<td>Student centered</td>
<td>Cater to reform mandates and succeed in CCE(^4)</td>
</tr>
<tr>
<td>7-12</td>
<td>Traditional class</td>
<td>Teacher lecturing</td>
<td>Success in CCE</td>
</tr>
<tr>
<td>13-16</td>
<td>Competition class</td>
<td>Teacher lecturing</td>
<td>Success in Olympiad competitions</td>
</tr>
<tr>
<td>17</td>
<td>International class</td>
<td>Teacher lecturing</td>
<td>Enrolled by international universities</td>
</tr>
</tbody>
</table>

The diversity of the classes and their influences on teachers, the school culture, and the reform are discussed in Chapter four, Results and Discussions. The following questions will be addressed: What are the reform based pedagogies that are used in the main body class? Why are there competition classes? What are the students’ and parents’ responses to the different types of classes? And, How are students selected and/or assigned to different classes?

The annex campus has three grades (10-12) as well. Each grade has five classes and there is only one type of class, referred to as the traditional class.

The teachers

The teachers are recruited from both campuses. I contacted school principals of both campuses and obtained permission to conduct research. Invitation letters were sent to all physics teachers in person or via email. There are thirty-one physics teachers in total. Ten teachers indicated their willingness to participate. Eight teachers were from the main campus and two

\(^4\) CCE is College Entrance Examination
teachers from the annex campus. The research participants’ gender, teaching experience, the kind of class they teach and grade they teach are indicated in Table 2.

Table 2. Participant teacher information

<table>
<thead>
<tr>
<th>Name</th>
<th>Campus</th>
<th>Grade</th>
<th>Experience</th>
<th>Class type</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chung</td>
<td>Non-main</td>
<td>11</td>
<td>20 yrs</td>
<td>Traditional</td>
<td>Male</td>
</tr>
<tr>
<td>Wong</td>
<td>Non-main</td>
<td>11</td>
<td>7 yrs</td>
<td>Traditional</td>
<td>Female</td>
</tr>
<tr>
<td>Don</td>
<td>Main</td>
<td>10/11/12</td>
<td>29 yrs</td>
<td>Competition</td>
<td>Male</td>
</tr>
<tr>
<td>Hao</td>
<td>Main</td>
<td>10</td>
<td>9 yrs</td>
<td>Traditional &amp; International</td>
<td>Female</td>
</tr>
<tr>
<td>Hu</td>
<td>Main</td>
<td>11</td>
<td>14 yrs</td>
<td>Traditional</td>
<td>Female</td>
</tr>
<tr>
<td>Wen</td>
<td>Main</td>
<td>11</td>
<td>9 yrs</td>
<td>competition</td>
<td>Male</td>
</tr>
<tr>
<td>Tang</td>
<td>Main</td>
<td>11</td>
<td>30 yrs</td>
<td>Traditional, competition &amp; international</td>
<td>Male</td>
</tr>
<tr>
<td>Yu</td>
<td>Main</td>
<td>12</td>
<td>4 yrs</td>
<td>Traditional</td>
<td>Male</td>
</tr>
<tr>
<td>Zao</td>
<td>Main</td>
<td>12</td>
<td>7 yrs</td>
<td>Traditional</td>
<td>Male</td>
</tr>
<tr>
<td>Zu</td>
<td>Main</td>
<td>11</td>
<td>8 yrs</td>
<td>Traditional</td>
<td>Male</td>
</tr>
</tbody>
</table>

Most participating teachers taught Grade eleven. Only one teacher taught Grade ten. Unfortunately, none of the teachers was recruited from the main body class, but I was able to obtain permission to observe one of the main body classes. There is a section in Chapter four where I briefly portrait some teachers in terms of their personal history, experience, and personalities.

**Methodology and methods**

In this section, I first discuss the methodologies and methods in the literature and then develop the methodology and methods of this study in light of the literature as well as within the notion of human agency in this study. Reviewing how other researchers study teacher agency informs my own study in terms of choosing methodologies and methods. I then justify the method and methodology which I selected for my study based on a synthesis of methodologies

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5 All teacher names are pseudonyms
and methods from the literature, the notion of agency in this study, and the research questions. As a reminder, the three research questions are as follows: In the context of the current Chinese curriculum reform, how do physics teachers:

1) exercise individual agency (how is it shaped by and produced the reform environment, and to what effect)?

2) exercise collective agency (how is it shaped by and produced the reform environment, and to what effect)?

3) negotiate the relationships between individual and collective teacher agency?

**How do others study human agency in education?**

Most of the research on agency in education employs qualitative research approaches. Only one study applied mixed methods (Lasky, 2005). Ethnographic fieldwork, teacher narratives, and case studies were the three main methodologies in these studies. Sloan (2006) adopted a critical and reflective ethnographic perspective to study teacher identities and agency. As ethnographic methods often apply in micro-level studies (Shilling, 1992), many ethnographic studies on teacher agency also claim the case study as their research method. Some teachers/researchers employ teacher narrative and autobiographical approaches to describe and reflect on their own agency (Alvine, 1987; Meixner, 2006). As the only mix-method study, Lasky (2005) used interview and survey methods in her study on teacher agency. The survey data provided information about school contexts and interviews provided in-depth discussions of teachers’ professional identity, vulnerability, and agency. In addition, the researchers analyzed ministry documents, school documents, public commentary, education policies, and test reports with the intent to depict a comprehensive context. Lasky adopted a sociocultural perspective on agency. Primacy is placed on social context and cultural tools.
Almost all the studies on agency I reviewed for this thesis employed interviews as the research method (Frost & Durrant, 2002; Goswami & Stillman, 1986; Lane et al., 2003; Paris, 1993; Schweisfurth, 2006; Sloan, 2000, 2006; Turnbull, 2005). Interviews were used to explore teachers’ thoughts, understanding, and opinions. Sloan (2006) also employed focus group interviews with students, administrators, school boarders, and parents. Most interviews were semi-structured in order to elicit conversations (Turnbull, 2005). In teachers’ reflective journals and field observations, as in other major research methods, I suspect, reflection and context are key for understanding teacher agency. One research team analyzed videotaped lessons and student teachers’ portfolios (Lane et al., 2003).

After examining the methods that have been used to assess teacher agency, I further explore why scholars employed such methods. Lasky (2005) adopted a sociocultural approach to agency and stated that the analysis of human agency is to understand how “people do things together in social settings with the cultural tools available to them” (p. 900). Such belief considers the primacy of agency to be first on the socio-cultural plane and then second to the psychological plane. Lasky specified the socio-cultural context into the mandated reform policies, the norms of the schools, and the resources available to teachers. She described the school settings, the reform mandates of the study first by using the government documents, school documents, and public commentary. In addition, the survey method was used to provide information about the school context including teacher background, assignments, and experiments with the new curriculum from teacher’s perspectives. Then, interviews were employed to explore human agency on individual teachers’ psychological plane. As in Lasky, the interview approach in most research on teacher agency is oriented by specific research purposes or questions (Frost & Durrant, 2002; Lane et al., 2003; Lasky, 2005; Paris, 1993; Schweisfurth,
It carries a sense of formality, a sense of getting “data” from participants as if teachers are the ones who possess knowledge and the researchers’ job is to probe and collect these and move the data into the lab and analyze them. In contrast, Alvine (1985), Lane and her colleagues (2003), and Sloan (2006) utilized interview as a way to invite dialogue, to seek meaning through conversation, and to discover themselves (both interviewer and interviewees). The boundaries between researchers and teachers, interviewers and interviewees were vague, and the meanings/data constructed out of the dialogue were evolving and dynamic. The interviews did not strictly follow the interview protocols. Instead, the conversations were “reflective-transfer orientated” (Sloan, 2006). It was a “process of reflect, dialogic engagement” (p. 8) with the participants. Researchers and teachers explored the findings together and negotiated the meanings throughout. Sloan’s (2006) intention was to “present a complex portrait of the varied, even contradictory, ways teachers experience…” (p. 122). He considers agency as embedded in students’ and teachers’ life experiences. Such experiences are informed by curricular and pedagogical practices and complex cognitions. In other words, the researcher nurtures the conversations with teachers in order to construct and provoke the nuances of their life experiences.

Sloan (2006) stressed the long-term observation approach in his study. He claimed that most research data on teachers’ perceptions were gained through survey or interviews, which leave the “varied, even contradictory, ways such systems influence the overall quality and equitability of teachers’ classroom practices” (p. 122) underexplored. The long-term classroom observations and engagement with students and teachers in classroom setting provided a holistic picture of the research contexts. Lane et al. (2003) and Schweisfurth (2006) also employed field observations to provide contexts of their studies.
As reflection/reflexivity is the core property of human agency (Bandura, 2006; Giddens, 1984), teachers’ narratives and teacher reflective journals are widely applied in research on teacher agency (Alvine, 1987; Lane et al., 2003; Meixner, 2006; Sloan, 2006) However, few studies mention why they use teacher reflective journals as data or what teachers reflect upon. Alvine and Meixner use teachers’ narratives describing the changes on them and on their students/peer teachers. Such reflections encompass the research purposes, psychological traits, autobiographic stories, and the social contexts. However, such reflections/narratives often lack theoretical framework, e.g. the definition of agency is not clear.

Only one research study reviewed the historical development of the research context. Paris’ (1993) reviewed the history of the relations between teachers and curriculum in order to situate teachers’ role in a historical context. Goodson (1980) proposed a teacher life history as a new method to confront “the complexity of the schoolteacher as an active agent in making his/her own history” (Goodson & Numan, 2002). Teachers’ narratives, autobiography, interviews, as well as archives studies are major methods of studying teacher life history. By studying teachers through a life history lens, the research outcomes provide insights on educational reform in a collaborative and grounded way (Goodson & Numan, 2002).

To answer the question, “how do others study human agency in education?” the short answer is, not surprisingly, “it depends”. Although different studies employed similar research approaches (interview, observations, reflective journals, etc.), why and how they use it to meet what ends are informed by their research purposes, social contexts, feasibilities and theoretical frameworks. In the next section, I develop the methodology and methods for my study based on the research questions and research context.
How am I going to study human agency?

The notion of agency in my study is mainly informed by two strands of theories, Social Cognitive Theory and Structuration Theory. How the theorists in the two strands propose methodologies informs the generation of methodology in this study. Bandura rejects methodological reductionism e.g., fundamental science will explain phenomena at a higher level. He proposes a plurality of methodologies that could study the emergence at multiple levels (Bandura, 2006). Such belief is also supported by other scholars (e.g. Haggis, 2008; Horn, 2008; Kuhn, 2008; Radford, 2008). The study of human agency should encompass psychological principles, social determinants such as social norms, culture, families, peer relations, school systems, and social-economic life conditions as well as the “the subserving neurobiological principles governing the process of learning” (p. 169). In addition, the study of agency should recognize the investigator’s behavior and thought (Horn, 2008). Hence, Bandura envisions a methodology that could study the complexity of various factors that influence human agency. This methodology does not reduce phenomena to rudimentary relations but focuses on the system-level emergence. Causality is no longer linear; it is multi-factorial (Haggis, 2008) and decentralized in the sense that there is no one cause leading to the effect. In addition, this methodology does not reject particular methods or thoughts. In a sense, it is intimate to phenomenology as it studies the phenomena as it is (Aoki, 2005) and seeks meanings in the life world (Schwandt, 2000).

Bandura’s suggested methodology resonates with Structuration Theory in the sense that meanings are produced and reproduced by human actors in “a continuous manner with the flow of day-to-day conduct in the contexts of social activity” (Giddens, 1984, p. xxii). Giddens asks researchers to pay attention to “what actors are able to say about the conditions of their actions”
which could possibly be a range of significant discursive phenomena. Meanwhile, we must study the practical consciousness, which refers to what agents know about what they do and what they are restricted to do. Therefore, “analyzing the structuration of social systems means studying the modes which such systems, grounded in the knowledgeable activities of situated actors who draw upon rules and resources in the diversity of action contexts, and produced and reproduced in interaction” (p. 25). To be concrete, researchers need to pay attention to the complex skills that actors have in moderating their day-to-day life as well as being sensitive to the time-space constitution of social life.

Giddens (1984) proposes “double hermeneutic” as a way to study about research on structure and agency. When researchers study a field of phenomena:

the condition of ‘entry’ to this field is getting to know what actors already know, and have to know, to ‘go on’ in the daily activities of social life. The concepts that sociological observers invent are ‘second-order’ concepts in so far as they presume certain conceptual capabilities on the part of the actors to whose conduct they refer. But it is in the nature of social science that these can become ‘first-order’ concepts by being appropriated within social life itself…The appropriateness of the term derives from the double process of translation or interpretation which is involved. Sociological descriptions have the task of mediating the frames of meaning within which actors orient their conduct. But such descriptions are interpretative categories which also demand an effort of translation in and out of the frames of meaning involved in sociological theories. (p. 284)

Researchers need to situate themselves in the field and understand the field as the first order. They then might distance themselves in order to generate second order concepts. When people engage with the second order concepts, it is possible for them to situate the second order
concepts into the first order conditions. Therefore, Giddens suggests that research should be written with descriptions of “the cultural milieu to others who are unfamiliar with it” (p. 285). Researchers, as communicators, should generate meanings with a description of its context to others.

The notion of agency and structure in this study is guided by Bandura’s Social Cognitive Theory and Giddens’ Structuration Theory. Both theories reject methodological reductionism and embrace the emergence of methods at multiple levels. Horn (2008) proposes to recognize researcher’s behaviors and thoughts in studying human agency, which enriches Giddens’ double hermeneutic in that researchers not only engage with, abstract, and interpret the social orders, but also acknowledge researchers’ existing values in the research process. In addition, researchers need to provide rich descriptions of the social contexts in which the research participants are embedded. Both theories approach the relationship between human agency and social structure as recursive, continuous, and interactive. Based on the methodological implications of Social Cognitive Theory and Structuration Theory, I employ autoethnography (Jones, 2007; Starr, 2010) as the research methodology to study human agency and social structure because it “link(s) the personal to political” (Jones, 2007, p. 205). I adopt Ellis’ (2004) definition of autoethnography: “[Autoethnography is] research, writing, and method that connect the autobiographical and personal to the cultural and social. This form usually features concrete action, emotion, embodiment, self-consciousness, and introspection … [and] claims the conventions of literary writing” (p. xix).

The “auto” part focuses on my perceptions of physics teacher agency in the school. I acknowledge and reflect on my position, perceptions, reflexivity, action, and existing value and interpret my interactions with participant teachers (Peshkin, 1988). In the process of self-
exploration and self-interrogations, I locate myself in my own history and culture and deepen the understanding of my own values in relations to others (Starr, 2010). The “ethnography” part allowed me to immerse myself in the school, build trust with teachers, and construct meanings together with teachers. In addition, I worked as a teacher during the four months period. The first-hand teaching experience helped me see and reflect upon agency and structure from a teacher’s perspective so that I could present, interpret, and analyze the experience both as a researcher and a teacher. Autoethnography depicts the recursive relationship between agency and structure and create spaces demonstrating the complexity of human actions, social systems, and the interplays between the two. It is “a balancing act” (p. 207) that holds the self and culture together and writes “a world in a state of flux and movement” (p. 207). The research focuses on the interactive voice by examining the researcher’s positions, social locations, interpretations, and personal experiences (Chase, 2008). The autoethnography approach aligns with my own role as both a researcher and a teacher as well as with Giddens’ (1984) double hermeneutics methodology.

The study focuses on physics teachers in one high school. I immerse myself in the school for one term in order to explore how physics teachers act in day-to-day school life. I explore each individual’s agency as well as their collective agency in the curriculum reform. Given the limited funding and resources, I only approached physics teachers in one school and employed qualitative research methods. Interviews, long-term observations, and teachers’ reflective journals were the major research methods.

The interview approach is a “process of reflect, dialogic engagement” (Sloan, 2006, p. 8) with the participants. Physics teachers and I constructed meanings around their agency and the social structure together. The interviews began with their day-to-day teaching practice and then
explored their teaching history, critical events in teaching, how they work with colleagues, and how the complex environments such as school culture, students, parents, administrators, physics textbooks, and reform guidelines influence their teaching practice. The interviews attempted to reveal the four properties of teacher agency: intentions; forethought; self-reactiveness; and reflexivity. Special emphasis was placed on reflexivity. Meanwhile, the interviews also explored the recursive process of how teacher agency produces and reproduces the social system. In other words, not only does the study look at how complex context influences teaching practice, it also examines how teacher’s actions shape the environment and how such a process is situated within a historical context.

The long-term observation and engagement with students and teachers addressed how the environment influences teachers’ practice and also depicted a holistic picture of the research context. The long-term observations provided me with the opportunity to build intimacy with teachers and become familiar with students and administrators in order to gain deeper understandings of the school culture, reduce teachers concerns of “outsiders” and immerse myself as part of the school. The observations were not limited to classroom observations. I also observed teachers meetings, school events, lab activities, workshops and extra-curriculum activities in order to pay attention to the complex day-to-day school life.

As reflexivity and reflection are the most important properties of teacher agency, teachers’ reflective journals were an invaluable data source for this study. I invited teachers to reflect on their teaching practice, centering on how multiple, sometimes even contrasting factors influence their decision making, and how they evaluated various factors and made decisions. I also hoped the reflective journals would reveal the restrictions and motivations of their actions.
Hence, the reflective journal explored the intrapersonal thoughts, the influencing contexts as well as the interactions between the two.

The archives analysis attempted to portray the broader context of the curriculum reform, the history of the school, the local culture related to education, and the history of curriculum reform. It focused on both the current circumstances as well as the historical development of the research contexts. I studied government policies on educational reforms from the founding of the People’s Republic of China in 1949. Archives also include local media’s commentaries and reports on education reform, school reports, and literatures that reported on Chinese curriculum reform.

I became a temporary teacher in the participant school during the data collection phase, which provided me with the opportunity to work with students and involve myself in school activities. The experience of teaching in the same high school contributed to my understanding of teacher agency in my specific study. Through the reflective writing of my thoughts, and experiences, I explored how teacher agency was exercised on me and how I monitored the complex contexts that shaped my decision making.

The various methods applied in this study aim to approach teacher agency from different facets and thus offer a complex picture of agency. The different methods are connected as complementary roles. My own agency and how my agency interacted with participants as well as with the contexts also contributed meanings to the course of study on teacher agency.

Data collection and analysis

Data collection

The data collection started in April 2012 and was completed in September 2012. During this period, I conducted two rounds of interviews, observed all participants’ class, collected
teacher reflections, analyzed relevant documents, worked in the school as a teacher, and wrote my own reflective journals.

After the initial contact and recruitment of teachers, I started the first round of interviews at the beginning of May 2012. The interview protocol was semi-structured and aimed to encourage dialogic engagement (see appendix I). Teachers’ day-to-day practice and their personal/professional histories were the major focus of the first round interviews. The first round interviews also inquired into teachers’ expectations and plans for the term. These questions aimed to explore the four properties of agency proposed by Bandura, intentions, forethought, reactivity, and reflexivity. The interviews also examined teachers’ practice in relation to students, colleagues, administrators, the school culture and the social context.

The second round interviews were conducted in early August, 2012. The interview was based on the observations of their classroom. Teachers were encouraged to talk about their actions, decisions, and reactions in order to connect their intentions with their actions. In addition, the second round interviews encouraged teachers to reflect their practice in relation to the curriculum reform policies. Teachers’ moral beliefs also become one of the interview questions as they reflect teachers’ values and the values carry the personal history.

Both rounds of interviews were audio-recorded and transcribed. Each interview was one hour in duration. All the interviews were conducted in the teachers’ offices, a relatively quiet and safe environment for teachers to talk. I sometimes spoke the local dialect depending on the teacher’s preference. The use of local dialect was to create a relaxed conversation environment. Protocols for both rounds of interview are included in Appendix I.

I observed physics classes, lab activities, teacher meetings, extra-curriculum activities, workshops, and even a graduation ceremony. I obtained teachers’ or the department head’s
permission and made appointments to observe physics classes, lab activities, and teacher meetings. Observations focused on teachers’ behaviors, reactions, and interactions with students. In teachers’ meetings, I focused on the negotiations between individuals, and between individuals and the group. Field notes were recorded during the observations. Some of the second round questions were generated through the observations and field notes. Also, as a temporary teacher, I had opportunities to participate in various school activities including extra-curriculum programs, public lectures, teachers’ sport games, and teachers’ social events.

Interviews and observations, in general, went as planned in terms of the durations, schedules, and locations. Asking the teachers to engage in reflective journaling, and being a temporary physics teacher did not go as planned. Initially, I planned to ask teachers to submit their reflections on a monthly basis. However, almost all participants rejected this idea due to their workload. We finally agreed to submit at least one reflection upon their practice in the reform context. Seven out of ten teachers submitted their reflections. Six teachers sent one reflection, and one teacher sent three reflections. I found it was difficult to have teachers write down their thoughts in the form of reflective journals. Most preferred to talk about their thoughts and experience.

Government policy documents regarding the high school curriculum were collected and analyzed. The history of curriculum reform in China was presented in an earlier section of this chapter. I subscribed to two newspapers to collect commentaries from the media and the society. *Chinese Education* is a national newspaper issued by an affiliated press of MOE. It is a government newspaper that mainly reports government policies, reform progress in different places, and highlights individual schools and principals. The second newspaper, *DaHe* (“Big River”) is a local newspaper for the general public. It has the largest local circulation in the
province. There is a section reporting and discussing education issues in the Saturday issues. Unfortunately, few reports or commentaries appeared in both newspapers with regard to the reform in this particular city during the data collection period.

I planned to become a physics teacher assistant or a temporary physics teacher so that I could, from a physics teacher’s perspective, perceive how the social structure, especially the curriculum reform, influenced my own agency. However, the school administrators considered that, given my experience in a Canadian university, I could contribute more as an English teacher for the international class. In addition, there was no position available in the physics department. I agreed to teach English for the Grade 11 international class. With these compromises, I gave away to a certain extent, my developing an understanding of the entailments in teaching physics curriculum. However, as a teacher, instead of as a teacher assistant, I had more experience engaging with the school culture, students, and peer teachers. I interweave my experience and reflections as a teacher in Chapter four.

Data analysis

The data sources consist of interview transcripts, observations, field-notes, teacher’s reflections, reform policy documents, and the researcher’s reflections collected from May 2012 to August 2012. I use the constant comparative method (Lincoln & Guba, 1985) to analyze the data corpus and develop themes responding to each research question. When I read through the interview transcripts, teacher’s reflective journals, my own reflections, and field notes, I still visualized these teachers in their classroom, in conversations with me or with their students, in staff meetings, and even in the after school basketball games. I perceived these teachers as vivid individuals whose words and actions were so much more than part of a set of data. The transcriptions, reflections, and notes make more sense to me when I associate them with
individual teachers, where they work and live\textsuperscript{6}, and interactions between them. Hence, I provide portraits of selected individual teachers and attempt to present their “image” in front of readers. I, in a way, draw upon qualitative principles of portraiture (Lawrence-Lightfoot & Davis, 2002).

Portraiture is a method of qualitative research that blurs the boundaries of aesthetics and empiricism in an effort to capture the complexity, dynamics, and subtlety of human experience and organizational life. Portraitists seek to record and interpret the perspectives and experience of the people they are studying, documenting their voices and their visions --- their authority, knowledge, and wisdom. The drawing of the portrait is placed in social and cultural context and shaped through dialogue between the portraitist and the subject, each one negotiating the discourse and shaping the evolving image. (p. XV)

During the interviews, the teachers and I constructed meaning together. The interviews allowed, even encouraged conversations about what teachers believed was important to their current practice. I neither attempted to constrain nor lead the conversation. I tried to provide a comfortable atmosphere for conversation. The data analysis approaches also juxtaposed teachers’ portraits, and I employed constant comparative method to present teacher’s profile and stories as well as the social contexts. Atkinson and Delamont (2008) reject the use of one type of data or one approach of analysis as a prime source of social and cultural interpretation. “The forms of analysis should reflect the forms of social life, their diversity should mirror the diversity of cultural forms, and their significance should be in accordance with their social and cultural functions” (p. 288). This is not to celebrate the diversity of analytic approaches. It is, instead, a

\textsuperscript{6} As the main campus located on the skirt of the city, the school provides dorms for teachers. Most participant physics teachers live on campus.
methodological grounded theory or analytic induction (Atkinson, Coffey, & Delamont, 2003) in which analytical approaches emerged from processing the data. The analysis approaches aim to explore a certain aspect(s) of social life and serve to address the research questions. In this case, I explored how teachers evaluated their social surroundings, negotiated with their personal histories, made decisions, took actions, and reflected upon their actions in their professional practice. Teachers’ portraits provided a glimpse into teacher’s personality and history while the constant comparative method generated heuristic themes and patterns (Lincoln & Guba, 1985) around physics teacher agency in the new curriculum reform. In addition, the portraits of teachers also provided a means to integrate my reflection as a researcher as well as a teacher into the analysis.

To be more specific, by using the constant comparative approach, I followed the four stages proposed by Glaser and Strauss (2009). I broke down the data into incidents, coded the data into units, categorized the data by comparing incidents, and then integrated the initial categorized data into three major categories in order to address the three research questions: How do physics teachers exercise individual agency, exercise collective agency, and negotiate the relationships between individual and collective teacher agency in the reform structure? The further articulation and categorization of the data then led to the delimitations of constructions under each research question. At this stage, each theme became saturated (Lincoln & Guba, 1985, p. 343). The themes were then reviewed for overlap and possible relationships in order to achieve homogeneity internally and externally. Data sets were compared and contrasted and unique perspectives and actions were explored to address the research questions (Miles & Huberman, 1994). The aim of this process is “to assemble or reconstruct the data in a meaningful or comprehensible fashion” (Jorgensen, 1989, p. 107).
Finally, each theme and data set was examined through the following four criteria 1) exhaustion of sources; 2) saturation of categories; 3) emergence of regularities; and 4) overextension in order to make a stop collecting and processing decision (Lincoln & Guba, 1985, p. 350). Here coding is a heuristic tool rather than the objective of the analysis (Seidel & Clark, 1984). Coding aims for further investigation of the data. Guided by the research questions and the notion of human agency, the initial coding was around the three major themes, individual agency, collective agency, and the interactions between the two. The further categorizing of each theme generated sub-themes. I drew upon the four properties of agency (Bandura, 2006) to analyze each major theme and attempted to identify teacher’s intention, forethought, reactiveness, and reflexivity. The observation field notes tracked teacher’s actions in their daily practice, which explored and evaluated the recursive process of decision making and action taking, i.e. what teachers intend to do, how teachers make plans, what teachers really do in practice, and why teachers take such actions. Interview transcripts and teacher’s reflective journals were used to not only examine the process of decision making. That is, what internal and external factors influenced teacher’s intentions and actions but also to track the autobiographical history of teachers and of the school. Meanwhile, attention was also paid to teachers’ perceptions of the surrounding environment, and how such social structures shape and are shaped by teachers’ actions. The initial themes were tested by comparing different teacher’s assertions as well as my field notes of observations and my researcher reflections. Lastly, the themes generated from the study were compared to findings in the teacher agency literature in order to test the validity of the results and contribute new perspectives to the literature.

The teachers’ portraits revealed their personal histories, values, reflections, and moral judgments. As Giddens (1984) and Seixas (2001) suggest, human agency entails the individual
history within his/her memory, value system, and morality. And the memory, value system and morality mirror the social structures, traditions, and culture that the individual has experienced. Hence, the portraits contribute to the study of action in a given cultural milieu (Cortazzi, 1993; Czarniawska, 1998). Experiences, memories, emotions, and other apparently personal or private states were constructed through the conversions between participant teachers and the researcher. The analysis, thus, took into account the interactive voice by examining the researcher’s positions, social locations, interpretations, and personal experiences (Chase, 2008) as well. While reading teacher’s stories, researchers (I) make themselves (myself) vulnerable in the text (Behar, 1996; Krieger, 1991). Thoughts, emotions, research relationships and subjective interpretations were included and thus open to the criticism. I needed to understand myself, reflect upon my positions and experiences in order to understand teacher’s narratives and stories. Such analytical approaches, I sense, resonate with the autoethnography methodology. By presenting teachers’ as well as the researcher’s portraits, the interplays between agency and structure are presented to the readers. I hope, with the teachers’ portraits and the constant comparative method, I present a comprehensive picture of teacher agency in the curriculum reform context.

**Ethical considerations**

To ensure my study follows appropriate ethical guidelines, I applied to the UBC Behavioural Ethical Review (BREB) and was approved as a minimal risk study (see appendix II). In accordance with BREB procedures, all participants received a “Consent To Participate” letter outlining the principle investigator(s), the research purposes and processes, and the conditions for partaking and withdrawal from the study. To ensure anonymity and to maintain privacy and confidentiality, I used pseudonyms for all participants. All data were stored on a password-protected computer, and documents were kept in a locked filing cabinet. All data will
be erased five years after the termination of the data collection and study. My research was also approved by school administrators who provided their consent and gave permission for me to enter the school and conduct my research.
Chapter four: Results and discussion

This chapter consists of two major parts: teachers’ portraits, and results and discussion. The teachers’ portraits I include in this section are the outcome of reading through the interview transcripts, teachers’ reflective journals, observation field notes, and my own reflections along with my experience as and memories of being an English teacher during the data collection process. The portraits enable a depiction of teachers as lived individuals and of social settings through those individuals’ experiences. In addition, my own reflections aim to acknowledge my existing perceptions, bias, and value (Peshkin, 1988). The approach echoes Social Cognitive Theory as well as Structuration Theory as it blends multiple research methods in the data analysis process and invites readers to make their own interpretations. The purpose of the portraits is to present teacher profiles as accurately as possible (Denzin & Lincoln, 2008).

Guided by naturalistic inquiry (Lincoln & Guba, 1985), I employed the constant comparative method to generate themes and sub-themes around the three research questions. In the context of the current Chinese curriculum reform, how do these particular physics teachers:

1) exercise individual agency (how is it shaped by and produced the reform environment, and to what effect)?

2) exercise collective agency (how is it shaped by and produced the reform environment, and to what effect)?

3) negotiate the relationships between individual and collective teacher agency?

Employing both approaches aligns with Giddens’ (1984) double hermeneutics which suggests that social studies researchers often extract second-order theories from first-order lived experience. At the same time, such second-order theories also are translated and appropriated
into the first-order life (Giddens, 1984). The portraits illustrate the first order experience while the constant comparative method theorizes the second-order rules. By reading the text and reflecting on the reader’s own experience, such second-order rules are mediated and translated into first-order again.

**Teachers’ portraits**

I use one word to describe selected individual teachers. In these portraits, I articulate both my narratives and the teachers’ narratives. My intention is to present each teacher as a unique person and help readers develop comprehensive perceptions of teachers’ agency.

**Chung---Introspective**

Chung experienced considerable professional frustrations early on in his teaching career. His grandfather was a teacher all his life. Chung was not at all in favor of teaching because in witnessing his grandfather teaching, he came to the conclusion that teaching was a job with many repetitive tasks. In the 1980s, when he graduated from university, Chung aimed to work in the House of Audio-Visual Education Program but was picked by the participating high school in this study. He attempted to switch this job many times since then. “To be honest, I wanted to escape in every summer vacation” (transcript excerpt, Chung 1 p. 1).

However, Chung was not able to change jobs and his frustration worsened. Meanwhile, he discovered that he was a good speaker and explainer. Two skills that are important for teaching. Both his frustrations and the act of teaching gradually dulled his resistance. As time

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7 An institute affiliated with the local education department/bureau. It directs and supports local school to use technology in teaching and learning.

8 In the 1980s, some cities used the “double pick” model to assign job positions. Applicants applied for the positions that they wanted and companies/institutes also picked the employees they wanted. Employment resulted from a combination of application and assignation. It was a special process during the period when China was transitioning from a centralized economic system to the Reform and Open-up policy system.
passed he thought, “if I cannot change the macro-environment, I can change my own mind-set and see if I can adapt to this environment” (transcript excerpt, Chung 1 p. 1). Chung tried to love students and think of them as new computers because he loves computer science. He imagined his students as brand new computers and himself, as the teacher, setting up software in these computers. Then he found every class was different even though the curriculum remained the same. After several years of teaching, he felt that he, together with his students, had accomplished some worthwhile objectives (e.g., high school completion, university entrance). He occasionally received postcards from students, and sometimes, former students visited him to convey their gratitude. For example, some students expressed that his words still benefited them in university. “Moments like these make me realize that I am still of use…, and I stayed and have been teaching for that reason” (p. 1).

Chung then shared with me several examples of his work with individual students. Some suffered from their individual family’s economic conditions and had lost their confidence in learning and in the prospect of entering universities. Some who struggled with physics throughout high school, or were clever but never worked hard. The word “respect” and “trust” often appeared in Chung’s narratives. One student spent most of her high school time only learning physics because she felt Chung respected her and believed she had the potential to do better. Another boy, who was the only one in the class who could not afford a pair of sneakers, used to confront the principal and was left out by most teachers. When the College Entrance Examination (CCE) was only three months away, Chung took charge of this boy and encouraged him to face this exam and prove himself. Three months later, this boy visited Chung and thanked him for being the only teacher who had trusted him to advance to university.
Another of Chung’s students, a girl, had cold feet just one month before the CEE. Sometimes she was too stressed to breathe and to enter the classroom. Her parents wanted to send her abroad and asked Chung’s advice. Chung saw her difficulties as an opportunity to grow. “You could help her escape this time. But she will face countless difficulties in her life. She has to learn how to conquer her fear and face the music,” Chung told her parents. Then he worked with this student every weekend, not on physics problems, but on listening to her thoughts, struggles, fears, and emotions. He told the student to try her best and not think about the results. After the CEE, the girl admitted to Chung that she had amplified the difficulties of the CEE and now had the courage and confidence to face challenges. “Students thank me and I never tell them I should thank them for encouraging me. Teachers need more encouragement” (p. 2).

On his journey from initially disliking the profession to his eventual affection for his students, Chung changed his state of mind and realized the value in teaching, the appreciation from students. However, students have been both his well of encouragement and his source of frustration. As mentioned in Chapter three, the high school had two campuses. The students on the main campus excelled in academic performance while the students on the annex campus did not demonstrate similar scholastic ability. Chung was assigned to teach in the annex campus in 2009. “They froze my passion from head to toe”, said Chung, “one simple problem, which had been discussed in class, they could ask you the same question several times in the tutorial session. I was patient at first, but then lost my temper when they asked so many times. Sometimes their questions were so simple that you felt that it was a negation or even an insult to your teaching” (transcript excerpt Chung 1, pp. 2-3). Last term, Chung experienced his greatest frustration when teaching the Electrostatic Field. Students could not grasp the concept or think it through. Few students submitted their assignments. Both students and teacher were struggling.
Chung even became depressed. Daily, he questioned whether he should be a teacher. He even doubted his own beliefs, values, and pedagogical approaches.

Chung wrote about his frustrations in his reflective journals, especially in his semester reflections of January 2009 and July 2011. In the 2009 reflection, Chung felt he had put a great deal of effort into helping his students, but the test results were barely satisfactory. His reflections centered mostly on the difference between students from the two campuses and how he might change his pedagogical approach to suit the students he presently taught. Although he expressed some frustrations, the reflection was mostly positive. He saw the challenges but focused more on hope. He ended this reflection with sentences such as the following: “I believe, after days and years of work, even concrete grounds can grow high quality crops” (Teacher reflections, Chung 1, p. 2).

In Chung’s 2011 reflection, however, his tone and the content had completed changed. He stated that he often doubted his efforts and approaches. He called his students “God’s outcasts” who are like reefs that had shattered his waves of hope and confidences into sprays. Interestingly, at the very end, he referred again to the concrete ground and crops metaphor. He wrote “…it is like growing crops on concrete grounds even if one waters them again and again, one still hardly harvests anything” (Teacher reflections, Chung 2, p. 2). Chung did not realize his depression had extended to and was reflected in his emotions, until one day, a colleague told him that his temper had changed. Chung then started to reflect upon his behaviors and manage his emotions. “I talked to other teachers about this issue, played badminton with them and tried to let these negative emotions gradually out” (p. 3).

Chung also went to a Buddhist concert during this period hoping to calm his mind. The visit was fortuitous because Chung was not a Buddhist, and the ticket was given to him by his
friend. He ended up going to the same concert three times. The first time he felt he wanted to become a monk. The second time he wanted to stay in the temple for the rest of his life, away from secular affairs. The third time, “I found I still would love to come back to school and help more people. It is a Zen process of escape from the world—retreat—back into the world” (transcript excerpt Chung 1, p. 3). The concert shocked Chung and the religious music helped him reach an epiphany. “Then I thought these students were still growing. I needed to help them. The frustrations were not frustrations anymore” (p. 3). Buddhism, as one of the three main philosophies that shaped and nurtured Chinese social and cultural traditions, “understands the educated man as an enlightened man” (Zhang & Zhong, 2003, p. 260). In other words, Buddhism encourages people to pursue the spiritual ideals from within oneself. Buddhism perceives the world as changeable and intangible. The only thing we can do is “to know our own mind, discover our nature, and attain the moment of enlightenment in seeing Buddha” (p. 259).

When I interviewed Chung in 2012, his state of mind had improved. He told me: “When I started to work with this class, about one fifth of the students fell asleep in physics class, but now very few students sleep in physics class. After two years, they have changed a lot…and they seem happy in my class” (Transcript excerpt, Chung 1, p. 2 & p. 4). Chung’s descriptions are consistent with my classroom observations. The most impressive aspect of his teaching is the breadth of his knowledge base. He associated physics with Hollywood movies, weather changes, soccer, painting authentication, and Mars exploration. Such topics drew students’ interests in the class, and students actively participated in discussions with him and with other students. The student-teacher relationship was friendly and encouraged discussion. Chung was active, even enthusiastic in class and barely needed to attend to classroom management. “When you cannot
change the environment, change your state of mind, change the people you are social with. That’s it” (p. 4).

**Wong---Jaded**

Wong, like Chung, is a Grade 11 physics teacher on the annex campus. She transferred from the main campus two years ago. Unlike Chung who found a way to vent his frustrations, Wong seemed to still be struggling with the transition of students. She also referred to herself as being in a “profession burnout period”. She explained that, “[I am] more experienced now but [have] lost the passion that I had when I just entered this profession” (Transcripts excerpt, Wong 1, p. 1). It was her seventh year of teaching. She chose to teach because it was a stable profession. Her experience with the annex campus students in the past two years was hardly satisfying. She often compared the students from the main campus and the annex campus in the following ways: attitudes towards knowledge; learning habits; and sentimental attachments.

Wong mentioned one recent unsuccessful lesson when she taught the wave-particle dualism of light. This lesson was more about the history of optical physics. She spent the entire class period explaining the development of scientists’ research and various conceptions of the nature of lights. At the very end, she told the students that this lesson was only for their interest, and that the CEE does not test this section of the curriculum. “Then students said, ‘you should’ve mentioned this earlier. Otherwise we wouldn’t have paid so much attention.’ You see, if I had told them at the beginning, few students would have paid attention to my class” (Transcript excerpt, Wong 1, p. 2). Although one may blame students’ attitude toward knowledge, this scenario also reflects one of the conflicts between the CEE and the new curriculum reform. The new curriculum was designed to let student re-experience the scientific inquiry process by adding the history of physics and thus nurture students’ scientific thinking and longing for
science. “Students obviously have no interest in the parts that are not tested in the CEE” (Transcript excerpt, Wong 1, p. 2).

According to Wong, not only did the new curriculum conflict with the CEE, it also conflicted with traditional ways of schooling where knowledge is delivered by teachers in Grades one through nine. At the high school level (Grade 10-12), the new physics curriculum involves a large segment of inquiry learning. Wong found this learning approach inefficient. For example, Wong believed not every topic in physics is suitable for inquiry learning. Also, in her view, students still retained their junior high school learning habits, which was in opposition to the inquiry approach and thus affected their participation in class and their assignments.

“Students work very hard and get very tired. But most of the time they do not know their purpose of learning. And teachers are tired, too” (Transcript excerpt, Wong, p. 3).

Although Wong experienced a great sense of achievement and respect when her previous students visited her, in her comments concerning current students she expressed disappointment. “Teaching is not a one party business. It is not just teacher’s job. I never had a cohort like this one. My previous students, even if they did not appreciate your teaching, they acknowledged your efforts. But my current students are not like that” (Transcript excerpts, Wong 1, p. 4-5).

One can sense the tension or indifferences between teacher and students in Wong’s class. Although Wong blamed students for this situation, I feel Wong was also partly responsible. Her lectures seemed dry and without passion. Students rarely asked questions or answered her questions. She did not seem very positive towards her class and even I, as an observer, sometimes wished the class would end sooner because of the atmosphere.
**Don---Success**

As one of the two Distinguished Teacher\(^9\) in the physics department, Don was, by definition, a successful teacher. He had taught physics for almost thirty years, and he specialized in the physics Olympiad contest training. In this field, he had a nation-wide reputation. Don found value in teaching by witnessing his students’ success. It was the source of his sense of achievement:

The first is to see them (students) earn prizes (in physics contests); the second is to see them go to fine universities; furthermore, it is to see whether they can get American university scholarships. I feel achieved when they get prizes and go to fine universities. Although some students might not get the first rank prizes in competitions, when they take the CEE, they still enter elite universities. Simply put, my achievement comes from their achievements (Transcript excerpts, Don 1 & 2, p. 1).

Don had all his students’ achievements at his fingertips. He proudly listed several student names, their ranks in various physics competitions, which universities they attended, and whether they received scholarships. Some students graduated in 2003, which was a decade ago, and Don narrated their accomplishments as if they had occurred yesterday. His enjoyment of teaching the competition class grew with his teaching experience. Although he admitted teaching the competition class was not without pressure, he considered these students gifted and possessing positive learning attitudes. He remarked to me, “It comes with a great sense of achievement”.

\(^9\) The “Distinguished Teacher” is an honorable title for outstanding elementary and secondary teachers. It is nominated by schools, evaluated by municipal education department, approved by provincial government, and put on record at the central government. Thus, it is a very prestigious title.
Don’s professional life was full of, according to Don, “history-making”. When Don graduated from university, he was assigned to a high school in his hometown. It was a high school in a remote area with poor facilities and low student achievement. He thought teaching seemed like a stable job, and he took charge of two Grade 12 classes. One of the classes outperformed all other classes in his county on the CEE. In the previous year, not one single student in his high school enrolled in university, while there were six students in his class who successfully entered universities. “In our county, there are two key high schools and our school was the underdog, but my class performed better than any class in those two key schools. I was awarded by the Outstanding Teacher by the county and was the youngest among all the Outstanding Teachers. It was such a tremendous encouragement to me” (Transcripts excerpts, Don 1 & 2, p. 2). Several years later, Don worked in one of those key schools in his county and helped a student earned a second rank prize in a provincial physics competition. “It was the first student who earned a second rank prize in the school’s history” (p. 2). Then, Don started worked at his current school. His first competition class earned seventeen first rank prizes, which was the highest number in this school’s history. Don’s interests in teaching sprung from his success, which came from students’ success in exams.

Don also had his regrets. In 2006, his class excelled in the physics competition. His 2009 and 2012 classes, however, did not do as well. “Nobody in these classes was recruited by the national team” (Transcript excerpts, Don 1 & 2, p. 6). “Getting students into the national team is my goal for competition training. The training for Grade 2009 and 2012 was not as intense as Grade 2006, although the 09 and 12 students were as talented as those 06. I gave them assignments, but they did not do them and I did not punish them for that. Hence they did not achieve as well. They did much fewer physics problems” (p. 7).
It seems that Don’s obsession with student achievement is the result of the encouragement and compliments he received early in his career. In addition, Don believed that his devotion to physics competition training was for the greater good because he understood physics and student creativity to be the key pillars of a stronger nation. Creativity and physics promise a brighter future for China. Therefore, helping student succeed in physics means building a stronger country. He mentioned a diplomatic conflict between the Philippines and China, which was concurrent with my data collection period. China yielded in the diplomatic conflict and Don remarked that if China had been stronger, the situation would have gone otherwise. “…so what I can do for this country is to cultivate student creativity and curiosity. (and make China) cope with this era” (Transcript excerpts, Don 1 & 2, p. 3).

Interestingly, contributing to the country is a theme that was also mentioned in another teacher’s (Tang) interview. Tang, as the other Distinguished Teacher in the physics department, also had thirty years’ teaching experience. I wonder if the specific time period both teachers experienced had an influence on their values of teaching and thus their agency. This theme will be discussed later in this chapter.

Don also had a school-wide reputation among students for his tough training style in his physics competition classes. Some students commented that he was “not a very skillful teacher but only relies on a huge amount of practice and problems”. Students had a love-hate relationship with him. They admired him for his experience in helping students achieve competition prizes and disliked him for his dull lectures, lack of holidays, and insurmountable assignments.

Hu---Art

One phrase Hu often used during the interview was “the art of teaching”, which is an area she was currently exploring and pursuing. For Hu, the art of teaching referred to the refining of
language, the forging of one’s distinctive teaching style, and the stimulation of student involvement in physics class. The art of teaching lies in “making a regular lesson into a show in which students applaud you spontaneously” (Transcript excerpts, Hu 1, p. 1). From 2003 to 2006, she completed a master’s degree in education at a normal university in Beijing. The three-year graduate school experience seemed to be a milestone in her career and had an impact on her perceptions of teaching, thoughts on being a teacher, and implementation of the reform.

Having taught for seventeen years, Hu used to think teaching focused on knowledge. “If I can clarify this point, deliver the knowledge of this lesson, and make the knowledge understood by students, then I felt a sense of achievement. After three-years of graduate school training, oddly, teaching became more difficult to me. When I studied pedagogy in graduate school, I felt that forging the art of teaching and teachers’ professional competences were what I should work on” (p. 1). Hu used singing opera as a metaphor for teaching. “At first, singing opera is about memorizing the lines. If one can memorize the lines and recite them smoothly, it should be fine. It’s easy. But the more you sing, the harder it becomes. It’s not just about reciting lines. It’s about your nature and personality. You must act like your character but at the same time people can find your signature in your acting…why is Xiangyu Chang the best performer? The same lines, nobody sings as well as she does” (Transcript excerpts, Hu 1 p. 1 and Hu 2 p. 5).

Hu’s new challenges in teaching became how to transform plain content into a lesson of enchantment and how to connect physics knowledge with other disciplines, topics, and daily life. “Plain content’, according to Hu, was content that only involved either one or two formulas or was rarely tested in the CEE. Usually students were not interested in spending time on such chapters because they were either simple to memorize or irrelevant to the CEE. Most teachers treated this plain content in a dull way, but Hu, saw a challenge in teaching this content. “Before
I had studied pedagogy, I was never aware this (teaching plain content) could be a challenge. Even though I had been teaching for a long time, sometimes you require a certain mind-set. Since my mind-set was switched, I also made some changes in action” (Transcript excerpts, Hu 1, p. 1). Hu was the only teacher who observed other teachers’ classes as often as I did and she was the only experienced teacher who still observed other teachers’ classes. “When I observe classes, I focus on their pedagogy, how other teachers organize their instructional language, and one or two shining sentences that might inspire the class. I feel these might be useful for my future teaching” (p. 1). For Hu, teaching plain content required more consideration of the introduction, the use of language, weaving humor into instruction, the ways in which to make a lesson interesting, and thus attracting students’ attention. Hu strove to make students interested in physics for its own sake rather than for the test score they might obtain.

In trying to make her lessons interesting, Hu found she needed to broaden the breadth of her lessons and to connect knowledge in other disciplines and in daily life to physics. She used a Chinese idiom “深入浅出 (shen ru qian chu)” (means one needs to dig deeply in order to simplify the profound) to envision her teaching. She deemed she spent the first decade of her teaching career working on the “digging deeply” part as she mastered the structure of high school physics knowledge. During this study, she was working on the “simplify the profound” part, in which she made an effort to help students more easily grasp the essence of physics knowledge. She used metaphors and analogy to connect physics to students’ existing knowledge in other disciplines and to their experience in daily life (Nashon, 2004). Hu discovered physics in pop song lyrics and poems, which softened the hardness and coldness of science and made physics more approachable and appealing to her students. “The key is to get students interested in this subject. Even though I gave them fewer assignments, and they did not always submit their
assignments on time, the two classes that I taught did well in various tests” (Transcript excerpts, Hu 1, p. 3). Fewer assignments for students, however, became more preparation work for Hu. In addition to the instructional language and content organization that she constantly worked on, Hu spent time on expanding her horizons in various disciplines such as university physics, cutting edge technologies, chemistry, biology, pop culture, and literature.

Along with her transformed perceptions on teaching, her views of being a teacher changed after graduate school. Hu categorized teachers’ professional competences into subject matter knowledge and other competencies. As a physics teacher, one must be very familiar with high school physics knowledge and possess a knowledge base larger than the physics taught at a high school level. This knowledge base should include the applications and theoretical extensions of high school physics, modern physics, and knowledge that relates to physics. Other professional competencies comprise cultivating students’ scientific views, fostering their spirit of exploration, their curiosity of the unknowns, and their rigors towards research. “When I was in graduate school, I surveyed teacher’s professional competencies. Many teachers’ awareness of professional competencies were limited to subject matter knowledge. Mostly they focused on delivering the textbook knowledge and solving problems in exercise books” (Transcript excerpts, Hu 1, p. 1). Then Hu started to pay attention to other teacher professional competencies. However, these other professional skills were more complex than the act of delivering knowledge. She decided to incorporate other competencies into her teacher practice. Hu attempted to become a role model and hoped that she could influence students. “Mr. Tang’s (another physics teacher and research participant) students almost worship him because they are often impressed by his solid knowledge foundation, his sense of humor, and his passion for physics. Maybe some of his students will continue to study physics in their future” (p. 2). Hu felt
that she needed to extend her reading outside of physics so that students might “maybe not worship me, but get interested in my class” (p. 2).

In addition to the influence of her graduate school experience, Hu’s shifts in professional attitude was also triggered by a memorable event. One student skipped math class several times, and the math teacher suggested that Hu call the student’s parents as Hu was the class advisor. Hu made the phone call and reported the student’s absence to his parents. Then, around mid-night, Hu received a phone call saying that the student had left home and that his parents could not find him. The parents finally located their child, and Hu learned that, later on when the child’s father discovered he had skipped classes, he was angry and got drunk. He then beat both the child and his mother. The child left home and stayed away until mid-night. Even though this case happened years ago, Hu still felt sorry for the student and guilty. “It was caused by my phone call. Well, even though there was nothing wrong with making that phone call, that’s what a teacher usually does when students skip classes … but, on the other hand, if I have known his father’s situation, I would have talked to this child first rather than call his parents” (Transcript excerpts, Hu 1, p. 3).

This case left a scar upon Hu. Rethinking student-teacher relationships radically affected her conception of being a teacher. She realized that student-teacher relationships are not peripheral to teaching. Teachers must also pay attention to students’ lives beyond school walls. Teachers are responsible to report students’ academic performance to their parents. Although, sometimes the means of communication hold the potential to damage constructive suggestions. Hu discovered that children are able to sense whether her communication with them was genuine or not. “You need to like these children from the bottom of your heart. They can sense whether your emotions are genuine. Then, these children are willing to accept your suggestions or even
criticism because they know you have acted for their own good” (Transcript excerpts, Hu 1, p. 3). Years before, even though her classes’ academic performance was good, Hu felt a distance between her and her students. “You know they said hi to you out of manners rather than intention” (p. 4). Presently, when I observed her class, students were relaxed but engaged. Students felt free to ask questions in her lecture. One time, a student stood up during the lecture. Later I learned that there is an agreement that students who feel sleepy are at liberty to stand up. She used many forms of interactions in class, including eye contact. Hu found students not only have knowledge needs from teachers but also emotional needs. “Children need your recognition, your encouragement, and your appreciation” (p. 5).

Her shift of perspective regarding the implementation of the curriculum reform was a result of her graduate school experience. Most teachers held the opinion that textbooks and curriculum reforms were designed and proposed by experts and high-ranking scholars. Hence, teachers tended to follow the textbooks and curriculum and rarely critically challenged them. Hu’s graduate school experience afforded her the opportunity to work closely with the “experts and scholars,” which “secularized the saints” and empowered Hu. Graduate school helped her to see the limits of high school teachers, and she came to believe that most teachers only focused on knowledge delivery and problem solving skills in exams. Due to her more than ten years’ teaching experience, Hu also saw the limits of university researchers and faculties. Hu used the term “ivory tower” to refer to her supervisor’s research. “They do not often go to high schools and see what’s going on there. The research they do thus breaks away from high schools, which leads to a derailment between curriculum reform and high school teaching and learning activities” (Transcript excerpts, Hu 2, p. 2). Hu believes that high school teachers do not always fully capture textbook designers’ intentions and thus do not make the most out of the textbook
and the reform; whereas textbook designers are not familiar with current high school students and their cognitive attributes. Thus, sometimes high school teachers feel reform tasks are irrelevant and disconnected from their teaching.

Hu suggested that I, as a researcher, look for research questions from schools, observe school classes, and listen to teachers’ struggles and bewilderments rather than create research questions in an ivory tower setting. Through her teaching language, her connecting physics knowledge to daily life, her involvement of other disciplinary knowledge, her sincerity towards her students, Hu synthesized the multiple needs of students, parents, administrators, reform designers, and the society into her art of teaching.

Wen---Isolated

Wen’s physics teaching is different from that of most other physics teachers in the school. He is the class advisor/coach of the Grade 11 physics Olympiad competition class, which means he teaches a group of students who are designated gifted in physics using a self-designed curriculum. The physics competition class aims to help students become eligible for “direct admission” to universities. The direct admission system started in 1988. It allows post-secondary institutes to enroll gifted students who do well in the competition without their taking the CEE (Zheng, 2002). The enrollment criteria are that students must win science, mathematics, information technology, or sports competitions at the provincial level or above. Many students who are interested in mathematics and science but want to avoid the competition of CEE often choose to compete for direct admission. Even though the high school curriculum has been changed several times, such changes do not affect the competition system. Wen still used the physics competition curriculum and thus had few interactions with his colleagues in terms of discussing daily practice.
Wen’s daily work routine was quite different from his fellow teachers. While other physics teachers struggled with pedagogy, student-teacher relationships, and accommodating the new curriculum, Wen spent most of his time developing curriculum for his Olympiad competition class. Unlike the general physics curriculum, which was issued by the Ministry of Education, the physics competition curriculum did not have an official version. Competition teachers developed their own curriculum for students. They were in the minority in schools and had very limited curriculum when compared with other physics teachers. In addition, the competition content often touched on university mathematics and physics which created even higher barriers for collaboration with other physics teachers. Traditionally, physics competition teachers relied on previous test questions and a few exercise books to develop the curriculum. Wen was described by one of his colleagues as “buried in his office cubicle and designing and solving exercise problems day-in and day-out… Sometimes he spends hours in front of his laptop just to draw a graph for an exercise problem” (Transcript excerpts, Zu 1, p. 2).

These challenges seemed to motivate Wen as well. While most other teachers sought help from fellow teachers in the same discipline, Wen had to think outside the box. He collaborated with math competition teachers to help him teach higher mathematics. He invited university professors to deliver lectures and sent students for short-term training in universities. He obtained materials from Hong Kong University (HKU) to enrich his class. The Internet has opened up possibilities for Wen to go further. Every Saturday, Wen showed students an open physics course from international elite universities such as Yale and MIT. “I think their classes are really good. They have very sophisticated lab facilities and do wonderful experiments. There are also some simple but interesting experiments that even we can do in our class…we plan to watch plenty of these courses next year” (Transcript excerpts, Wen 2, p. 1). With convenience
comes new challenges, and one challenge for Wen’s students was translation. “The open courses are all in English. Sometimes there is no or less proper translations/subtitles. Then students would lose their interest … The materials from HKU --- there is no answer key so I have to figure out each and every problem myself” (Transcript excerpts, Wen 2, pp. 1-3). Wen was baffled by the challenges as much as he enjoyed them. “Sometimes I struggled with a problem for the entire day and two weeks later, I suddenly got it. It’s a pain as well as a pleasure” (p. 2).

I asked, “Why do you choose to teach the physics competition?” Wen replied, “Multiple reasons”. Wen’s middle school and high school teachers were pivotal in his decision to become a physics teacher. “Their lessons were very interesting. They touched a lot of cases in daily life…I still remember that my high school teacher brought an ‘erhu’ (a traditional Chinese music instrument) to class and talked about sound. It was so impressive” (Transcript excerpts, Wen 1, p. 1). He was one of the elite physics students in his high school and had several friends together to study physics. “Even now, we still work in fields related to physics” (p. 1).

While his interest in physics launched his teaching career, the interactions with colleagues and students sustained Wen’s commitment to this profession. His teaching career started with an apprenticeship with Chiang who was presently teaching in Shanghai. “I just graduated from a normal university and thought teaching was to transmit knowledge to students…I found Chiang’s class was like a magnet attracting student attention … I found I have learned a lot from Chiang and had a lot of fun” (Transcript excerpts, Wen 1, p. 1) Similar to many other teachers, Wen also sensed the value of teaching from students’ expressions of appreciation. “I often play basketball with students and we barely have gaps in communication. When they graduated, they hugged me. It felt really good” (p. 1).
In the first few years of Wen’s career, however, the idea of giving up often occurred to him because students and parents did not appreciate his efforts especially when he dealt with misbehaving students. As a new teacher, he was not very patient with students and became easily frustrated. Then he talked to the principal and the department head a few times and they provided a supportive environment for him. Later on, he became a father and this transition also affected his perspective of students. “Now I have a child, I feel different when I see students’ misbehaviors. They are children, too. I can understand now” (Transcript excerpts, Wen 1, p. 2). It appears that Wen’s passion for physics had not faded from his middle school years, but his relationships with students had experienced many ups and downs.

Like Don, Wen enjoyed working with competition class because students are “…very bright and their minds are very active … Although many students in this class are aiming for direct admission, there are still some students who are here just for the joy of learning physics … Sometimes students have had heated discussions concerning physics models and they have even tried to solve extra problems in addition to those in their assignments” (Transcript excerpts, Wen 2, pp. 2-3).

As much as Wen enjoyed teaching the competition class, this class might have been his last physics competition class. The competition system in China is facing a crisis. As it offers a channel to universities without taking the CEE, the system has been tainted by corruption and cheating, which has resulted in many talented students working hard in vain. Beginning in 2014, high school Olympiad competition winners will not be qualified for direct admissions (Ministry of Education, PR. China, 2013). In general, Wen believed the advantages of direct admission outweighed the disadvantages. “I think the system has powerfully motivated an elite education. It’s a nice way to select outstanding students … students are smart, self-disciplined and hard-
working … Universities and employers love these students because they are elite in terms of intelligence, habit, and potential … we could change (the corruption)” (pp. 2-4).

Wen’s teaching has been heavily shaped by the competition system. His class was more exam-oriented, filled with lectures, practice, and mock tests because eventually students would attend the provincial and national physics competitions, which are exams. In this setting, test skills outweighed interest in physics. Wen was isolated in the sense that he lacked his peer physics teachers’ professional support; this isolation was caused by the parallel systems in high school physics. He seemed powerless in the face of imminent changes in the system even though he was in favor of the current system. The isolation, however, enabled him to make connections beyond his school and reach out to colleagues even at an international level. The emotional support from colleagues, administrators, and students maintained his dedication to teaching.

**Tang---Traditional**

Tang had the longest teaching experience of all the study participants. He was the physics department head and the other Distinguished Teacher along with Don. He was well respected among teachers and was Hu’s role model. Hu called herself a fan of Tang’s because she often audited Tang’s class. Tang was considered a traditionalist because he had “a red heart,” which means he had orthodox ideas, advocates government policies, and propagated the communist party’s ideology. In addition, he was prudent and serious about teaching and remained humble in his relationships with colleagues and other people. His class notes on the chalkboard were neatly organized with beautiful handwriting and clear structure. His lesson plans were well written, full of detail, and updated every year while many younger teachers only reused or rarely updated their lesson plans. He always briefed me about his lesson and the students before I entered his class to do an observation. In class, he often encouraged his students to devote themselves to
science development and overcome the challenges in physics learning, for the sake of the revival of China. He spoke of this with such a passion that students often applauded him. He sometimes used Marxist dialectic and Mao’s philosophy to interpret some physics conceptions. Most students would laugh at such speeches, but much of the time they were very engaged by his lectures. He considered the curriculum reform a very necessary movement that had great potential in the long term because “it suits China’s current conditions, undermines the traditional class structure, and centers around student development” (Transcript excerpts, Tang 1, p. 1).

The two Distinguished Teachers in the school each had approximately thirty years of teaching experience. When they began their teaching careers, the Chinese economic structure was in the process of transferring from a planned to a market economy. Mao’s thoughts were still influential in society. Both teachers were assigned to teaching positions but both became dedicated to this profession. Even though Tang thought of changing careers and tried other positions, he discovered that teaching was already part of his life. “It’s inertia. People also have inertias. In addition, doing other jobs helped me realize that I got a great deal of satisfaction from delivering knowledge to students” (Transcript excerpts, Tang 1, p. 1). While most teachers believed that adopting the new curriculum was beneficial to student well-being, both Tang and Don believed the new curriculum’s value lay in its potential to contribute to China’s development. Teaching physics might encourage students to pursue science. With many talented people working in science, China’s science and technology would advance at a faster pace. In Tang and Don’s conception, China would become a stronger nation as a result of a more solid science and technological foundation. Thus, they felt implementing the curriculum reform was their personal contribution to the country’s advancement.
Zu---Passion

Interestingly, Zu is the only teacher in this study who became a teacher because he loves teaching. The other participating teachers were either assigned to the teaching profession or teaching was their only choice. None of Zu’s family member was a teacher, and he did not think anyone influenced him to become a teacher. “I just loved it, from a very young age” (Transcript excerpts, Zu 1, p. 1). He applied to only one university, Northeast Normal University, with the aim of becoming a teacher. Many people around him did not understand his choice because he could have been admitted into more prestigious universities. “But I think I made the correct decision because one should choose a career that he/she likes. I did not think of the workload; I did not think of the income; I just liked it. In fact, I think happiness is doing what you like doing. So teaching is my happiness” (p. 1). For Zu, the two most enjoyable things about teaching were that students were engaged in his class and paid attention to his lectures. Through communication, he helped students see and appreciate the love and care that teachers, parents, and people around them provided. “They should learn to be grateful to their parents and society. My conversations and communications with students about such themes are more meaningful, significant, and valuable than teaching a lesson” (p. 2).

Zu had strong beliefs concerning his teaching and his pedagogy. He tended to remain with his own teaching strategies and course of progress and often refused to comply with group decisions or even the reform mandates. “I am not a qualified teacher in terms of implementing the curriculum reform according to the national mandates. Although I use the new version of textbooks, I still teach many units in traditional ways because of the CEE. For parents and students, they care about getting into universities. Even though personally I think the reform is
good … but student’s grades and test scores are crucial in my teaching” (Transcript excerpts, Zu 1, pp. 2-3).

Zu also had different opinions concerning ordering exercise books. Each grade ordered exercise books for students at the beginning of each term. While other teachers agreed to order two exercise books, Zu insisted on ordering only one exercise book for each of his students because he preferred having students study one exercise book in depth rather than assigning them too many physics problems that they might find impossible to absorb. As a result, Zu only ordered one exercise book per student while the other instructors used two exercise books. His teaching timeline was two weeks ahead of the other teachers because he liked to leave more time for students to review Grade 11 content in order to get ready for Grade 12.

Zu is confident in his teaching. “I think my teaching style, my pedagogy and the content I teach are correct and proper. From a practical perspective, I can help students achieve” (Transcript excerpts, Zu 1, p. 6). He used the word “smooth” to describe his criteria for correct and proper. “If students acquire knowledge smoothly or if I feel smooth in my teaching, then it is right” (p. 6). Zu’s physical appearance altered perceptibly when he was teaching. During interviews and conversations, he was small in shape and his voice was soft. However, when he was in class, he gave the impression of being a giant with a strong, passionate, and convincing voice. I think his independence or even assertiveness in teaching practice was a result of his confidence in his professional skills, and his confidence emerged from of his love of teaching and care for students.

**Researcher and teacher**

My engagement with teachers encouraged me to describe several teachers’ profiles as, I believe these descriptions reveal teachers’ life stories, memories, and values in a fluid form
rather than a fragmented one. I wish to present participant teachers as vivid individuals rather than abstract knowledge claims. Employing authoethnographic approach, I am both a researcher and a teacher in the data collection process. As a researcher, I interviewed teachers, observed teachers and their practice, attended staff meetings, collected teachers’ reflections and wrote reflective journals. As a teacher, I was responsible for a Grade 11 class and carried out a typical English teacher’s daily practice\textsuperscript{10}. My dual identities in this research project enable me to acknowledge my position, perceptions, reflexivity and actions in the study as well as “connect the personal to the cultural and social” (Ellis, 2004, p.xix). In presenting teachers’ profiles, my reflections of their stories, along with my reflections of my four months’ teaching experience, I intend to weave intricate connections among emotions and reflections, experience and theory, evocation and explanations … and “hope for readers who will bring the same careful attention to your words in the context of their own lives” (Jones, 2007, p.208).

My mom used to complain to my dad and me, “it’s so hard to prepare a meal for the family. Sometimes you eat up everything and still aren’t full. Other times, I prepared some more, and you leave a lot of leftovers.” Although I understood every single word, these words just slipped out of my mind. Now I have a family and sometimes prepare meals for my wife and me. One day, I said exactly the same thing. Then I realized, “I never really understand my mom until this moment.” I also realized that true understanding often emerges from a common experience. This is the reason that I decided to also serve as a teacher in this study; to put myself in a teacher’s position and obtain in depth understandings of the negotiations, conflicts, struggles, achievements and memorable moments in teaching.

\begin{flushright}
\textsuperscript{10} As discussed in Chapter 3, one of the research compromise is that I teach English rather than physics in the same school.
\end{flushright}
Lesson plan

I went to the school as a researcher and a PhD student from a prestigious university in Canada. When I told the school administrators that I would also like to be a teacher or teaching assistant, they were pleased, and I was quickly enrolled into the school’s teacher training program. I needed to develop the entire semester’s lesson plans and complete several rounds of trial lessons in front of other teachers and administrators in this program. At the beginning, I did not take the program seriously as I was arrogant. “It’s just high school English”. However, after several trial lessons, the department head still did not allow me to teach actual classes. I could not understand his reasoning and lost my patience. I confronted him about the matter. He said my knowledge foundation, classroom management, and teaching manners were fine but my lesson plans were too abstract. Then, I said, “it is only high school level English. How can I have detailed lesson plans for simple things like this?” He then took me to his office and shared his lesson plan with me. I was embarrassed by his lesson plans because he had been in this field for more than a decade and his lesson plans were five times thicker than mine. His attitude towards teaching dispelled my arrogance and ignorance.

This experience also resonated with the interview I had with Zao, a Grade 12 physics teacher with seven years’ teaching experience. “There are many elites [physics teachers] on this team. The two Distinguished Teachers --- Don has nation-wide fame for competition training; Tang’s students have very strong problem-solving skills; Gao never stops from learning from others and is now completing a PhD in the United States. These colleagues motivate, even push you to be rigorous and serious about your work because you have to think about how you can keep up with the team. The only way is to improve yourself and maximize your potential …” (Transcript excerpts, Zao 1, p. 1). The following week, I thoroughly revised my lesson plans.
These lesson plans ultimately saved my classes several times, especially on those occasions when I had taught all the content I had initially intended for a specific class and still had time leftover. My detailed preparation enabled me to forge ahead, teaching students additional concepts or elaborating more comprehensively on those topics just discussed.

**Responsibility**

The first time I stood on the podium in that school, I suddenly realized that I was on my own. I had mixed feelings. I was in charge and responsible for all my students’ English performance. Although I felt empowered because I could make decisions regarding curriculum and pedagogy for the four months period. I also felt vulnerable because if anything went wrong I would probably be the one to be blamed. It was totally different from observing other people teaching or collecting data from a classroom setting. The responsibility both strengthened and worried me, motivated and intimidated me, cheered me and cautioned me. After the entire process of teacher training, I originally felt like I had just passed a series of tests and could do as I wished. Then, as I realized my responsibility, I thought for the first time about what I should teach the class, and the ways in which I might help my students and make a difference in their lives.

**Pointless teaching**

The participant school utilized a student feedback system to evaluate teachers. The English department head collected feedback from my students after my first few lessons. The students’ responses suggested my lessons were pointless and lacked practical and concrete skills. Students did not believe that my lessons would be very helpful to them for passing the IELTS
and TOFEL\textsuperscript{11} tests so that they might enter international universities. I was upset about such feedback and felt my students had not appreciated my efforts. I explained to the department head that what I was attempting to deliver was learning skills, logical thinking, and attitudes towards English, which could benefit students in the long term. I did not want to just focus on passing one or several exams.

“But you have to understand that’s all THEY want from you”, said Lee, the English department head. He continued, “The IELTS and TOEFL tests are the major barriers for students to enter international universities. Chinese high school English is far from enough for them to pass the tests and their time is short. You need to understand your students from their perspectives first and then design your lessons.”

I borrowed Lee’s lesson plans again and carefully went through them. The plans touched details that surprised me and also reminded me how I had studied English while I was a high school student. I remembered feeling that there were so many words whose meanings I did not know and that English sentence structures were so strange. It was nothing like Chinese. Then Lee’s detailed lesson plans made more sense to me. He broke down an IELTS mini essay into sentences and demonstrated step-by-step instructions for writing each sentence. He shared an inventory of words that were often used in IELTS and TOEFL writing. I used to despise such strategies, as they were skills specifically designed to pass the test rather than truly learn the English language. However, once I attempted to see these skills from the students’ perspectives, I started to appreciate the “test skills” because they were practical and calmed and focused students when they were only three or four months away from the exams.

\textsuperscript{11} IELTS, International English Language Testing System. TOEFL, Test of English as a Foreign Language.
At the same time, I still want to integrate logical thinking, learning skills, and learning attitudes into test skills. After my discussion with Lee, I modified my teaching strategies by starting the lesson with assuring students that they would be able to pass the tests. The lectures focused on analysis of the exams and strategies to deal with various problems with minimal efforts. At the same time, I stressed the importance of persistence, reading extensively, and using English as much as possible. I believed my students would appreciate my efforts in the long term because most of them aimed to attend international universities and would probably have similar experience to mine in terms of improving their English.

Although my class did not need to follow the new curriculum as much as other classes did, I emphasized learning skills, logical thinking, and proper attitudes that were in accordance with the curriculum reform. The reform encouraged students to develop learning attitudes and values via my English class while weakening the emphasis on examination skills and rote learning. My own experience learning English convinced me to use the curriculum reform goals in my classroom. However, when I implemented my beliefs about learning English and they conflicted with my students’ interests, I compromised and adjusted my actions to meet students’ needs first, also managing to address the reform mandates and my personal beliefs. Experienced colleagues helped me to understand my students’ perspectives and modeled concrete strategies for me to make changes. Students accused my teaching of being pointless, which precipitated my realization that changes needed to be made. After evaluating the various needs from students, the school, the reform and myself, I developed plans to address them. Experienced colleagues provided me with the tangible means to enable changes in my behaviour to implement the plans.
Talk

I was invited to give a talk at one of the physics department meetings. Tang, the department head, asked me to talk about the “advanced educational thoughts” that I had learned in Canada. He introduced me as an important, erudite educator, which totally humbled me. I briefly talked about constructivism, meta-cognition, and professional learning communities, but the teachers did not appear to be interested in any of these concepts. Then, I opened up the Q & A session. Teachers asked me about the differences between Chinese and Canadian classrooms, textbooks, and university enrolment systems. Teachers were especially interested in the differences between the university enrolment systems. They asked detailed questions regarding the university admissions process in Canada, from high school graduation to the ways in which students accepted admission offers and constantly compared the pros and cons of this process to the Chinese system. The discussions took much longer than I had anticipated. Teachers were as much motivated as they were constrained by the CEE system in China and were curious about alternative approaches in other countries and cultures.

Rewards

Almost all (nine out of ten) teachers mentioned that student growth, achievements, and appreciation motivated them to stay and devote themselves to teaching. During my four months’ teaching practice, I also experienced such appreciation.

Bo, a student of my international class had obtained conditional admission from a British university when I started teaching the international class; the condition was that he obtain a minimum of 5.5 in his IELTS score. Writing was his major challenge. He was one month away from the test, and he was in a panic. Bo worked very hard. He did not just finish homework but also did extra work. He monopolized most of my office hours with questions and requests for
feedback. I sometimes had to work extra hours to answer his questions and read his writings samples. The week before his test, he was absent for two days working in his dorm. I sensed he might have put too much pressure on himself and managed to talk to him before the test. I summarized those items he needed to note on the test, tried to relieve his stress, and encouraged him to look beyond the test. He did not return to class after the IELTS test.

Three weeks later, I received a phone call from Bo. His voice was filled with excitement: “I passed, teacher. I cannot believe it! It’s real, right? They (the IELTS) wouldn’t change my mark, would they?” After I assured him that the grade he received was official and would not be changed, he said, “I want to treat you to a lunch when I get back.” At that moment, real happiness emerged from the bottom of my heart. This euphoric feeling lasted for days and when I recall the event, it still seems like yesterday.

**My reflections**

This section included my reflections on the teachers who were part of my study and on myself as a teacher and a researcher. I considered these reflections as “a space for dialogue and debate” (Denzin & Lincoln, 2008, p. 50). It is retrospective sense making --- studying of my and other teachers’ past experiences (Chase, 2008). The stories I have told about myself and others are representations of lived experience (Denzin & Lincoln, 2008) and, by and through these stories, I have attempted to “present, explain, entertain, inform, defend, complain, and confirm or challenge” (Chase, 2008, p.65) physics teachers’ agency in the Chinese curriculum reform context. The stories were enabled and constrained by communities, organizational and social settings, cultural and historical locations and circumstances as presented in teachers’ portraits. In addition, the stories were interactive performances (Chase, 2008). Although I am the narrator, I constructed the stories by engaging with physics teachers, administrators, students, parents,
media, and the reform. At the same time, I invite readers to connect the stories to theirs and thus produce the meanings together through engaging and connecting the stories in this study with their own experiences.

I began my reflections wondering why I was so keen on portraying individual physics teachers. My first thought was that it was for the sake of my research report because, as Giddens (1984) noted, human social activities lay in “neither the experience of the individual actor nor the existence of any form of societal totality” (p. 2). Agency and structure are interwoven and recursive. By presenting individual profiles, I was able to describe physics teachers within their social settings and circumstances, thus reducing the separation between agency and structure. My second thought was that readers might have a glimpse of the ways in which teacher agency in this setting was generated, developed, performed, constrained, and transformed through viewing teachers’ stories. A third thought was that there is something about these teachers that touched me and propelled me to share my engagements with them. Their motivations in teaching, in other words, things that made them start and stay in this profession, encouraged me to depict them as human beings rather than research data. Their motivations were embedded in the values they saw in teaching. Sometimes I did not understand or even resist such motivations at first. As time passed and as I gained more experience in the actual school, I began to comprehend each teacher’s intentions and the motivations behind them.

Don’s motivations emerged from his students’ success. His definition of success, however, was different from mine. Don felt a sense of achievement when his students were enrolled in elite domestic and international universities, received scholarships, and earned awards. When he said that during the interview, several questions occurred to me---Is going to elite universities the only standard of measuring success? Is that a high school student’s only
value? Why does the barometer of success not include students’ happiness, self-realization, or development into human beings whom others appreciate for their own sake? I did not bring up these questions to challenge Don. I wrote down these thoughts in my reflection journal and asked them to myself. Why did such questions sprout in my mind? A part of me felt I should have admired Don’s dedication to his students. When I was a high school student, the only thing that I probably ever dreamed of was going to an elite university. And what Don was doing was helping students reach their dream. Then why would I have doubts about his beliefs and deeds?

There is a flip side to this dream-achieving process. I also recall my pale high school life buried in piles of exercise sheets, practice books, and papers. My personal regrets of not having a more colorful high school life floated through my mind when Don said he should have been stricter with his students. My teenage years lacked impulsiveness and rebellion; rather, they were characterized by compliance with teacher and parental expectations. I often wished I could have spent more of my teenage years traveling, reading non-textbooks, loving, and making mistakes. But at the same time, these wishes are retrospective, which means they might not be what I wished to do when I was a teenager. They are what the “current I” hopes the “teenaged I” could do. In other words, these thoughts are the result of a decade’s experience, during which time I attended an average Chinese undergraduate school and, later, a prestigious international graduate school in the field of education, and acquired some teaching experience. I do not believe getting into elite universities should be the criteria for a student’s success. Thus exam skills are not as crucial as they have been emphasized in the Chinese context. An elite university should not be the ultimate goal of a student. There are things such as recognizing oneself, community engagement and service, and compassion that, in my view, are more important than an elite university diploma. That, in retrospect, is perhaps why I attempted to focus on learning skills,
attitudes, and logical thinking in my class and why I diluted exam-related skills, problem solving, and knowledge-delivery.

My intention, as the first property of human agency (Bandura, 2006), was generated by my own beliefs in teaching (logical thinking, attitude, and persistence are more important than exam skills). These teaching beliefs are a blend of my personal experience in learning English, my experience in an international university, and my perspectives about what is important in education. I have struggled with English learning from middle school. As a hard-worker, I positioned myself as an above average English learner in the Chinese context. Once I started graduate school in Canada, I realized that English was no longer a subject; rather, it was real life. One has to live and breathe English. Thus, examinations are neither the end nor the parameter of learning English if one aims to study abroad. A life-long learning attitude, persistence, logical thinking, and curiosity would help students more in terms of adapting to living in international universities located in cultural settings different from one’s own.

Likewise, Don’s intentions were also produced by his personal experience, especially his successful experiences. His passion for teaching resulted from his first year’s experience teaching. His class achieved the highest score in the CEE in the county, and he became the youngest award recipient for excellent teachers in that year. He had many “first in the history” titles and earned his national reputation through helping students succeed in the CEE and in physics competitions. His sense of achievement came from student success and this sense of achievement gradually became what he valued in teaching.

I planned lessons based on my intentions and expected that students would benefit from and appreciate my teaching. I carried out the planned teaching and modified my plans based on student reactions. My expectations, anticipation, and execution together constitute the second
property of human agency, which is forethought (Bandura, 2006). Bandura argued that forethought could be defined as cognitive representations that visualize goals and anticipate outcomes. Goals and outcomes are depicted in an agent’s consciousness, which are a production of one’s social-historical experience and current circumstances (Giddens, 1984). A human agent’s forethought also includes self-guided behaviors and interventions to the current circumstances. While I was planning my first lesson, curriculum reform requirements in English, discussions in the teacher training program, and observations of other teachers’ classes all came to mind. The responsibility laid on my shoulders stimulated my search for and evaluations of the past relevant experiences and predicted possible encounters and outcomes for my class. In the end, my beliefs regarding learning attitudes, learning skills, and logical thinking rose above other factors and became the theme for my lesson planning and instructions.

Student feedback was a wake-up call for me. At first I was upset and frustrated. I felt my efforts were not appreciated, and students did not realize or understand the essence of English learning. The feedback I received initiated adjustments to my pedagogical approach. The feedback triggered the third property of agency, self-reactiveness which is the “ability to construct appropriate courses of action and to motivate and regulate their execution” (Bandura, 2006, p. 165). When outcomes are different from expectations and anticipations, agents often experience frustrations from the environment’s reactions rather than from self-doubts regarding their own actions. When Wen started his career, he was impatient towards and frustrated by students’ misbehaviors. His feelings of being not understood and not appreciated almost drove him to quit teaching. Similarly, when Wong and Chung were assigned to the non-main campus to teach, both of them experienced frustrations from their students’ responses and test scores.
Chung once compared teaching these students to growing crops on a concrete floor, and Wong was still in a jaded state concerning her teaching.

The teaching profession is a collaborative course of action, which requires shared responsibility and contributions from students. When teachers implement actions in class, students, also as agents, received such actions with their own values, beliefs, intentions, and expectations. The actions students received may differ from or even conflict with their own beliefs and expectations. Students may be confused or frustrated as well when such conflicts happen. Naturally, students will respond with appropriate reactions, expressing their confusions and frustrations. If teachers neither adjust their teaching practice nor transform students’ values and beliefs, conflicts and frustrations may worsen and cause teacher attritions. In my case, my beliefs concerning learning attitudes, learning skills, and logical thinking conflicted with students’ expectations of learning exam skills and exam-related knowledge. In Chung and Wang’s case, they did not anticipate the differences between the main campus students and the annex campus students and still applied the same teaching approaches to the annex campus students and, as a result, received different responses and results. In Wen’s case, his impatience may have stimulated student rebellion, and, this in turn caused Wen’s frustration because he did not feel appreciated by his students. Therefore, teaching is a process of reconciling different values and perspectives between teachers and students.

After agents execute and regulate their actions and interventions (which are guided by their intentions), the surroundings react and respond to these actions. Agents receive and process the immediate environment’s reactions and re-evaluate their previous actions, which produces the fourth property of agency, self-reflectiveness (Bandura, 2006). Both Bandura and Giddens considered reflexivity the core property of human agency. Giddens (1984) defined reflexivity as
“the monitored character of the ongoing flow of social life…which human beings display and expect others to display” (p. 3). The constant monitoring and examining of oneself and social life is a metacognitive capability that human beings distinctively possess (Bandura, 2006). The feedback from environments and surroundings, especially negative feedback are often the stimuli of an agent’s self-reflectiveness. In my case, students’ complaints about my pointless lectures shocked me and forced me to re-evaluate my actions. In Chung’s case, it was student performance in assignments and tests. In Wen’s case, he was demoralized by students’ responses to his handling of student’s behaviors. Both Wen and I managed to talk to colleagues and administrators about our frustration which was an “inevitable phase in teaching” according to Don (Transcript excerpt, Wen 1, p. 2). In addition, becoming a father extended Wen’s paternal love to his students. Wen soothed his feelings of failure by becoming more tolerant of young people’s actions. He believed that they were still young and immature. Rebellion was part of their psyche. Lee, an experienced teacher and department head, helped me to see the students’ perspective, which initiated my recollection of my own high school experience and led to understanding my current students’ expectations. For Chung, the Buddhist music concerts purified and composed his mind, which helped him comb through his thoughts, unwind his vexation, and realize his value for students.

The frustrations and struggles originated from the intersection of different values and expectations of teachers and students. Reactiveness helped teachers become aware of such differences. Self-reflectiveness, in addition, is the key for teachers to understand and see from their students’ perspectives, eventually shifting teachers’ thoughts and actions. In this process, teachers are often in need of external influences to prevent them from becoming trapped by their frustration and enable them to think of approaches for improvements.
The process through which teachers gain understandings of students’ perspectives is an accumulation of the agent’s knowledgeability which refers to “all those things which the members of the society know about that society and the conditions of their activity within it” (Giddens, 1994, p. 9). In this study, the enlargement of knowledgeability was achieved through self-reflectiveness, by which teachers regained their efficacy, negotiated their intentions, and executed their actions. As Bandura stated, “human function is a product of a reciprocal interplay of intrapersonal, behavioral, and environmental determinants” (Bandura, 1986, p. 32). The circle of an agent’s actions consists of four properties of human agency. Each property is interwoven with the individual’s consciousness, personal values and beliefs, interactions among individual agents, and interplays between individuals and environments. The key point, to me, is the reconciliations of various values and beliefs among different individuals. Otherwise the change of action is not sincere and will not last.

I did not systemically consider the value of teaching until I had the responsibility to teach a class. I tried to collect and sift memories of past classroom experiences, as a student, as an observer and as a teacher. Then I recalled relevant information and perspectives that I acquired in graduate school. I developed my own teaching approaches and curriculum content based on my past experience and current beliefs about teaching. Once I received positive feedback from students, their appreciation confirmed and consolidated my efforts and beliefs about teaching. Positive feedback from students, either from their test performance or from communication enhances teachers’ values, strategies, and actions. Such feedback maintains teachers’ motivation in teaching and more importantly, endorses teachers’ beliefs about teaching. For example, Don’s success confirmed his belief about rote memorization and redundant practice. When Don’s students did not perform well in competitions or exams, Don tended to blame their lack of
practice. When Zu realized that his words might affect a student’s growth and even had an impact on a student’s life, he weighed communication with students over knowledge delivery. My own beliefs concerning teaching also shifted due to my student’s touching phone call to say thank you. I did not insist on learning skills, attitudes, and logical thinking. Instead, I integrated exam skills into teaching.

Interestingly, the ongoing curriculum reform did not have much of an impact on my planning and implementation when teaching the international class nor on many of the participant teachers. I was neither required to implement the curriculum reform nor did I receive any instructions or opportunities to attend workshops. The main reason for this is that international class students do not need to take the CEE and thus they do not necessarily use the official textbooks as learning materials. Even for the teachers I interviewed, the curriculum reform’s influences was exerted mainly through textbooks and administrators’ recommendations. The participant teachers rarely mentioned the curriculum reform when we discussed factors that influenced their teaching. In teachers’ portraits, the reform was scarcely discussed. When teachers were asked specifically about their views on the reform, some teachers claimed that they were supporters of the reform while others, honestly admitted that the reform had limited impact on their daily practice. Similar to my experience, teachers were influenced more by their students than the curriculum reform. But, the CEE still played a leading role in shaping teachers’ selection of curriculum and pedagogy. In competition classes and international classes, teachers and students were also oriented by exams such as the provincial/national physics competition, IELTS, and TOEFL.

The exam-oriented culture is still prevalent in the Chinese high school education and its influence is beyond the CEE system. Teachers were interested in hearing about and seeking
alternatives for the CEE. When I introduced the Canadian university enrolment system, teachers engaged in prolonged discussions and asked detailed questions during the department meeting. Some teachers expressed how the CEE was a major barrier to the curriculum reform and to quality education in China (Dello-Iacovo, 2009). They even suggested a few possible alternatives to replace the current CEE. When it came to the Chinese physics Olympiad where the original intentions is to “cultivate student’s motivations and interests in physics, improve student’s learning skills…” (Chinese Physical Society, 1997), physics competition class in schools still fell under the influence of an exam oriented approach. Likewise, the international class, whose purpose is to send students to international universities, was also driven by a different sort of exam, even though many international universities do not require an exam score at enrolment. Here I do not intend to trace the exam history and culture from ancient past to present. I would like to offer a personal account showcasing my own experience of transferring from quality education to exam education.

When I started teaching in the international class, my lecture was described as pointless because the content was not sufficiently exam-oriented. I was surprised that such an allegation came from students rather than administrators or parents, as students were often depicted as the victims of the exam-driven system. Why would students, as victims of a test-oriented system, make a significant effort to prepare for the English tests?

First, students associated a high test score with a promising future. In my case, a high English test score almost equaled admission to elite universities. The importance of high English test scores had been over emphasized in the Chinese context. I informed students that their English test scores would only make them eligible to put forward an application to universities, and that their high school transcripts, community service, and demonstrated leadership were
elements that would also distinguish them from others applicants. Even though they were aware of this, students remained overly concerned about test scores and skills. In addition, there were thousands of commercial advertisement boards in the city on the streets posted by tutoring centers trumpeting the importance of these test scores and “secret skills” that would “guarantee” students to pass. Casual conversation among students often centered on information about tests. Someone who had received a high score was often invited to share their successful experience, whereas someone who had failed was often belittled. Many parents talked to me about their concerns about their children’s English test score. My voice was faint among all the other voices.

Second, short-term test scores seem more concrete than long-term learning skills and attitudes. Taking my Grade 11 class as an example, if students wish to be enrolled by universities right after their high school graduation, they needed to send out applications before their Grade 12 winter term (February-June), which means students need to take their English tests before January. When I took over the class, many students were only two or three months away from their tests. They had a concrete score to reach and expected a concrete plan from me. Learning attitudes and skills seemingly were not needed in this pressure-cooker situation.

In the school, students evaluated teachers. If I had insisted on emphasizing learning skills, attitudes, and logical thinking, students probably would have given me a low score, which could have jeopardized my teaching job. When teachers talked about why the CEE constrains the implementation of curriculum reform, one might argue that was that society, parents, and prospective students may judge a high school based on its CEE performance rather than its reform implementation. If a school cannot maintain its high performance results on the CEE, it loses its social recognition, ranking, external funding, and excellent prospective students.
The curriculum reform seems to have had less effect on teaching than the test-driven system. Although many consider the CEE as the culprit that prevents reform of Chinese education, it appears that even without the CEE, students, parents, and teachers tended to think about and structure education in terms of exams. This issue will be discussed further in the next section.

**Summary**

This section presented selected teachers’ portraits and the themes that stood out when I examined their interviews and reflections. My experience, as a researcher as well as a teacher, was also depicted in terms of the crisis, achievements, and major events during my four months of professional development, teaching, and researching. The intention of this section was to draft an overview of the participants, the school, and school events. I invited readers to connect with and reflect on their own experiences and stories in order to understand and contribute to physics teachers’ agency in the ongoing Chinese curriculum reform. Although I did not explicitly address the three research questions in this section, the teachers’ portraits blended how individual and collective agencies produced and were shaped by the reform, the CEE, students, peers, and administrators within teachers’ profiles. The text attempted to convey the emergence of, development of, and change in teacher agency. In the next section, I employ the constant comparative method to present research data in terms of themes. In this way, I intertwine, echo, and advance ideas presented in this section through different analytical approaches that seek to understand teacher agency.

**Results**

In this section, I employed a constant comparative method (Lincoln & Guba, 1985) as an analytical tool to interpret my engagement with teachers and the school. I have described the
constant comparative method in detail in Chapter three. I constructed themes and sub-themes guided by the three research questions: In the context of the current Chinese curriculum reform, how do physics teachers:

1) exercise individual agency (how is it shaped by and produced the reform environment, and to what effect)?
2) exercise collective agency (how is it shaped by and produced the reform environment, and to what effect)?
3) negotiate the relationships between individual and collective teacher agency?

For each research question, I outline the themes and sub-themes that emerged and support each theme with quotes from interview transcripts, teachers’ reflections, observation notes, and researcher reflections. Where applicable, I intertwine my findings with relevant literature.

**Individual agency**

Research question one: *How do physics teachers exercise individual agency in the context of the current Chinese curriculum reforms.*

Two themes emerged from data analysis relating to individual physics teacher agency.

i. Personal history, currency, and moral standards influence teacher agency.

ii. Students appear to be catalytic\(^{12}\) to manifestation of physics teachers’ agency.

In the following section, I present, analyze, and discuss the data related to each theme.

\(^{12}\) I use the word catalytic in its chemistry sense. Students can enable/constrain teachers’ awareness/assessments of the surrounding environment and thus influence teachers’ agency. Meanwhile, students are agents as well. They cannot be categorized into structure. They are the catalysis, participate in the reaction but not consumed by the chemical reaction.
History, currency, and moral standards

History

Teachers’ personal experiences influence their actions. Important individuals in teachers’ lives, memorable events in their teaching practices, and major life changes all have an impact on teachers’ evaluation of the surroundings and choice of action, especially in the curriculum reform context. The reform proposed a series of extensive and thorough changes regarding seven aspects of pre-collegiate education (Zhu, 2002), which can be overwhelming to teachers (Erickson et al., 2009). The curriculum mandates developed by policy makers and university scholars are sometimes abstract and vague for in-service teachers. Most of the physics teachers interpreted and narrowed the reform mandates to “leave the class to students to guide” and “employing inquiry-based approaches” (Transcript excerpt, Tang, 2, p. 1). However, many teachers are not clear about what a class guided by students using inquiry-based approaches look like or what the specific approaches and strategies should be employed in a student-centered class. Some teachers referred to their past experience of an inquiry-based class.

Researcher: how to you convert the reform requirements into practice?

Don: It was, after all, a matter of questions, who posed the questions and who first answered the questions, whether the questions were asked by teachers or teachers elicited questions from students, whether the teacher gave the answers or led students to find the answers.

Researcher: What factors help you realize that it was a matter of asking questions?

Don: It probably had something to do with my personal experience. My high school physics teacher, Mr. Lu, his class was very active. His class structure was basically the current reform required class structure, consisting of questions – he presented questions
one after another and students constantly posed questions as well. Students were actively engaged in thinking throughout the entire lesson. I observed his class every week after I became a teacher, which enhanced my belief in this class structure. I strived to recreate this kind of atmosphere in my class. (Transcript excerpt, Don 1, p. 4)

Like Don, many other teachers also referred to their own middle school teachers or their school advisors\textsuperscript{13} when start teaching. Wen thought of his high school physics teacher as well as his school advisor’s class when he developed his own lessons.

Our school has the apprenticeship system. My first master was Mr. Chiang… Chiang’s class was VERY interesting. His lesson mixed physics history, method, and knowledge. He stood there, did not even look at the textbook, and used his voice and facial expressions to elicit students’ enthusiasm. As a teacher, I started to think about how I could also make student interested in my class… Even now I still think of what I have learnt from Chiang. (Transcript excerpt, Wen 1, p. 1-2)

Hao’s approaches and attitudes towards student-teacher relationships were influenced by two of her middle school English teachers. “I like their personalities, and attitudes towards students, which made me adore this profession…Even though each student has distinct characteristics, my creed is to always treat students with sincerity and honesty” (Transcript excerpt, Hao 1, p. 1).

Zao’s father, who was a teacher, had “significant influence” on Zao’s attitudes towards teaching.

\textsuperscript{13} A more experienced teacher acting as a mentor for new teachers.
When I was in university, I somewhat yearned to become a teacher and was a bit fond of teaching. After I became teacher, I was dedicated and strived to become an excellent teacher… Some of my high school teachers influenced me but my father has had the most significant influence. (Transcript excerpt, Zao 1, p. 1)

On the contrary, Chung’s grandfather, also a teacher, almost kept Chung away from teaching because “it is quite annoying to see him constantly repeat things all his life” (Transcript excerpt, Chung 1, p. 1). Such negative impressions made Chung’s first three years of teaching a period of “wishing to escape from this school” (p. 1).

Memorable events in teaching imprinted teacher’s understanding of the requirements of the profession and thus shaped teacher’s actions in practice. As discussed previously, Hu experienced a case where one of her students was beaten by his father as a direct result of her informing the student’s parents that he had skipped classes. In response, Hu re-assessed her approach to student-teacher relations. Chung found the value of being a teacher after helping several struggling students to grow. Several teachers received expressions of gratitude from individual students, whereby they discovered the value in their work.

Memorable events also included incidents that were not explicitly associated with teachers’ practice. Chung’s fortuitous engagement with Buddhist music concerts calmed his mind, caused him to interrogate his value as a human being, and assisted him in transcending his struggles. This process helped him to realize that he still wanted to be in the school and help students, and that the existing problems were not as troublesome or disturbing as he had thought. He regained his confidence and patience in teaching via an introspective transformation.

Major life changes, even though they sometimes seem irrelevant to teaching, expanded teachers’ understanding of their profession. Both Hao and Wen were new parents during the
interview. The maternal and paternal love that had sprung up from this major life change expanded to their students as well.

Before becoming a mother, sometimes I still felt I was a child. Sometimes I even was mad at students. After becoming a mother, the maternal love expanded to students because they are children. I am more responsible and tolerant in front of them.

(Transcript excerpt, Hao 2, p. 6)

Tang quit teaching and did administration work because he found little meaning in teaching. The new position was “cozy” but had less sense of achievement than teaching. “In the school, facing students and passing on some knowledge to them made me feel dependable and satisfied. I found I was suited for teaching when I left the teaching position” (Transcript excerpt, Tang 1, p. 1). The three-year graduate school experience was evidently Hu’s watershed in her teaching career. She referred to the graduate school experience frequently when she commented on the reform, her teaching beliefs, and her practice in class. Unlike Don and Tang whose models of “a reformed class” were generated from memories of their own teachers or school advisors, the reformed class in Hu’s mind came from her practica in several schools in Beijing during her master’s study.

I did my practicums in Beijing No. 4 Middle School and Beijing Normal University Affiliated Middle School\(^\text{14}\). They have very good lab facilities and the class size is around forty students. Students took the lead and inquired about physics principles in class. In our school with the lab equipment, the experiment results were often rough, from which students could not abstract principles and thus lost interests in inquiry. Plus we had

\(^{14}\) Two of the top middle schools in China.
seventy students in a classroom and had higher pressure from the CEE. So I feel in order to implement the reform, each region and each school should work with what they have”. (Transcript excerpt, Hu 1, p. 7)

The graduate school experience also offered Hu opportunities to work with professors and scholars who were involved in reform design and development. As an experienced teacher, she saw the gap existing between reform theories and practice and strived to bridge such gaps in her pursuit of the art of teaching.

Although I focus on teachers’ personal histories in this section, personal histories are embedded in the broader history of Chinese society. Another aspect of contemporary Chinese history that has had an impact on teachers has been the decentralization process. In Chapter three, I briefly reviewed the decentralization of the Chinese economy and curriculum administration since the founding of the P.R. of China in 1949. Economic decentralization gradually propelled the decentralization of many other aspects of Chinese society, including curriculum administration and people’s beliefs concerning education. A shift in beliefs about education was evident in both the comments teachers made during my interviews with them and in their actions in the classrooms, which I observed. Both Tang and Don have been teachers for approximately thirty years and Chung became a teacher 20 years ago. They have lived through the transition from centralized social system modeled on that of the former Soviet Union and Mao’s collective ideology to the current system based on a market economy and influenced by the infusion of Western thought, especially the concept of individualism. These teachers have a value system that, in part, reflects the centralized system. Both Tang and Don believed that the

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15 The province has a larger student population and a lower university admission quota than Beijing and thus the school has higher pressure from the CEE than schools in Beijing.
purpose of teaching physics is to train excellent physicists who will advance the scientific and technological development of China, thereby contributing to China’s strength as a nation. In other words, their educational purpose leans towards collective wellbeing and is influenced, perhaps, by a hint of cold war competition. Chung has used both the “Soviet Union version textbooks” and “the US. version textbooks” and in his conversations with me highlighted the differences between the two.

The Soviet Union version textbooks focused on knowledge, theory, and inference. The Soviet Union model first works through theories and then designs experiments. Whereas the US. version textbooks stress experiments. They like to use experiments to solve problems. They tried different strategies and used various devices until the problem was solved. Two systems and two ways of thinking. We used to use the Soviet Union version for eight or nine years. Very high quality book (Transcript excerpts, Chung 2, p. 3).

It appears that Chung was still in favor of the “Soviet Union version textbook”, theories, and knowledge rather than inquiry and experiments. Tang also commented on the “Chinese nurturing education and the American heuristic education”.

The Chinese nurturing education is a lecture-based education whereas the American heuristic education is inquiry-based education. Adopting the heuristic education does not mean a complete negation of nurturing education. Chinese students have solid knowledge foundation but are less creative compared to US students. The point is to integrate the both and encourage students to actively learn. (Transcript excerpts, Tang 2, p. 1)

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16 In Chung’s own terms (Transcript excerpts, Chung 2, p. 3). The “Soviet Union textbooks” refer to the physics books used in the 1980s and 1990s. The textbooks mimicked Soviet Union’s physics books according to Chung. The “US. version textbooks” refer to the current textbooks which are influenced by the US. physics textbooks.
Teachers like Chung and Tang have experienced the transitions of Chinese society in the past two or three decades. Their experiences have granted them more comprehensive perspectives, enabling them to more fully grasp the implications of the current curriculum reform and adjust their teaching actions based on their past experience and current mandates. The contemporary history enriched their evaluations and decision-makings facing the reform mandates.

On the other hand, the younger teachers I interviewed who have less than ten years’ teaching experience focused their pedagogical efforts more on the growth of individual students rather than the future of the nation or knowledge delivery. Many of them believed that “becoming a righteous person” is far more important than “attaining a high test score”. None of the young teachers mentioned or associated the nation’s advancement with their own teaching practice. The current curriculum reform has stronger influence on their teaching as it is the only curriculum that they have ever used.

When I was graduated, the new curriculum had just been implemented. I haven’t touched the old curriculum. I felt it was easy to teach using the new curriculum. You need a daily life case as an introduction, then lead students to experience some experiments, and then teach the new lesson. It’s more practical than hollow lecturing. So I support this reform and am looking forward to more breakthroughs from this reform. (Transcript excerpts, Yue 1 & 2, p. 1)

Informed by curriculum reform and the social changes in China, teachers’ pedagogical ideas reflect the societal, cultural, and political trends they have encountered during their lifetimes.

Situating teachers in their own personal historical contexts has facilitated my demonstration of the development of their agency. Important figures, memorable events in teaching, and major life changes in teachers’ lives influence the ways in which they teach,
interact with students, and implement the reform. In addition, social changes and their influence on education have also left marks on teachers’ memories.

**Currency**

I define currency as the current structures, rules, and systems that have exercised influences on teachers’ choice of actions in daily practice. Currency is used in the sense of the instantiations of organized sets of rules and resources in social systems (Giddens, 1984). Even though such instantiations are embedded in specific historical contexts, it is the recursive feature that is important here. In other words, currency indicates the presence of recursive rules and social structures in teacher’s practice. Although Giddens’ definition is broad, in this study, I employ the notion of recursive rules and social structures in daily practices. Thus, this section outlines the ways in which the rules and resources that physics teachers constantly drew on in their situated context have shaped their behaviors in teaching. Not surprisingly, two major structures emerged during my data analysis: the College Entrance Examination (CEE) and the current curriculum reform. All the teachers in this study seemed to seek ways to negotiate between through the requirements of the CEE and the reform, and balance the multiple requirements generated from the two. Most teachers considered many of the CEE and reform requirements to be in opposition to each other. “Treading on thin ice” was the expression they used to describe the caution they exercised when applying the requirements to their teaching practice.

Even though teachers complained about the pressures and constraints that the CEE created in their teaching, they agreed that the current examination system was the most feasible and effective mechanism for screening applicants to post-secondary institutions. Teachers were
aware that the CEE is the fairest selection vehicle in terms of narrowing the gap between the rich and the poor. Students who come from various social-economic backgrounds use the same sets of exams and the same criteria. It is also the most economical form of nation-wide assessment in terms of the amount of human and material resources utilized. “Given the large student population, qualities of universities, and students’ future careers, you have to deal with the CEE” (Transcript excerpts, Chung 2, p. 1). In addition, the CEE performance has a long, entrenched history as the single most important societal standard with which to evaluate a high school. “For parents and for our school, they only focus on one single aspect, the school’s admission rate to universities” (Transcript excerpts, Zu 1, p. 2). “The bar of CEE rather than the reform intentions are recognized by society” (Transcript excerpts, Chung 2, p. 1). “In order to maintain the school’s ranking, we have to use ‘practice teaching’ (train students through intense practice). To put it bluntly, ‘practice teaching’ is to deal with the exams…If Grade 12 students do not perform well in exams, parents would be unhappy. The school’s reputation would diminish in the community’s eyes, which is not consistent with the ‘key school’ title” (Transcript excerpts, Don, p. 3). Therefore, many teachers confessed that they prioritized students’ test performance and test skills in their teaching practice. “It was determined by the current circumstances in China, by the entire social environment” (Transcript excerpts, Zu 1, p. 3).

The curriculum reform as a nation-wide curriculum movement has also exerted its influence on physics teachers’ practice. Most teachers have politically supported the reform, as indicated by their praise of the reform’s intentions even though teachers may vary in their comprehensions of the reform’s intentions. Tang believed the reform was a “must” in the long term, especially for students. Tang understood the reform as an attempt to “seek the balance between Chinese nurturing education and the American heuristic education” (Transcript excerpts,
Tang 2, p. 1). Don perceived the reform aim as the cultivation of students’ creativity and exploratory nature which could “make China cope with this era” (Transcript excerpts, Don 1, p. 3). Chung deemed the reform aimed to stratify students into universities, professional schools, polytechnic schools, and work positions and provide various choices for high school students. Such efforts would create a balanced society and direct students to develop working skills in various professions. Society, then, would not just worship intellectuals but also respect people in all kinds of professions.

When it came to the details of implementing the curriculum, teachers negotiated their support for the reform with the demands of the CEE, the perceived flaws in the new curriculum, and their limited resources. When the reform was launched in He’nan province in 2008, the provincial and municipal education departments organized intense workshops to deliver the reform intentions and a few recommended pedagogical approaches to teachers (Fu, 2010). Currently, the reform has been implemented via the textbooks, and government and school requirements. The textbook, according to Hu, has had the greatest impact on teachers in implementing the reform.

The textbook is really different from the previous ones. First, the ‘Think and Discuss’ and the ‘Meander through Science’ sections illustrate the applications of knowledge learned in class. In addition, the content no longer merely presents the results. The textbook pays attention to the presentation of questions and assumptions, and then uses experiments to explore and test the results, which is a process of inquiry. I feel the compiling of the textbook may have contributed to students’ participation and engagement in class. It was very hard for teachers to lecture all the time again. (Transcript excerpts, Hu 1, pp. 5-6) Hu’s point was also supported by Tang,
I mainly follow the new version of the textbook. For example, in the Momentum unit, the textbook first explores the experiment of collision. Then the concept of momentum was revealed through the measurements and observations of the experiment. In old textbooks, the collision experiment was a verifying experiment put after the concepts and formula of momentum. You have to inquire in the new textbook. (Transcript excerpts, Tang 1, p. 2)

The government and school requirements, however, have not been as effective as textbooks in terms of encouraging teachers to implement the reform. It appears that teachers have experienced little pressure from either education departments or the school administrators. “We know about our city --- if the government inspected the schools, teachers would implement the reform. If not, things would go back to normal” (Transcript excerpts, Wong 1, p. 3). “Teachers have the liberty to choose the teaching methods…It’s just under this backdrop (curriculum reform), sometimes you would try the reform recommendations and think about them, more or less” (Wong 2, p. 3). The education department policy did change two teachers’ practices. The participant school, as a key school in the province, was required by the provincial education department to share educational resources with other schools. Hao and Zu both were mandated to use Smart Boards in their classes so that another school could be connected to their classes online. Both teachers initially preferred traditional chalk-boards. The Smart Board experience enabled their appreciation for the integration of technology in classrooms. “Some physics models are hard to find in life. We can demonstrate through animation or video clips. We can also show some experiments in university classrooms. Plus, you don’t inhale chalk powder, which is healthy!” (Transcript excerpts, Zu 2, p. 6).

The CEE has deterred the process of implementing the reform. Even though teachers have politically supported the reform, they have implemented reform suggestions for teaching
approaches only in “unimportant units”, such as atomic physics, nuclear physics, and physics history, sections that are not included in the CEE. More than half of the teachers admitted that they tried the new curriculum approaches only in “unimportant chapters” because of the pressure from CEE. Only Hu seemed take the unimportant units seriously. For her, these units “requires even more of your teaching skills --- how do you introduce the abstract atomic physics by visualized images or analogies, how do you cultivate student’s personality and morals through physics history --- I made great efforts to make these units vivid and engaging” (Transcript excerpts, Hu 1, pp. 1-2). Hu’s pursuit of the art of teaching has made her an exceptional case. But for most teachers, preparing students for the CEE is prioritized over implementing curriculum reform in their teaching practice. Teachers admitted that a reform inspired education is important and necessary. However, in the current circumstance, because the CEE is the sole evaluation system that is recognized by parents and society, many teachers believe that full implementation of the reform not only risks students’ CEE performance but also is a less efficient manner of learning high school physics.

If not for the CEE, for example, we would spend the entire lesson inquiring into the relationship between work and velocity square through experiments. Students would discover the relationship by themselves. But now we are constrained by time. I only spend half the class to do the inquiry experiment, let them experience a bit of the process and then give them the results directly. Students are not able to conclude much from the experiment in such a short period of time. The teacher needs to advance their findings into Kinetic Energy Theorem”. (Transcript excerpts, Hu 1, p. 6) Students need to learn a large amount of knowledge in the three years of high school. It is impossible and unnecessary that they re-explore every path that physics predecessors
Implementing the reform and improving CEE grades sometimes have conflicts. Discussions and inquiry in class would reduce the amount of information that can be delivered in one class. In addition, students often were not quite clear about their discussion results and teachers did not have enough time to present what he/she is supposed to lecture, which would undermine student’s grades. (Transcript excerpts, Tang 1, pp. 1-2; Tang 2, p. 2)

The need for high CEE grades relegated the implementation of the curriculum reform to a secondary position. Hao, Yu, Zao, and Zu confirmed that the so called “important and difficult units” were units whose content was targeted by the CEE. In addition, according to teachers, parents and some students seemed to not realize that there is an on-going curriculum reform in pre-collegiate education. Many teachers suggested that parents do not know about the reform and only care about their children’s test scores. Therefore, because the reform was not as well-received in the community as high CEE scores, teachers only implemented reform in “unimportant units”.

Another factor that tempers teacher’s enthusiasm for implementing the reform is the perceived flaws in the new curriculum itself. Two perceived flaws were pointed out by teachers: 1) the disconnections within the physics system; and 2) the disjunctions among different subjects in the new curriculum.

One of the reform goals is to reduce the amount of difficult content in high school curriculum (Zhu, 2002, p. 200). A strategy to do such in physics is to divide high school curriculum contents into compulsory and elective textbooks. Difficult content is moved into elective textbooks. There are three elective textbooks, and students are expected to study two of them. The CEE contains questions that cover the content of all three elective textbooks, but
students are advised to choose two textbooks to answer. The intention of this strategy is to encourage students to study sections that they are interested in and, at the same time, reduce their burden.

In addition, the reform attempted to create elective courses in high schools and break down the system in which a group of students stay together in the same class for three years and different teachers come to the class to teach. In reality, the province arbitrarily assigned two elective textbooks for all high schools in order to “save costs of organizing elective courses and tests” (Transcript excerpts, Tang 2, p. 1). As a result, many students do not have a chance to study thermal physics, and the class format still remains. “Physics is an intact system. How can one not study thermal physics? It is a flaw of the textbooks. Students will start from zero in thermal physics when they enter the college” (pp. 1-2). Likewise, the concept of momentum was also placed in elective textbooks.

Momentum is an essential concept in high school physics, even in college physics. It is closed related to force, movement, and energy. Now it has been put in the elective textbook separately just to reduce the difficulty. Many teachers think this is very unreasonable. Many students would not take momentum seriously. (Transcript excerpts, Zu 2, p. 5)

In addition to these unsatisfactory arrangements within the physics discipline itself, new disjunctions among disciplines exist in the new curriculum. The reform creators claimed that the new curriculum would break down the barrier between subjects and encourage comprehensive teaching and learning (Zhu, 2002). Such attempts were reflected in the knowledge application sections in textbooks as daily life applications, often entailing cooperation among many
disciplines. However, both Chung and Wong complained that the mathematics curriculum has not coordinated with physics to streamline student progress.

Physics needs help from Mathematics, urgently. For example, students need to have some knowledge and skills in trigonometric function in order to perform force analysis in grade 10. But math teachers do not start to teach the trigonometric function unit until physics completes the force and movement chapter. Physics teachers have to teach math in physics class. And then the math class in trigonometric function becomes redundant to students. (Transcript excerpts, Wong 2, p. 1)

The reform is making schools into hospitals. Teachers only focus on their own specialty but lack width and coordination” (Transcript excerpts, Chuang 2, p. 2).

In face of the perceived flaws in the reform, teachers demonstrated various responses through their actions. Tang used both the current and previous textbooks in his teaching. “Even though students would have more assignments, students would also experience the physics system...Teaching cannot just focus on the CEE and doing problems. Students need to experience the wisdom and culture in physics” (Transcript, Tang 1, p. 3; Tang 2, p. 2). Hao attempted to integrate momentum and thermal physics in her class because she felt these parts were necessary for student’s future development if they pursue science in college. At the same time, she had to condense other units to make up time for momentum and thermal physics. “I studied physics myself and know which parts are more important for their future development. Some parts in high school physics would only increase students’ burden. I would rather students to learn things that are more useful” (Transcript excerpts, Hao 2, p. 1). However, more teachers comply with the arrangement of the reform because of the limited time, difficulties in coordination with teachers in math, and the hassles of changing textbooks and exercise books back and forth.
Limited resources have also undermined the implementation of the reform. Outdated laboratory facilities and over-sized classes have been reported as the main factors preventing teachers from applying inquiry-based approaches. Hu’s transcript excerpt in the personal history section detailing her observation that schools in Beijing had better lab facilities than her school has already demonstrated this point and thus I will not present similar evidence again.

This section has indicated the ways in which the currency, mainly the CEE and the reform, has both enabled and constrained teacher agency. It appears that both the CEE and the reform played more of a constraining role than a motivating role. Have teachers thought about resisting, subverting, and altering the structures, given that the CEE and the reform have played such a constraining role? I have reported in a previous study (Fu, 2010) that teachers as a group appealed to the provincial education department, asking for the release of the CEE guidelines under the new curriculum backdrop. In this study, all of the teachers admitted that the systems and the rules shaped their behaviors rather than the other way round. Teachers perceived themselves as policy/rule executors. Even though teachers have expressed their dissatisfaction and complain about the reform and the CEE, such complaints only circulate among colleagues. Hu and Wen considered there were “few channels” for teachers to express their opinions and make changes in their current society. Other teachers deemed this situation was due to the “broad environment” in China, where the individual’s voice was too faint.

At least I wouldn’t appeal to the above. Why? Because it’s meaningless in the current Chinese administrative system. We need to understand the current circumstances in China … From my point of view, if the above does not ask my opinion, I won’t propose anything”. (Transcript excerpts, Zu 2, p. 5)
What is the “broad environment” then? Wen interpreted a way of changing things in China. “Basically, the reform patterns are top-down, always have been top-down changes. Teachers could propose change, but this would rarely work” (Transcript excerpts, Wen 2, pp. 2-3). Hu perceived it as the “habitual hierarchical awareness” in China. Chung reckoned the “broad environment” as Chinese people’s personality. “Few Chinese people would do things like this. Historically, Chinese people’s personality is endurance. Endure until it’s beyond one’s forbearance. It’s always been like this. So it is impossible to hope that we could change the system” (Transcript excerpts, Chung 2, p. 4). Teachers had a full comprehension of the current circumstances. They had their complaints but also understood that they were powerless in the face of the broad environment. Teachers chose to implement requirements from “the above,” kept their complaints within a small circle, and waited for the day when “the above” would hear their voice.

*Moral standards*

Moral agency refers to the agent’s standards of right or wrong that direct the agent’s actions of doing or refraining from doing things (Bandura, 1991). One’s moral standards are associated with self-sanctions and thus are exercised through behaviors that give people self-worth and satisfaction and constraints of behaviors that violate one’s moral standards. Moral standards relate to agency in the sense that they exert influences on people’s action choices. Self-sanctions motivate people to act in accordance with their moral standards. Thus, moral actions taken by agents contain evaluations of social obligations, righteous causes, responsibilities of actions, and the consequences for other people and environments. People’s moral standards are rooted in their identity, situated in the socio-cultural context, and the history of personal and social development. This study included questions concerning participants’ moral standards as
they pertain to being a teacher and why such moral standards are important. This line of questioning is important because it enables a more nuanced understanding of teachers’ evaluations of their identity, their socio-cultural contexts, and their historical developments.

Teachers’ professional morals in this study can be categorized into three aspects, those pertaining to: 1) directing students to become moral people; 2) their personal dedication to teaching; and 3) their rich knowledge foundation. Six out of ten teachers considered the cultivation of students to become moral people as the single most important moral standard for teachers to possess. “Teachers need to help students form the right value system” (Transcript excerpts, Wen 2, p. 3). This moral standard is deemed a priority in education because “it’s responsible for student’s future development” (p. 3). These teachers believed that the first priority of schools is to train students to become a righteous, kind, and positive person, and its second function was to pass down knowledge. The best way to instruct students to become moral persons is through actions. Chung and Hu believed that they needed to behave like a moral person in order to exert influence on students. “Otherwise it’s not convincing. Only this way, you can influence your students” (Transcript excerpts, Chung 2, p. 5).

Nowadays students read many books. They can search information online. Sometimes they know more than you do. They don’t like to be told what to do. But they lack the capability to execute. Hence, as teachers, your behavior must be consistent with your words. Then they will accept you and listen to you. (Transcript excerpts, Hu 2, p. 3)

The development of technology has seemingly dragged teachers down from their former authoritative position as knowledge keepers. But their experience, moral beliefs, and executions have reconstructed teachers’ authoritative status via morality.
Four teachers (Hu, Wong, Zao and Zu) considered dedication an important standard of teacher’s professional morality. Zu deemed dedication as being rigorous in every aspect of teaching, from planning, lecturing, to grading assignments. “The planning must be sufficient. Your lecturing must be in high volume and high density. In addition, you must be active and passionate so that students won’t be sleepy in your class. You must grade all the assignments by yourself and pay attention to students’ progress” (Transcript excerpts, Zu 2, p. 5). To Hu and Wong, dedication means the time commitment in class and after class. However, such time commitment is more due to cultural convention than teachers’ willingness.

I feel teachers in other countries have work time and time off. But there is a fine line between work and time off for teachers in China. Dedication is emphasized … Students expect to find you anytime they need to, morning, evening, after class, like a taxi driver. (Transcript excerpts, Hu 1, p. 4)

To Zao, dedication was to put one hundred percent of himself into teaching. “When you teach, you might have one hundred students, to you, each student is one percent. But to a family, that student is one hundred percent. So I cannot allow myself to slack off” (Transcript excerpts, Zao 2, p. 4). Even though teachers have various definitions of dedication, they shared a common devotion to teaching and willingness to give their students extra time and attention.

Three teachers put knowledge delivery as a moral standard of being a teacher. Wong believed teachers must meet students’ needs for knowledge. Tang considered a solid knowledge foundation would lead students to experience the wisdom, the culture, and the spirit of physics and then get students interested in physics. Zao considered passing down knowledge as a social requirement. “The society expected you to deliver knowledge and improve students’ grades. You
cannot ignore such requirements … You have to make every efforts to improve students’ test performance and be responsible for them” (Transcript excerpts, Zao 2, p. 4).

Moral standards provoked or constrained teacher’s actions. In order to nurture students to become moral persons, Wen and Yu indicated that they actively communicated with students and attempted to build the right value systems; these teachers were willing to step down from their authoritative position and established a rapport with students. Chung, Hu, and Zu strictly disciplined their own behaviors such as not being late to class, cleaning up the classroom, grading assignments in a timely manner, and respecting other people in order to be a good role model for students. Tang was addressed as a “living CEE problem depot” because he was extremely familiar with the CEE test problems from the past decade. He also studied and continued to study university physics in order to maintain his rich knowledge foundation and encouraged students to look beyond the CEE.

Students

Students are catalysts for physics teachers to exercise their agency. I classified students as a factor that influences teacher agency because: unlike structures or rules, students are also agents carrying their own baggage, shaped by the CEE and the reform, and forming their own moral and value systems; and the results in this study indicated that students shaped the core property of teachers’ agency --- self-reflectiveness (Bandura, 2006).

The debates between agency and structure have been focused on either agency or structure as the primary determinant of human actions. Bandura (2006) and Giddens (1984) endeavoured to reconcile the dualism between the two, but there is a lack of literature regarding the interactions between agents. Teachers interact with students on a daily basis and teachers’ actions are strongly shaped by such interactions. As such, students are not “structures” or
“systems” or “rules” in Giddens’ sense or in any sense. This section attempted to focus on the ways in which students, as a group of agents, shaped physics teachers’ agency in their daily practice.

This section first outlines several characteristics students in this study have that influence teacher’s behavior in practice. Some of the characteristics students exhibited in this study include pliability, aptitude for learning, expectations regarding examinations, and emotional needs. Then I reveal the ways in which those characteristics influenced each property of teacher agency.

As high school students are teenagers, their beliefs and values are still forming. Many students see their teachers as authoritative figures, not only in knowledge, but also in experience and morals. Students trust their teachers and listen to their advice. When some of the teachers who participated in this study realized the power they had, they cherished such power and put it to good use. “I found a teacher could indeed change a student’s life. If you care for your students, they will be very happy and grow up smoothly. And vice versa. Three years of high school is a key period for students forming their personality and learning habits … teachers in our school care about students” (Transcript excerpts, Yu 1 & 2, p. 1). Yu’s claim was also supported by Hu, Chung, Wen, Zao, and Zu. “Teaching is a profession that requires conscience commitment because this profession is related to children’s future. No idleness is permitted” (Transcript excerpts, Hu 1, p. 5). Teachers also viewed students as teenagers and vulnerable, and expressed their belief that teachers have an obligation and responsibility to lead students in the “right direction”.

Students’ aptitude for learning is another factor that influenced teacher’s behavior. I noted that both Chung and Wong experienced frustration when moving from the main campus to the annex campus. The major difference between the two campuses is centered on student learning
aptitude. Both teachers acknowledged that they had to adjust their teaching significantly to suit the annex campus students.

You have to be very clear in every detail and every concept. My teaching was very rough on the main campus but is very detailed here (annex campus). During the tutorial period, I waited for students to ask questions on the main campus but here I must write down hints on the blackboard so that students are able to complete their assignments within the tutorial period first and then ask questions. (Transcript excerpts, Chung 1, p. 6)

Wong allowed for a great deal of flexibility in her lesson plans because “even though I hope we could go along with the plan, I need to monitor students’ learning progress according to the current situation” (Transcript excerpts, Wong 1, p. 3).

In my four-month role as a teacher in the school, students’ expectations about examinations influenced my teaching. As a result, I adjusted my teaching focus. Their examination-oriented minds sometimes frustrated me and other teachers as well. There are cases when teachers made an effort to make “non examinable” units interesting and more reform oriented, and students were interested and engaged. But at the end of the class, teachers told students that the lecture material would not be tested in the CEE. Students complained, “you should have told us earlier”, implying that otherwise they would not have paid so much attention to the lesson. Hu reported that students focused their attentions when doing physics problems. “They stay at the level of ‘I can solve this problem.’ If you facilitate an engaging lab lesson but students end up not being able to solve problems in the exercise sheets, they consider this lesson a failure” (Transcript excerpts, Hu 1, p. 6). “It’s understandable. They live in this system. They have to take the CEE” (Transcript excerpts, Hao 2, p. 5). Because students have little interest in
the reform, teachers’ efforts on implementation were not always appreciated. Students’ expectations in exams drove teachers to adhere to the examination-oriented education.

Teachers observed that, other than the communication of knowledge, students had emotional needs. Hu sensed that there was an invisible wall between her and her students in the first few years of teaching in an urban school. She then discovered that in addition to knowledge delivery, she needed to care about, encourage and communicate with students. “You must like them sincerely. They can feel it. They need to be recognized. They need to understand that you like them from your heart. Then even when you discipline them or critique on them, they know it’s out of good intention” (Transcript excerpts, Hu 1, p. 4). Student’s emotional needs motivated Hu to step down from the podium and interact with her students as she would with friends. Her class atmosphere was relaxed, active, and supportive. Students actively responded to Hu’s questions and class activities. They asked their questions upfront and chatted with Hu after class. Zao thought that providing emotional support to students made teachers more approachable. “Then students dare and like to open their hearts and share their thoughts with you. You can drag them back on the right track in time if they have some negative thoughts” (Transcript excerpts, Zao 2, p. 3). As a teacher, Zao worked on two things: improving lecture skills and communicating with students in a heartfelt manner - “Try to see from student’s perspective” (Zao 1, p. 1).

Students were also the major factor for teachers to initiate self-reflection. According to Bandura (2006), self-reflectiveness is the metacognitive capability to reflect upon oneself and the adequacy of one’s thoughts and actions, which is the core property of agency. People reflect on their intentions, purposes of action, self-efficacy, and the surrounding environment, and then adjust both thoughts and behaviors. Reflexivity, according to Giddens (1984), monitors the
recursive continuity of social life. In the study, teachers’ reflections, without exception, were mirrored by the students.

The teachers’ reflections emerged most often after class. Whether the teaching was successful or not satisfactory, teachers usually reflected upon their teaching strategies, class arrangements, or problem settings (how teachers set up a problem in class). Teachers then enhanced their successful practice or adjusted unsatisfactory practice in the next class. Hu, Yu, and Zu admitted that their second class was usually better than the first because of the reflections upon their practice. Teachers judged their practice based on students’ instant reactions in class “I like to observe student’s facial expressions in class. Sometimes their eyes lighted up. Sometimes their attentions are on other things, rather than on the lecture. Sometimes they look confused. Then I think about what I did right and wrong in this class” (Transcript excerpts, Wong 1, p. 4). Some teachers also reflected when students’ grades were released. Don had great success in training the 2006 physics competition cohort. He also coordinated the 2009 and 2012 cohorts, but they were not as successful as the 2006 cohort. “I have been reflecting on my class structure after the competition results were released. I recalled what I had done with the 2006 cohort and found some issues in my current teaching” (Transcript excerpts, Don 1, p. 6). No matter whether they reflected on pedagogy, content sequence, or problem settings, the purpose of reflections, for most teachers, was to make their lectures more accessible to students.

Teacher reflections tend to be more reactive than proactive. Few teachers made reflections part of the routine of their practice. Hu outlined a few important points in her lesson plans before teaching. After teaching her three classes, she rewrote the lesson plans in more detail and added her reflections. Then she saved the lesson plans for future use. In addition, most
teachers performed reflections only mentally. Only three teachers (Hu, Tang, and Yu) developed a habit of recording their reflections.

In the teachers’ portraits, I have demonstrated that teachers were often motivated by student appreciation and also frustrated by their students’ unresponsive behaviors. Thus I will not repeat this aspect in this section.

**Summary**

Teacher’s history, currency, moral standards and interactions with students are the major factors that shaped their beliefs in teaching, evaluation, selection of actions, and their reflections upon their own actions. The next section presents the ways in which I examined collective agency in this study.

**Collective agency**

The second research question: *In the context of the current Chinese curriculum reform, how do physics teachers exercise collective agency (how is collective agency shaped by and produced the reform environment, and to what effect)?*

Three themes emerged from data analysis relating to collective physics teacher agency.

i. Collective agency is stimulated by structural change. The curriculum change created common needs for teachers. The needs to implement the curriculum motivated teacher’s collective agency.

ii. The manifestation of collective agency can be initiated and organized by individuals in a group.

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17 Agency resides in the implementation. Direct and do is still possible with agency reflecting in the actions.
iii. The available technology offers collective agency the extent to which geographic boundaries can be overcome.

I present two events of teachers collectively developing physics curriculum. The three themes outlined above regarding collective agency have been intertwined into the description of the two events to keep the scenarios intact. As a reminder, collective agency refers to those instances when agents who “pool knowledge, skills and resources, and act in concert to shape their future” (Bandura, 2006, p. 165).

The main campus has seventeen classes in each grade. The first six classes are called “main body classes” because students are the “main body”. Teachers implemented teaching approaches recommended by the reform in the main body classes. The school created the “main body class” in response to the reform mandates. Classes seven to twelve are regular classes or traditional classes. These classes have maintained for the most part the pre-reform classroom structures and pedagogies. Classes thirteen to sixteen are Olympiad competition classes in mathematics, physics, chemistry and biology respectively. Class seventeen is the international class for those students who aim to continue post-secondary study at international universities.

Before the reform in 2008, the school only had one type of class. Every class was a regular class. Competition training was offered via after school programs, and the international class did not exist.

The physics competition cohort

My first example of collective agency concerns the ways in which competition cohort coach, Wen, developed the physics competition program. The physics Olympiad competition originally aimed to stimulate students’ interest in exploring the subject. The competition became increasingly intense since being associated with direct admission in the 1990s (elite Chinese
universities directly enrolled competition winners). According to Wen, only a few students joined
the competition class because they liked physics. Most of them saw the competition as an
alternate way to enter universities. The school set up the competition class, according to Don, as
a response to changing circumstances. “Our school had more and more external pressures. Other
schools worked really hard on their competition cohorts. The specialized competition class was
set up to deal with such changes” (Transcript excerpts, Don 1, p. 1).

As described in the portraits, Wen devoted most of his time to designing the curriculum
for the competition class. He was quite isolated in the school in the sense that he used different
curriculum content from other physics teachers. However, Wen sought help from Fan, the
mathematics competition teacher, obtained online materials provided by international
universities, used lab training programs provided by domestic universities, and implemented
exchanges with other coaches across the country.

The separate curriculum prevented Wen from collaborating with peer physics teachers in
the school. Although it did provide him the freedom to collaborate with other competition
coaches, university researchers, and professors. Wen asked a mathematics competition coach to
deliver lessons on calculus and higher mathematics. Meanwhile, he organized several short-term
training programs with different universities to develop students’ lab skills. In collaboration with
coaches from other provinces, Wen facilitated two physics camps where students learned from
and communicated with other physics competition students. In addition, Wen showed his cohort
open courses from Yale University and MIT during the weekend in order to enhance students’
university physics knowledge. Even though Wen was not able to collaborate with his fellow
physics teachers in the school, he made connections beyond the school walls to reach out across
the country and outside the nation’s borders. Wen pooled knowledge, resources, and skills
together with people who shared similar interests. Such collaboration enabled Wen’s cohort students to advance in their studies.

The collective efforts would not have been possible without modern technology such as the internet and telecommunication tools. Technology has generated a unique kind of collective agency that connects people around the globe to act on local community issues. In addition, Wen admitted that, as a competition coach, he had a high degree of autonomy in terms of organizing activities and events with his cohort. “The administrators rarely intervene in my work. Competition coaches can make decisions on their own” (Transcript excerpts, Wen 2, p. 2).

Even though Wen worked very hard on designing the curriculum and improving students’ test performances, he did not support the current competition class model. “Setting up a special class for physics competition keeps many students away from physics competition if they don’t join in their first year. Organizing the competition study as an after school program was a better idea because, then, most students in the class were those who were interested in physics” (Transcript excerpts, Wen 2, p. 4).

Currently, the Ministry of Education in China has cancelled the direct admission privilege for competition winners, beginning in 2014. How Wen’s class will change and whether physics competitions will continue to exist is unknown. Originally, the collective agency around the physics competition class was initiated by the school in response to the fierce competition in the city. It is highly likely that the competition cohorts will be terminated as the result of the cancellation of automatic university admission for students with high competition scores.

**Main body class curriculum development**

My second example of collective agency concerns the ways in which physics teachers work together to develop curriculum for the “main body class”. According to Wong, the
municipal department of education pushed schools to implement the reform. The main body class idea was initiated by the principal in response to reform requirements. Hao considered the main body class more than just a response to the reform. It was an innovative school initiative as well because the school administrators were keen on cultivating students’ comprehensive capabilities. In Chapter three, I discussed the major shifts in physics teaching in the reform context. The five proposed changes by the reform include: 1) change from promotion of rote memorization of facts to the nurturing students’ interests and encouragement of active learning; 2) change from a teacher-centered to a student centered pedagogical model; 3) change from a focus on learning outcomes to an emphasis on learning process; 4) change from a knowledge delivery model to one that promotes student learning; and 5) change from a centralized curriculum administration to three levels (national, regional, and school) of curriculum administration.

The structure of the main body class was distinctive from traditional classroom. The teacher’s podium was still located at the front of the classroom but the students’ desks, instead of facing the teacher, were divided into two groups and the students faced one other as shown in Figure 1.

Figure 1. The main body class setting
Each main body class consisted of three sections. In the first 15 minutes, students studied the course materials by themselves. During this time, they also completed a section in the student guidebook. The student guidebook contained questions related to the key concepts or formula for each lesson. Students were expected to read textbooks, absorb the content, and complete all the questions in the guidebook. The following eight minutes comprised the second section called free questioning. Student discussed the questions from the first section with their peers. The last 16 minutes of class formed the third section. Here teachers commented on and answered unsolved student questions and stressed key points of the lesson.

The student guidebook was a collective effort by teachers of each subject. In physics, Chan (not a participant in this study) was the main body class coordinator. He collected every physics teacher’s lesson plans and distributed these lesson plans to teachers in Grade 11. Each teacher took charge of several units. Usually, each unit contained a clear objective statement and a series of questions set up as scaffolds for students to achieve the objectives. Then, every Grade 11 teacher’s work was collected and assembled to constitute the student guidebooks. The draft books were then sent to Grade 10 teachers who were given the task to review the draft books, collect feedback from students and teachers, and make necessary edits.

The main body class addressed almost all reform requirements, such as school level curriculum development and the establishment of student-centered classes. More importantly, teachers considered this innovative class structure as a benefit to the students’ futures. “There is no difference between the main body class and traditional class in terms of test performance. But main body class students are more active in discussions, collaboration, debates, problem-solving, and inquiry, which will benefit them in universities” (Transcript excerpts, Yue 1 & 2, p. 2).
observed that the main body class elicited the students’ initiatives which had often been smothered in the current Chinese education system.

My son is in kindergarten now. He is quite active in class, like most other children.

Students in elementary school are also active. However, most students are very shy in high school. They are used to the passive lectures. They like to listen and take notes, but not participate in discussions. Usually after one month of main body class, you could see students have heated debates around physics. Sometimes their thoughts are deeper than teachers. On the one hand, they now think actively. On the other, such debates and discussions enhanced communication and collaboration. (Transcript excerpts, Wen 1, p. 3)

The main body class was implemented with two classes to start and has since been expanded to six classes. Next year the main body class will be extended to ten classes. When the main body class concept was first implemented, the school received protests and complaints from nearly 90% of the parents. “Parents worried the new class structure would undermine student’s grades. After two months’ implementation, the objections gradually faded away. Now the main body class students would defend this class format if people had doubts or concerns” (Transcript excerpts, Zu 1, p. 4). However, Zu admitted that continued support for the concept of the main body class is largely due to its uncompromised test scores. “It took time for people to accept, be part of, and promote new things” (p. 4). With the issue of the National medium- and long-term educational reform and development project summary (Ministry of Education, PR. China, 2008), the reform will become a long-term movement which will encourage the promotion of the main body class. Although teachers reported that many schools had returned to
the traditional classroom structure and the exam-oriented system, which may be detrimental to the school’s reform implementation.

Many schools in rural areas have returned to the old model and had very intense exam training to their students. This raised the bar for us. We need to compete with them in the CEE test score. We also need to implement the reform because you are in the city. The government watches you closely. (Transcript excerpts, Don 1 & 2, p. 5)

In the above excerpt, agency resides in the challenges to compete, to implement the reform, and to increase the number of main body classes. Even with potential barriers, the school plans to increase the number of main body classes next year.

**Individual and collective agency**

The third research question: *In the context of the current Chinese curriculum reform, how do physics teachers negotiate the relationships between individual and collective teacher agency?* Three themes emerged from the data sets.

i. The collective agency events (the physics Olympiad competition curriculum and the main body class curriculum outlined in the previous section) created a need for individual agents’ professional development.

ii. The collective agency cases generated a culture of collaboration, which also could address individual needs.

iii. The collective agency events established concrete examples of reform implementation for individual agents.

**Needs for professional development**

All teachers claimed that developing a collective curriculum was a rewarding experience. Through this process, teachers also realized their insufficiency in designing and implementing
the collective curriculum. Most teachers did not have previous experience in designing curriculum, given that the reform had just released power over the curriculum administration to the schools. Thus, the curriculum development process was a shared novelty and virtue. Teachers in this process evaluated their strengths and shortcomings in curriculum development. Teachers considered themselves familiar with their students and varying kinds of physics exercise problems at the high school level. Teachers understood at which points students most often made mistakes or became confused. The difficulty level of the exercise problems was more suitable to their students in the school-developed curriculum. In addition, some teachers appreciated the freedom to design curriculum for students because they could teach more content that would ultimately benefit students’ future development and also teach less content that was simply exam-oriented, thus reducing their students’ burden.

Teachers also discovered their shortcomings while developing curriculum. They discovered that the depth of their physics knowledge was insufficient to design a comprehensive curriculum. The traditional classroom was for the most part under teachers’ control. The lesson could be elaborately planned. The reform encouraged students to take the lead in classroom with teachers becoming facilitators. “This is one challenge in curriculum design because you can never know what kind of questions students might pose. Nowadays, students obtain information from the Internet and other media. They do know a lot, which requires teachers to do more lesson planning” (Transcript excerpts, Zao 2, p. 1). In addition, teachers felt a lack of confidence when writing chapters relating to modern physics. “Unlike mechanics, it’s all there. Most high school teachers cannot clearly convey unit 3-5 (quantum physics) because we are not standing at the edges of physics” (Transcript excerpts, Wong 2, p. 1). Some of the chapters require considerable university physics contents in order to explain all the concepts. Such shortcomings motivate
teachers to further consolidate their physics knowledge. Hu and Tang learned some university modern physics every week in order to be “better prepared for class”. Meanwhile, Tang, as the physics department head, often encouraged teachers to cursorily study university physics in order to become more confident in teaching modern physics and preparing students for university studies.

Another challenge for teachers in developing curriculum lay in a lack of theoretical guidance. Teachers confessed that they did not have a sufficient “basis in theory” when designing curriculum. They were familiar with exercise problems but they were not confident about the arrangement of these exercises. “It would be nice to have some theory guidance” (Transcript excerpts, Hao 2, p. 1). “Our limits are that we can only work around teaching methods or how to help students dig into a physics concept deeply. Curriculum, that you just mentioned, that’s for university teachers” (Transcript excerpts, Hu 2, pp. 1-2). There was a need for a systematic training of teachers for curriculum development. Yet although the municipal education department organized several training programs, teachers reported such programs were disconnected from their practice. Teachers’ lack of theoretical grounding and support for curriculum development was a common thread in my study. Here, agency is in teachers’ expressions of limits or what they can and cannot do.

Collaborative culture

Collective agency around the new curriculum created a collaborative culture among physics teachers. Physics teachers attended staff meetings every other Wednesday. Tang, the department head, organized these meeting. The meeting usually had two sessions: the first session was often about policy learning. Teachers were informed about reform policies and received recent updates from the government. The second session was often a short talk.
teachers shared their confusion, struggles, and difficulties in teaching. The entire group then discussed the issue. I participated in most staff meetings. Apart from my talk about Canadian physics education, the other meetings were about editing the main body class school curriculum. Discussions focused primarily on methods to solve physics problems, wording of certain questions, and unclear concepts. What surprised me was that the discussion was often very heated. Several teachers would argue over one issue for twenty minutes and still debate the issue after the meeting. However, according to most of the physics teachers, such debates were “very normal”. “Teachers in physics department are very straightforward. In the department meeting, we argued until our faces and ears turned red, like we are fighting. But afterwards, everything goes back to normal” (Transcript excerpts, Wen 1, p. 6). Tang considered such debates to be a norm in staff meetings. “We argue during the meeting and think about the issue after the meeting. Most of the time, we reach a common ground. If not, teachers keep their own opinion. The issues will be resolved sooner or later” (Transcript excerpts, Tang 1, p. 3). Because most of the debates were around solving physics problems, there always was a correct answer. “It is not hard to settle down the debates. It’s physics. We search online or refer to books for answers. And there usually is a right answer” (Transcript excerpts, Hu 1, p. 8).

Outside staff meetings, physics teachers appeared to have developed good relationships. The school organized regular social events such as the teachers’ sports meet, an end of term lunch/dinner, a knowledge competition, and various celebrations of holidays. “We often play basketball together. Sometimes we discuss physics on the court” (Transcript, Wen 1, p. 6).

Such norm enabled physics teachers to voice their opinions and learn from others. “It is like a roundtable meeting. Everybody states her/his own opinions and listens to others’ opinions. Individuals picks up whatever is useful to them and apply it to their teaching. The most
important thing is, everybody posts his/her ideas. Then we have a pool of ideas. Then you
choose” (Transcript excerpts, Yu 1&2, p. 3). In addition, the staff meetings provided
opportunities for cross grade collaboration. “Teachers who taught Grade 11 last year shared their
experience with us so that we might design and revise the curriculum accordingly. We took
Grade 12 teachers’ advices on momentum conservation principle and we did a better job than
last year. Even though students’ aptitudes were not as good as last year, their performance was
better” (Transcript excerpts, Chung 1, p. 5).

The staff meetings and outside social events seemed to build a strong community among
physics teachers as engagement with colleagues provided opportunities to learn more about and
appreciate others’ work. Teachers know about their colleagues’ professional beliefs,
achievements, and merits. Individual teachers often had their own role models within the group.
Zao described the community as “full of masters”. He was impressed and, at the same time,
encouraged by his excellent colleagues. He felt the need to work hard to earn the respect of
others. He listed other teachers’ achievements and used these as his motivators. Zao’s admiration
for other teachers emerged out of his familiarity with their personalities and achievements.

Like Zao, Hu also claimed to be a fan of Tang’s. She often audited Tang’s class and
learned from him. This strong community feeling also enabled teachers to share personal
struggles with colleagues. Both Chung and Wen experienced frustrations with students and had
considered quitting. Both of them were able to talk to colleagues and revealed their
vulnerabilities. They received support from colleagues and thus managed their frustration. Such
trust among colleagues would be impossible without a strong sense of community.

The collective curriculum development event provided teachers with a common topic to
discuss, and through such a process, teachers developed a collaborative culture. As curriculum
development is a novel event for most teachers, it generates a more collaborative culture where teachers are able to voice and possibly preserve their opinion, learn from colleagues, and have faith in colleagues. Hence, in this situation, collective agency has contributed to individual agency by creating a community.

**A concrete example for reform implementation**

Although the main body class was implemented in only six classes, it created a concrete example of reform implementation for teachers in traditional classes. Most participating teachers in this study did not teach the main body class. They only participated in developing the main body class curriculum. However, the main body class had a strong impact on their perceptions of the reform. Teachers used to complain that the new curriculum professional development programs offered by the government were too vague and abstract. Teachers understood the intentions of the reform after the training but lacked practical skills for implementation (Fu, 2010). The main body class provided a concrete example of a reform-appeal classroom that teachers may observe in their daily practice. Teachers were involved in the curriculum development for the main body class. They witnessed the ways students in the main body class were transformed and became more active and engaged in class activities while they maintained high scores in exams. “It is an inspiration, and a ripple…To be honest, if not for the main body class model in our school, I might have a much less positive attitude towards this new curriculum” (Transcript excerpts, Zu 1, p. 3). Most teachers, as mentioned in the previous collective agency section, were impressed by how students actively engaged in inquiry, discussion, debates, and problem solving.

In addition, the main body class has catalyzed teachers’ reflections on traditional classroom and reform proposed classrooms. “I feel that, in traditional classroom, students’ brains
are like containers. You need to stuff things in. In the main body class, in the process of seeking knowledge, students are able to discover a lot of questions. It is more fun than just doing problems” (Transcript excerpts, Wen 1, p. 3). Zu expressed the view that the main body class structure endowed students with more time to digest and absorb knowledge. The structure forced students to pre-study and come to class with purposes and questions which improved class efficiency. Meanwhile, students gradually learned to think by themselves rather than waiting to be fed information by their teachers.

The main body class provided teachers with an alternate model for teaching, which has, in turn, encouraged teachers to implement reforms on their own. “I often thought of the main body class when I was teaching. I constantly compared the traditional class to the main body class model, and tried to apply the main body class model where it fits” (Transcript excerpts, Wen 1, p. 5). Zu planned to implement the main body class with his next cohort. “For me, I will start with my next class in Grade 10. My current classes are in the end of Grade 11. It might not be wise to start in the middle. I will try it in the next round” (Transcript excerpts, Zu 1, p. 3). The main body class stimulated individual teachers to implement the reform by showcasing a concrete model of a reform-required classroom. Teachers were inspired by, witnessed, referred to, and reflected on the model. The achievement of the main body class encouraged teachers to appreciate and implement the reform.

**Summary**

Collective agency in this study is demonstrated by two curriculum development cases. The common need for teachers to work together share knowledge, skills, and resources is initiated by the curriculum change. It is the principal who took the lead and organized teachers so that they worked collaboratively. Although agency is not explicitly located, it can be argued that
it is in the teachers’ willingness to obey the principal’s guidance and to collaborate. The principal’s leadership created structural support for teachers to form collective agency at the school level. Modern technology has created a new means for teachers’ collective agency. Teachers circumvent geographical borders to pool knowledge, skills, and resources together. Thus, collective agency can reach national and international partners. Meanwhile, the collective curriculum development event assisted individual teachers to realize their insufficiencies in the teaching profession. The collective events offer a platform for building a strong community in which teachers felt safe to speak out their opinions and reveal their vulnerabilities. The activities exercised by collective agency demonstrate a detailed case of reform implementation, which inspired, convinced, motivated, and guided teachers to carry out the curriculum reform in their own classrooms.

**Discussions**

**Individual agency**

I explored the notion of human agency as discussed in the fields of psychology, sociology, and critical theory and noted the ways agency entails human beings’ capacity to evaluate and act upon the surrounding environment. I discussed feminist and post-structural perspectives and emphasized that agency should not be limited to privileged groups. This perspective echoes the sense of human agency in the discipline of history as agency resides in all people rather than only in outstanding individuals. In addition, history adds to the definition of human agency in that agency is a product of personal and socio-cultural histories.

This study specifies that individual physics teacher agency carries history, currency and moral standards. Giddens (1984) frames time into two layers, reversible time and irreversible time. Reversible time refers to “day-to-day routine conduct” (p. 133), whereas irreversible time
refers to the life of an individual. It is “finite and being towards death” (p. 35). History in this study refers to the irreversible time in one’s life. This irreversible time includes both personal history and history of the Chinese society. I frame reversible time as part of the social structure because social structure burdens history and entails an evolving and recursive nature and acts as an instant reflection of the social rules and systems.

Important figures, memorable events, and major life changes stand out in a physics teacher’s personal history and are stored vividly in teachers’ memories. Even though one’s life time is irreversible, memories re-enact past experience and play a significant role in shaping teachers’ agency. They not only provide concrete cases and references in guiding teachers’ actions but also shape teachers’ identities. Important figures and memorable events depict both successful and failed cases in detail to which teachers make connections. Referring to such experiences, teachers act with the intention to replicate successes or avoid failures. Major life changes often come with adding/shedding one layer of identity. Sloan (2006) claims that teachers’ identities are an important means in understanding teacher agency. Holland and his colleagues further argue that the extent to which individuals can exercise their agency is dependent on how they identify themselves in a given cultural context (Holland, Lachicotte, Skinner, & Cain, 1998). Teachers become master’s degree holders, mothers, and fathers. Change of identity shifts teachers’ knowledgeability (evaluation of the structures one embedded in) of the surroundings and generates new perceptions of oneself, other teachers, administrators, and students. In turn, this enriched knowledgeability enables teachers to act based on their new identities. Lasky (2005) finds that teacher agency is mediated by their professional identity, especially the early influences on teacher’s identity. Klein (1999) further argues that subjectivity is constituted through various discourses and interruptions of these discourses. I would further
argue that teacher agency is not just mediated by professional identity. It is also mediated by teachers’ multiple identities as teachers’ subjectivity is constituted by them and functions through them. Teacher, as one facet of a person’s identity, is constantly influenced by the individual’s other identities.

History is not limited to personal history. It also includes the history of a nation. Like a person’s history, a nation’s history is also irreversible. Thus, here I am not discussing the recursive features of social structure. I am discussing the historical development of a nation, which exert influences on each and every individuals of that nation. As mentioned in Chapter three, China has experienced a shift from a centralized political system and collective ideology to a decentralized economic structure and an ideology of more individualism. One of the influences of the centralized system imposed on experienced teachers (who have thirty years’ teaching experience) is that they were assigned to their teaching positions. Individuals’ intentions were obliterated in this social context. Individuals became teachers because the country needed them to be teachers. Thus, a significant part of their teaching objectives involved a desire for China to become formidable through the formal education of its citizens.

With the advent of decentralization, individuals are no longer constrained in their choice of careers, but their capacity to make a choice has not fully recovered. They officially can make a choice, but their circumstances prevent them from exercising that choice. Many participants chose to be teachers because teaching was the only choice or the most simple way to go in terms of a career. Their objectives in teaching, however, shifted to the development of individual students rather than collective aims. Only one teacher, Zu, out of ten participants, firmly declared that he became a teacher because he loved teaching. He had strong beliefs in teaching, and he defended his beliefs against some of his colleagues. Lane, Lacefield-Parachini, and Isken (2003)
find that student teachers “who have strong beliefs that they did not waver even when confronted by guiding teachers with differing conceptual orientations” (p. 62). I see firm beliefs and individualism in Zu. The development of contemporary Chinese history enables individuals to make choices and thus encourages individualism as a choice for teachers.

The nation’s history has also nurtured a fortuitous event for one of the teachers, Chung. His unintentional engagement with a Buddhist music concert occurred at a low ebb of his teaching career. The religious music calmed and nurtured him so that he reflected upon himself, his work, and his frustrations from a different perspective. After engaging three times with the Buddhist the music concert, he re-discovered his strength and devoted himself to his students and teaching. Bandura (2006) describes fortuitous events as “branching processes [that] alter the continuity and linear progression of life-course trajectories” (p. 166). I would argue that it is Chinese history that nurtured the opportunity for such a fortuitous engagement. Buddhism, portrayed as one of the three traditional wisdoms in China (Zhang & Zhong, 2003), flourished in China as a religion as well as a way of being for more than a thousand years. Countless temples were constructed in mountains all over China. The history and culture created the opportunities for individuals to engage with Buddhist events. Chinese individuals are receptive to Buddhist beliefs and ideas and tend to respect, if not believe, Buddhism’s way of being and its doctrines. Such a receptive attitude towards Buddhism in China has been nurtured by its history. In other words, Chinese history created the opportunity for such a fortuitous event in Chung’s life so that he can reflect and regain his agency in teaching.
Currency, which I frame as the instantiation of rules, systems, and social structures, is represented by the reform and the College Entrance Examination\textsuperscript{18}. It is not only the negotiation between the reform and teachers or the CEE and teachers, but also the negotiation between the reform and the CEE. The reform faces two challenges: acceptance by teachers and acceptance by society. The latter crucially depends on the co-ordination between the reform and the CEE.

The CEE is still a dominant factor that influence teachers’ practice, especially in the Chinese context in which the CEE is the major assessment for students entering post-secondary institutions. Sloan (2000) reports that the pressure of the Texas Assessment of Academic Skills (TAAS) precipitated a wave of changes and amendments of curriculum objectives, teachers’ classroom practices, instructional strategies, and professional development. Teachers have been constrained from formulating the purposes and ends of their teaching practice, from examining their own values and assumptions in relation to their practice, playing substantive leadership roles in curriculum development and school reform, and drawing from local contexts. The test data, however, are used to “determine whether or not schools are succeeding, and they rely on TAAS results to mete out consequences for everyone in schools: students, teachers, administrators, and school board members” (p. 1).

Similarly, the CEE has shaped nearly every aspect of teachers’ practice. The performance of CEE has affected schools’ reputations and the successive consequences such as student recruitment, funding, sponsors, and rankings. In addition, students and parents also have prioritized CEE performance because university admissions are often associated with students’ futures. Even though the CEE has come under scrutiny for causing fierce competition, damage to

\textsuperscript{18} The CEE represents an exam culture which I described in earlier section and thus it is considered as a social structure.
students’ physical and mental health, and jeopardizing the reform implementation, it is entrenched in society from teachers to students and parents. Teachers admit that the CEE is the fairest evaluation system given the circumstances (large population, uneven development, evaluation cost) in China.

More importantly, I argue that the CEE reiterates an examination tradition in China where education was reduced to examination skills. With economic development in China, more and more families look beyond the borders when seeking universities for their children. Students are no longer limited to domestic universities. An increasing number of families and teachers encourage students to study in international universities and to avoid the CEE. However, students who plan to enter international universities are still obsessed with test scores such as the English proficiency test. They are not interested in the qualities international universities look for in international students. The exam culture has blinded students and parents in its emphasis on test scores rather than the growth of individuals. In turn, students and parents rely on teachers to teach knowledge content and exam skills.

In addition to examination pressures, teachers are also expected to carry out the reform. Educational departments at various administration levels push for implementation. At the school level, school administrators and the physics department head set up structures to encourage teachers to implement the reform. Teachers learn about reform policies in regular department meetings and have fully implemented the reform in main body classes. The participants in my study faced dual, and sometimes competing, requirements from the CEE and the reform. Lasky (2005) reports that when the reform mandates were disjointed from teachers’ practice, teacher agency was constrained in the reform context. Having the reform objectives align with teachers’ professional beliefs is the key to encourage teachers to implement the reform proactively. The
current reform is launched by three demands: (1) winning international competitions; (2) coping with the development of modern technology; and (3) liberating students from physical and mental pressures.

Such demands also seem to align with participant teachers’ beliefs as experienced teachers cared about the development of the nation while young teachers cared about student development. Teachers are more constrained by the CEE than the reform. However, the perceived flaws in the reform have undermined teachers’ enthusiasm as these perceived flaws opposed to teachers’ beliefs in physics. For example, the momentum chapter was removed from the compulsory curriculum, and thermal physics was completely ignored by the new physics curriculum. Such perceived flaws enable teachers to exercise their agency and repair these perceived flaws in their own way. However, without the support of the curriculum structure, the efforts of the teachers in this study often resulted in a heavier workload for themselves and their students.

Negotiations between the reform and the CEE at the micro-level (schools and individual teachers) manifested as inclinations to knowledge delivery or to educating the whole person. Participant teachers believed that implementing the reform could possibly damage students’ test performance. Teachers also admitted that test-oriented education negatively affected the students’ health and was short sighted in its goals. Such negotiations were also consistent with teacher’s moral beliefs in education. Most teachers believed that either the education of a moral person or the delivery of rich and correct knowledge was the standard of a moral teacher.

Teachers in this study are not alone because secondary teachers in Ontario, Canada also consider their primary responsibility is to teach the curriculum and academic skills and to teach the whole child (Lasky, 2005). Teachers’ actions reflected their moral beliefs. Teachers studied
university physics in order to deliver correct and rich content knowledge to students. Teachers invested time in speaking with students about their issues outside the classroom to help them become righteous persons. Teachers worked overtime because they believed dedication and time investment were hallmarks of a moral teacher. Teachers were highly motivated and supported pursuing goals that they considered important such as students’ healthy growth and students’ appreciation of parents’ and teachers’ guidance. They had agency to do so.

All teachers claimed that in Chinese culture, rules and systems shape teachers’ actions rather than the other way round. Chinese culture seems to nurture a characteristic of obeying rather than resistance, which may also explain that teachers like Chung tended to find inner peace/improvement when feeling encumbered by frustration. Mencius, in his classic Confucian work, *Mencius*, said “if one’s actions did not receive the expected reactions, one should seek causes from oneself rather than somebody else”. In a culture that has been influenced by Confucian thoughts for more than a thousand years, it is not surprising to see most teachers claim that rules and systems have shaped their actions rather than the other way around. Teachers tend to follow the rules and seek their own ways to work through the rules and systems. In facing the multiple requirements from the CEE and the reform, teachers evaluate their priority, ensure the priority need is met, and seek room to address other requirements. These requirements also include teachers’ own intentions and beliefs. Teachers’ agency has functioned in between broad structures and within the crevices found among the multiple requirements of the CEE and the reform.

Although the reform was launched in 2001, it still faces the general resistance from society. The debate on the directions of the current Chinese curriculum reform has lasted for a decade (since 2004) among Chinese scholars (Zhang, 2014). I have focused more on the
acceptance from academia. Parents are barely aware of the reform and are mainly concerned about their children’s test performance. The school is judged by general test performance in the CEE rather than by their implementation of the reform. Teachers who experienced the previous curriculum still have nostalgic feelings for the Soviet Union’s physics curriculum, traditional teaching approaches, and the emphasis on physics knowledge. Even though the government issued the document supporting long-term reform development, the reform itself appears to face barriers in order to be accepted by society.

The teaching experience I had with the students and the ways in which teachers mentioned that students affect their teaching practices helped me realize how students potentially affect teacher agency. In this study, students were the most influential factor affecting teacher agency. Students’ needs surpassed the CEE, the reform, and the school administration in teachers’ decision-making. In Lasky’s study (2005), “a teacher’s ethical, moral, and professional obligations to students that go beyond the delivery of the curriculum” (p. 906), and developing a rapport with students played the central role in teacher’s beliefs. Teaching is “a human-centered profession, which required making real connections with their students” (p. 913). In this study, students’ trust, appreciation, pliability as children, willingness to learn, learning ability, and needs for emotional support are more important than reform requirements or the exam focus to teachers.

I would like to examine the ways in which students surpass other factors and become the most important factor in influencing teacher agency in this paragraph. Reflecting upon my own teaching, interview data, and teachers’ reflections, I find that students provide teachers with instant feedback to teachers’ actions. Receiving such instant and direct feedback, teachers then reflected upon their actions and made adjustments. Both teachers and students are agents and
walk into a classroom carrying unique personal histories, current status, moral beliefs, and expectations. The teaching process is one of negotiations among the various parties. For example, when I intended to teach students logical thinking, learning methods, and attitudes, my intentions were generated through my experience of learning English, my current perspective on English learning, and my perceptions of student needs. My students, however, expected me to teach exam skills instead. Their expectations of my class came from their own learning experiences, their beliefs about learning, and their perceptions of success.

After examining my own teaching practice in this study, my ideal pedagogical process emphasizes first, reaching a mutual understanding of teaching and learning, then working together on this established common ground. Collective here is in mutuality and working together. In this case, individual and collective are not mutually exclusive. The interactions of individual agencies lead to the mutuality in which collective agency manifests. A rapport is built in this process which is conducive for both parties to express their own expectations and which enhances negotiations. A sense of moving forward is made through the constant negotiation between students and teachers. Such a negotiation process is an example of a complexity system.

Johnson (2001) described such bottom up systems, for example ants, software designing, and city development as systems where individual agents pay attention to neighbors rather than utilizing a bird’s eye view. Engagement at the ground level becomes a general movement towards the common good of the entire group. I would argue, in this study, that it is the instant feedback system between students and teachers that make students the most effective factor influencing teacher agency. Teachers when they exert their intentions and actions upon students, receive instant feedback from a student’s facial expression in class, involvement in class activities, assignments, and exam grades. In the long term, such interactions become the
foundations of trust, rapport, and appreciation between students and teachers. Once trust, rapport, and appreciation are established between students and teachers, their relationship becomes an effective motivation for teacher agency and enables teachers to take actions that benefit the community within the classroom.

Bandura (1999) theorized agency as a product of the reciprocal interplays among intrapersonal, behavioral, and environmental determinants in Social Cognitive Theory. In Structuration Theory, Giddens (1984) emphasized the capability and knowledgeablebility of human agency. Giroux (2001) focused on the dialectical relations between agency and structure. However, none of these theorists paid attention to the interactions among agents. In other words, the duality between agency and structure left little room for the engagement among agents. I would argue the interactions among agents motivate a bottom-up change force that shapes the immediate environment. Likewise, the environment constrained or enabled individual agency through the interactions among agents.

**Collective agency**

Bandura (2001) has argued that a group’s collective efficacy determines a group’s aspirations, motivations, power, morale, resilience and accomplishments. Collective efficacy refers to “people’s shared belief in their collective power to produce desired results” (p. 14). Bandura (1999) further argues that people from collectivistic cultures, namely Hong Kong and China, work most productively under a group-oriented system. In this study, the principal played the role of maintaining the collective efficacy in the case of main body class collective curriculum development. At the very beginning, parents and students expressed doubts about the main body class. It was the principal’s persistence that kept it alive. The main body class has
proven that it is as effective as a traditional class in terms of test performance, and has gained parents’ and students’ acceptance and support.

I would argue strong leadership is the key in maintaining collective agency in a collectivistic culture. In a collectivistic culture, individual actions tend to be shaped by rules and systems. Individuals tend to sacrifice their need for collective goods. A strong leader, thus becomes a symbol, an embodiment of the structure within the group. Teachers are willing to follow the leadership and implement the main body class. As Giddens (1984) suggests, for the most part, social structures represent authorized systems of rules, social practices, and sanctions designed to regulate human affairs. These socio-structural functions are carried out by human beings who occupy authorized roles.

Bandura (1999, 2001) predicted that with the development of modern technology, people would divide into separate interest groups. Thus, collective agency is undermined due to the social fragmentation created by electronic technology. This study demonstrated that, on the contrary, collective agency may be achieved through the development of modern technology. Individual teachers are not bounded by geographic limitations and developed national and international collaborations through the Internet, search engines, and social media. Individuals’ strong efficacy played an essential role in producing collective agency.

**Individual and collective agency**

The collective agency events provided opportunities, subject contents, and scaffolding for individuals to build a rapport with one another. Such rapport created a safe environment for teachers to recognize others’ merits, realize one’s demerits, reveal one’s vulnerability, and seek help from others. Turnbull’s (2005) study showed that a positive and welcoming learning environment within the practicum context contributed to student teachers’ agency practice. The
collective agency, in this study, contributed to rapport building among teachers and this rapport, in turn, contributed to a stronger community among physics teachers. Palincsar and Herrenkohl (2002) suggest two necessary conditions for advancing collaboration: “the thinking is distributed among the members of the group. All members of the group work on the same aspect of the problem at the same time, sharing cognitive responsibility for the task at hand; group members are encouraged to share their thinking as they work together” (p. 26).

The two collective agency events created conditions that resulted in most physics teachers in the participant school working on the same aspect of the problem (developing school-level curriculum) at the same time. The collaborative culture among physics teachers encouraged members to candidly share their thinking. In addition, the collaborative culture and a robust leader in the group enable the group’s collective agency. Teachers were willing to not only pool their knowledge, skills, and resources together for a communal goal, but to also improve their professional skills and knowledge in order to continuously contribute to the collective agency.

Physics teachers involved in the collective curriculum development process experienced a concrete example of curriculum implementation. Even though some teachers did not teach the main body class, they witnessed the ways in which the main body class was designed, facilitated, and assessed. The achievements of the main body class vividly demonstrated the benefits of implementing the reform. Similar to significant events that enhance individual agency, the collective agency event provided a concrete example and stimulant for teachers to implement the reform. The achievements of the main body class are more convincing than government propaganda and professional training programs. In addition, teachers could easily draw on the main body class model and apply various aspects in their own classes. The collective curriculum development case enabled individual agency within and around this group.
The rapid shift of Chinese society influence the dynamics between the individual and collective agency. The Chinese society was considered as a collectivity for a long time (Bandura, 1999). However, with the economic decentralization and the “reform and open-up policy”, Chinese society has gradually shifted to an individualism oriented society. Liu and Dunne (2009) report that the process of decentralization and the development of a competitive educational market resulted in schools competing for funds. Improving student examination performance remains the priority for schools, local authorities, teachers, parents, and students. These findings support my study’s results as well because the school’s CEE performance is key for funding applications.

In addition, the social change mirrors the change of teachers’ teaching purpose and their relationships with the profession. Experienced teachers tend to teach students for the revival of China while novice teachers devote their teaching to students’ individual growth. While most in-service teachers were assigned to the teaching vocation or considered teaching as a stable job, more and more young teachers are entering the teaching profession because of their love of education. This affection enhances young teachers’ beliefs about their ways of teaching. These young teachers demonstrate more independence and less compliance to collective decisions. The collective culture in China may be gradually undermined by this emerging individualism. In other words, the social changes in China might enhance physics teachers’ individual agency and, at the same time, dilute collective agency.
Chapter five: Conclusions and implications

In this final chapter of the thesis, I restate the research problem and review the major methods used in the study. I then summarize the results and discuss their implications. This chapter concludes with research limitations and final remarks.

This study explored how physics teachers make sense of, negotiate, and give shape to their agency within the current Chinese curriculum reform movement. The on-going curriculum reform in China enforces several mandates on physics teaching including transiting from direct lecture and rote memorization pedagogies to student-centered and inquiry based approaches, and developing school-based physics curriculum. With the shifted structural movement, there is a need to investigate how Chinese physics teachers are responding to these reform efforts and how they are negotiating their roles as change agents within the typically conservative culture of Chinese physics education. Therefore, the following research questions guided my study: In the context of the current Chinese curriculum reform, how do physics teachers:

1) exercise individual agency (how is it shaped by and produced the reform environment, and to what effect)?

2) exercise collective agency (how is it shaped by and produced the reform environment, and to what effect)?

3) negotiate the relationships between individual and collective teacher agencies?

The research was conducted in one high school in a major city in mid-eastern China where the new curriculum was adopted in 2008. As one of the key schools in the city, this high school’s student achievement, teacher competence, reputation, and funding were superior among the thirty high schools in the city. The school had two campuses. In the main campus students
maintained a high academic standing. In the annex campus, students had lower test scores but are willing to pay additional admission fees.

This study is grounded methodologically in autoethnography and conveys the experiences of ten physics teachers, eight of whom teach on the main campus and two who teach on the annex campus. I employed qualitative research methods including interviews, long-term observations, teachers’ reflective journals, and researcher’s reflective journal to collect data. The data collection process took place over a four month period. I also worked as a teacher in the study school to build a rapport with participant teachers and to obtain firsthand teaching experience in this school.

I analyze and present the research data through teachers’ portraits using the constant comparative method (Lincoln & Guba, 1985). This process resulted in the generation of selective teachers’ portraits to depict a more comprehensive picture of participant teachers as well as portray three sets of themes related to the three research questions. The portraits focused on teachers’ professional beliefs, frustrations and struggles, professional pursuits, and/or current status. The portraits also included my own reflections on my experiences as a teacher in this school during the data collection process. These reflections illuminate my double identity as both teacher and researcher. My reflections also offer my comments on the participant teachers. The themes generated from my analysis are:

1. How do physics teachers exercise individual agency in the reform context?
   - Personal history, currency, and teacher’s moral standards influence teacher agency.
   - Students are the catalysts to physics teacher agency.

2. How do physics teachers exercise collective agency?
• Collective agency is stimulated by structural change.
• The manifestation of collective agency must be initiated and organized by group leaders.
• The development of technology enables collective agency to overcome geographic boundaries.

3. How do physics teachers negotiate the relationships between individual and collective agencies?
• The collective agency events created a need for individual agents’ professional development.
• The collective agency events generated a culture for collaboration which also could address individual needs.
• The collective agency events provided concrete examples of reform implementation for individual agents.

Conclusions of the results and several implications are developed through the analysis and discussions in Chapter four. The nature of conditions for physics teacher agency are then summarized. Finally, I propose implications for theory, practice, professional development, curriculum implementation, and future research in the following section.

Conclusions

The debates on whether agency or structure is the primary determinant of human action have developed from an objectivist to a subjectivist perspective and now to a duality which signifies the interdependent relationship between both in this study. Agency was enabled and constrained at the same time by structure. Davies (1991) challenges the inclusion of agency and argues that agency is not restricted to elite groups, but that every individual possesses agency.
Giddens (1984) frames agency as capability and knowledgeability. Capability refers to the capacity for individuals to act otherwise and to make a difference in human affairs (Shilling, 1992). Here “otherwise” refers to the power that individuals deploy to intervene in social life. Knowledgeability refers to agents’ knowledge and awareness about the society and the way it is constituted. Agents are able to assess the environment and predict the consequences of their actions. Together, capability and knowledgeability enable human agency to subvert, resist, and change the surroundings. Bandura (1999) establishes triadic reciprocal relations among intrapersonal factors, behavioral patterns, and environmental events. The three determinants influence one another in bi-directions. Giddens (1982) further argues that social structure has recursive features which constantly interact with human agency. Based on Bandura’s, Giddens’ and Davies’ notions of human agency, I develop human agency as the capacity to constantly recognize and evaluate the constitutions of surrounded social structures and to retain the possibilities to act upon, subvert, and resist the existing social structures.

I reject reductionism and favor juxtaposing of both positivism and interpretivism epistemologically and methodologically. Hence, methodologically, I employed autoethnography and served as both a teacher and a researcher in the school. I used teachers’ portraits and the constant comparative method to present and analyze the research data. Interactions with students were the most effective factors influencing teachers’ agency. Student’s needs, appreciation, and their trust surpassed the reform and even the College Entrance Examination (CEE) as the catalysts that shape teacher’s actions. Teachers’ reflexivity of professional practice, as the core property of agency, was mostly initiated through interactions with students. The point I am trying to make here is that the interactions between teachers and students could be understood as a
complex system in which teachers receive instant feedback from students and make adjustments of actions in the process of achieving common objectives.

The instant feedback at ground level is described by Johnson (2002) as a emergence system. Teachers’ attentions focused more on the ground level events rather than more distant structural constrains. Johnson states that in such systems, the massive and dynamic engagements at the ground level would emerge to a broader change of the entire system. In the long term, teachers and students built trust and appreciations with one another. Such relations remain in teachers’ memories and affect their future practices even after their students graduate. The memories, often as significant figures or events, become concrete examples in teachers’ practice; memories they can constantly refer to.

The instant feedback system extended to collective agency as well. When the participant school established the main body class, physics teachers, as contributors, formed concrete memories of how the reform mandates were embodied at the school level. In addition, the main body class set up a lived case in school that teachers could observe every day. The existing case at the ground level exerted critical influence on teacher’s understandings and implementations of the reform because teachers could constantly refer to the main body class as a case of new curriculum implementation. The main body class offered teachers instant feedback upon curriculum implementation and thus promoted the reform implementation at the school level.

Supported by various studies (Frost & Durrant, 2002; I. F. Goodson & Numan, 2002; Kimber et al., 2002; Klein, 1999; Lane et al., 2003; Lasky, 2005; Meixner, 2006; Schweisfurth, 2006; Sloan, 2000, 2006; Turnbull, 2005), teacher agency is influenced by their professional identities, curriculum reform, tests, professional development programs, and moral beliefs. The Chinese case is no exception. However, Chinese history and its social structure provide specific
features of the environmental determinants in which teacher agency is embedded. The Buddhism influence on Chinese society produces a fortuitous engagement between a Buddhist music concert and a struggling teacher who was about to quit teaching. Chinese history nurtures a rich soil for Buddhist thoughts to flourish and to be welcomed by Chinese people. Together with the traditional Confucianism which persuades people to seek problems or transformations from oneself, this teacher lived through his struggles and shifted his mind set. Our struggling teacher returned to teaching with a fresh perspective on his students.

In contemporary Chinese history, the people have experienced a transition from a centralized Soviet socialism system to a gradually decentralized socialism society with Chinese characteristics. Such a transition occurred over the past three decades, and teachers of different ages experienced this transition to varying degrees. Teachers who experienced the Soviet system education still held nostalgic sentiments. These teachers preferred to focus on content knowledge and had doubts about the current curriculum reform. Teachers who did not experience the Soviet education system tended to focus more on the development and growth of a child as a whole. They strove to educate students into righteous and positive individuals. Even though sometimes constrained by the CEE, these teachers were willing and did spend time with students to build a rapport and ensure students developed in a healthy way.

The conflicts between the reform and the CEE pose a challenge to the top-down system. Admittedly, the CEE is seen as the culprit of many education related issues in the pre-collegiate education system in China. The current exam system, however, has been well accepted by teachers, parents, students, and society. The reform, proposed and launched from the central government and the Ministry of Education, attempts to disrupt the existing exam system. The reform designers propose teaching methods and assessment approaches that might undermine the
exam system. The conflicts between the reform and the CEE are more than a negotiation between two social structures. It is a negotiation between a top-down presupposed structure and an existing structure that was accepted at the grassroots level. Therefore, the challenge to the reform is more than transformative teaching methods and assessment approaches. It is to convince the stakeholders in education to accept such transformations. The establishment of a grassroots foundation for the reform is critical to the success of curriculum implementation. This study demonstrated how the school developed a grassroots foundation through the main body class. The main body class was initiated by a school principal with strong efficacy. When the main body class proved that student’s high performance was sustained in exams, parents and students began to accept this model. When the main body class proved that its students were more active and engaged in class activities, the school’s teachers were convinced by the efficacy of the new model. This case proved that the CEE and the reform were not necessarily in conflict and that a bottom-up model from the school level could inform the further implementation of the reform.

Chinese society is described as a collectivistic culture in which people work more productively in a collective oriented system (Bandura, 1999). This study indicated that most teachers tend to be shaped by the structural requirements rather than actively change the rules and systems. In the main body class case, the principal became an embodiment of the structure as he was in a higher position to teachers. The success of the main body class is thus owed to the collectivistic culture in China. In addition, the collectivistic culture also nurtures teachers’ willingness to work collaboratively. The main body class created a platform for long-term collective work and teachers built a strong community through collaboration.
Implications

Implications for theory

Human agency existed in individuals and was historically situated and culturally shaped. The immediate environment exerted heavier influences on human agency than broader contexts. Constant interactions among agents established rapports, trust, and appreciations which could sometimes surpass the rules, systems, and structures. The instant feedback teachers received from students within a classroom could be understood and interpreted through complexity thinking. Meanwhile, the recursive feature of rules, systems, and structures implied a sense of evolving forward within the interactions between agency and structure. Thus, I consider the relationship between agency and structure as a dynamic, evolving, and adaptive system (Khan, 2012). The system could “adapt and respond to changes in a dynamic environment while maintaining a dynamic coherence” (p. 9). The major intellectual contributions of complexity thinking are “biological/ecological considerations and processes across phenomena…across all scales –from the sub-personal to the personal, through the interpersonal, across the social and cultural” (p. 9). Therefore, thinking agency and structure through the lens of complexity endows the relations a sense of moving forward.

As discussed in Chapter two, the philosophical trends in the social sciences have moved from objectivism to subjectivism to a competition between the two and, finally, towards reconciliation. Both Bandura’s (2006) and Giddens’ (1984) notions of human agency imply future development. In addition, the larger social context requires a complex relationship between human agency and structure.

Bandura suggests that individuals are “partial authors of the past conditions that developed them as well as the future course their lives take” (Bandura, 2006, p. 165); Giddens
(1984) claims that social structures constrain and enable human actions and actors to constitute and reconstitute social systems through a recursive process. I sense that in both Bandura’s and Giddens’ theories, the relationship between agency and structure is an evolving and self-governing processes. It is interactive, interdependent, but moving forward over time. By moving forward I mean the emergence among the interactions between agency and structures. Johnson (2001) defines emergence as “the movement from low-level rules to higher-level sophistication” (p. 18). In Kauffman’s term (2008), emergence is generated from repeating work cycles. Work cycle is a cycle of spontaneous and nonspontaneous processes featuring their non-equilibrium status and the capacity to embrace energy inputs. In the processes of repeating and renewing, the emergence occurs “by selection of agency, given the self-reproduction and heritable variation” (p. 85). Kauffman presents the concept of emergence to counter-argue reductionism and offers a “major part of the new scientific worldview” (p. X). He argues that the dominant reductionism view in physics cannot apply to the field of biology simply because human beings and other animals have agency to make selective decisions. These processes cannot be reduced to micro-level mechanism such as cells or DNA. Kauffman’s position not only aligns with Bandura’s rejection of epistemological and methodological reductionism, but also sheds light on a comprehensive perspective to look at agency and structure.

Renowned physicist Stephen Hawking predicts the 21st century will be the century of complexity in terms of “the emergent and transdisciplinary domain of complexity thinking” (B. Davis & Sumara, 2006, p. 3). Interdisciplinary, international, intercultural, and hybrid studies also thrive in social science and humanity. Bandura (2006) argues that system-level emergence calls for theoretical plurality across multiple disciplines such as biology, neuron-science, and
psychology. Under the inspiration of words such as evolving, self-governing, emergence, and multiplicity, I propose to adopt complexity thinking to inform the development of human agency.

I must emphasize that I neither intend to strictly follow the complexity theory (Mason, 2008; Morrison, 2008) and use it to interpret human agency and social structure; nor do I adopt the six conditions of emergence proposed by Davis and Sumara (2006, pp. 129-152). I prefer employing complexity “as a way of thinking and acting” (p. 25) in a broad sense and understand the relationship between human agency and social structure as a set of emergent processes as well as the intimacy to inter-/trans-disciplinary. The relationship between human agency and structure is dynamic, evolving, recursive, self-governing, and maintains a certain continuity. It carries features of biological systems such as adaptive and autopoietic. The system can “adapt and respond to changes in a dynamic environment while maintaining a dynamic coherence” (Khan, 2012, p. 9). The notions of “transphenomenality, transdisciplinarity, and interdiscursivity” in complexity thinking (Davis, 2008; Davis & Sumara, 2006) contribute to the various legacies and present understandings of human agency. Transdisciplinary, in Davis and Sumara’s (2006) sense, refers to:

a research attitude in which it is understood that the members of a research team arrive with different disciplinary backgrounds and often different research agendas, yet are sufficiently informed about one another’s perspectives and motivations to be able to work together. (p. 3)

In adopting complexity thinking, I reject reductionism in understanding and studying human agency. I recognize the self-organizing, evolving, and, trans-disciplinary features of agency and structure, and I propose to frame agency and structure through a complexity thinking lens. The interactions between agency and structure are hardly linear but discursive and
recursive. Human agents mostly interact with immediate surroundings and have less interactions with higher social rules. By acknowledging the existence of agency, I embrace the existence of consciousness, human will, and subjectivity. The rejection of reductionism, however, does not mean the rejection of objectivity and materials. Ontologically, I perceive the world as the dynamic mixtures of subjectivity and objectivity. Epistemologically and methodologically, I reject reductionism and favor the juxtaposing of both positivism and interpretivism. Thus, human agency exists in the nexus of social structure. Human agents mostly interact with immediate surroundings and have fewer interactions with higher social rules. For example, students often interact with peers and teachers but not as often with school district administrators. In other words, the intra-level interactions occur more often and have a greater impact on agents.

Emergence, in the case of agency and structure, may be considered as rules or codes generated through intra-level and inter-level interactions. Such rules and codes are value-laden because agents, structures, and their interactions bear their histories and present situations. At the same time, the newly generated rules and codes stimulate new reactions, form new memories, and shape human agency. Structures and agents are constantly dissolved and recovered. The recovery is never a total reconstruct but a process of changing and always in non-equilibriums. The way to perceive agency and structure is, in Johnson’s (2001) words, “about giving up control, letting the system govern itself as much as possible, letting it learn from the foot prints” (p. 234), and “see what happens” (p. 233). Thus, I propose to consider the relationship between human agency and structure in a three dimensional way, not only including the individual consciousness and socio-cultural context of the present, but also with addition of a time frame; to situate such a relationship within a historical context, not just in the past but also to envision the future.
Implications for practice

The study indicates that students are the stimulant for teachers’ reflections in practice. Most teachers’ reflections upon practice are reactive rather than proactive. Researchers have argued the importance of reflections for human agency (Bandura, 2006) as well as for teachers (Grimmett, 1988). This study suggests that in order to shift teachers’ reflections from reactive to proactive, teachers need to establish their routines of reflection and incorporate reflections into their daily practice.

Teacher agency is encouraged when teachers feel they are needed by students, and when they can contribute to students’ growth. Students’ needs, vulnerability, and pliability motivated teachers to take actions or even to resist the curriculum reform and the CEE. The prerequisite to empower teacher agency is the rapport that develops between students and teachers. In addition, a strong teacher community in which teachers are familiar with and trust one another enable individual as well as collective teacher agency in school. Therefore, building cohesive communities in schools is the key to enhance both teachers’ individual and collective agencies. Building such a community requires a shared objective and a leader with high efficacy. The shared objectives need to be clearly understood and accepted by each member within the community. Divergence in objectives may result in conflicts and frustrations within the community. By working together towards the common objective, stronger connections are often established in the process and result in consolidations of teacher agency.

Implications for professional development

Teachers claimed they received professional development training for reform implementation from the municipal educational department. Few teachers found the training helpful and feasible as the trainings failed to offer concrete suggestions and examples of
implementation strategies. The government’s professional development program played a role of informing teachers of the new curriculum intentions, objectives, and ideologies. The main body class offered teachers an opportunity to participate in the reform implementation at the school level and provided a concrete example that teachers could learn from and refer to when implementing the curriculum. Instead of preaching, the main body class offered an alternative approach for teacher’s professional development to imperceptibly immerse teachers into the implementation practice. Such strategies could not only provide concrete examples of curriculum implementation but also help teachers witness and accept the reform. Being willingly exposed to and involved with the curriculum reform rather than being forced into it will help teachers become reform agents and initiators in schools.

**Implications for curriculum implementation**

Contemporary Chinese history has experienced a transition from a centralized top-down system to a more decentralized one. The reform is initiated from the central government but requires bottom-up responses and initiatives. As the current Chinese society is in the transition period, a successful reform must be consistent with such transitional features. The reform needs to receive both central and grassroots support. Currently, the challenge for the reform is to be accepted by local schools, students, teachers, and parents. This study depicted an example of how the reform was adopted and initiated at the school level. The example is successful because it addresses students’, teachers’, and parents’ concerns and at the same time, shows the merits of the new curriculum. More importantly, a firm leader of the school persistently supported the school reform and set up the infrastructure where teachers could work collectively. With the development of Chinese society, further decentralization seems to be the future direction. Thus,
more school initiated and situated reform should be encouraged in order to establish a bottom-up structure that could respond to the central curriculum reform mandates.

**Implications for future research**

I would like to suggest two directions for future research: 1) how traditional Chinese wisdom influences teachers’ reflexivity; and 2) how engagement among individual agents shape teacher agency. This study encountered a case where a teacher fortuitously attended a Buddhist music concert and transcended his struggles in teaching. Chinese Scholars Zhong and Zhang (2003) argue that three traditional Chinese wisdoms (Buddhism, Confucianism, and Taoism) have shaped the present field of education and curriculum studies. The American scholar Dewey (original in 1929, reprinted in 2007) concludes that Taoism is the foundation of the Chinese people’s daily life while Confucianism has a deeper influence among Chinese officials. He appreciates the non-doing doctrine from Taoism. The three wisdom traditions seem to suggest a tendency to reflect, to seek inner peace, and to refrain from intervention. As reflection and reflexivity are the central property of teacher agency, it would be interesting to explore the connections between the Chinese wisdom traditions and their connections to teachers’ agency.

The second research direction emerged from teachers’ engagement with students and my own teaching experience in this study. Most scholars theorize human/teacher agency based on its association with structure and intrapersonal factors. However, interpersonal factors such as the engagement among agents are rarely discussed in current literature. This study shows that the individual teacher’s engagement with other agents such as students, administrators, parents, and colleagues, in fact, has a heavier influence on teacher agency because such engagement could provide instant feedback to individual teachers for the short term and build a rapport in the long term. A more in-depth look at how agents interact with other agents, and how such interactions,
as a collective force, influence the broader structure would contribute to the development of human agency and structure.

**Limitations**

As previously mentioned, I made several compromises in the data collection process. The major compromises include: 1) I worked as an English teacher rather than a physics teacher in an international classes. This change resulted in me not developing, to a certain extent, a particular understanding of the entailments in teaching physics curriculum; 2) most participating physics teachers only wrote one reflection instead of a series of reflections, which limited my data and provided fewer opportunities to examine teachers’ reflexivity; 3) none of the participants taught the main body class and thus this study can offer limited insights on how the main body class teachers exercise their agency; and 3) one of the second round interviews with a teacher was cancelled due to schedule conflicts. These compromises may undermine the richness of data. Such compromises are the result of negotiation with participant teachers and school administrators. I strove to maximize the level of respect for teachers and administrators and, at the same time, minimize the impact on the richness of data.

**Final remarks**

The four-month immersion in the participant school allowed me both as a teacher and as a researcher to appreciate and reflect upon the origins, development, and negotiations of physics teacher agency in the on-going curriculum reform in China. Listening to the teachers’ voices and observing my own students in this study made me realize the complexity and dynamics teachers and students encounter in their daily school life. The national reform guidelines often appear to be quite general and even overwhelming for schoolteachers. It is teachers’ agency that enables teachers to evaluate the various and changing social conditions and negotiate their actions in
their teaching practice. Teachers’ agency concretes the general reform guidelines and translates them into specific pedagogies. The Chinese pre-collegiate education system, as well as the entire society, have experienced rapid changes in the past thirty years. The uniqueness of the Chinese institutional, societal, and cultural context have shaped physics teachers’ agency. At the same time, physics teachers produce, change, and reproduce the institutional, societal, and cultural surroundings. With the tendency of internationalization and the development of modern technology, the challenge that lies before both the reform and teachers is bridging international thoughts and local uniqueness. This study of teachers’ agency may shed light on addressing such challenge.
References


doi:10.1016/j.ijedudev.2008.02.008


doi:10.1080/1363243022000007728


Sloan, K. (2000). Teacher agency and the TAAS: maintaining the ability to “act otherwise.” Retrieved from


Appendix I: Interview protocols

First round:

1. General information about the teacher:
   How long have you been a teacher?
   How many classes are you currently teaching?
   How many students in each class?
   Which unit/chapter are you currently teaching?
   How do you feel about your teaching in general (students, contents, progress, workload, etc)?

2. Personal history:
   Why do you choose to be a teacher? What factors influenced you to become a teacher?
   Follow up questions to further explore these factors.
   In these years of teaching, are there any people or events influence your perceptions on teaching profession? What kind of influence?
   Are there any events that shake or consolidate your faith in this profession?

3. Reform and teaching:
   How do the new curriculum reform policies influence your actions in practice (if any)?
   What do you think of the reform policies and your change in practice?
   What is the characteristic or culture of this school? Does it have any influence on the reform implementation?
   Does the reform constrain or liberate you in terms of exercising daily practice?
   How about students’ and parents’ attitudes toward the reform?
   How do you see the relations between the reform and the College Entrance Examination?
What do you do in practice to make sure you address the needs of both (the reform and the CEE)?

To what extent do you think that you can choose the teaching approaches you want in the reform?

4. Properties of agency

What are your teaching objectives in this phase?

Why do you set these objectives as your objectives?

How do you achieve your objectives in the following period of time?

What factors would make you reflect on your teaching practice?

What would you reflect on?

Would you write down these reflections?

How do reflections affect your teaching?

5. Collective agency and moral standards

Do physics teachers, as a group, have any collective objectives? (if yes, what are they?)

How are the collective objectives set up?

Were there any conflicts between individual and collective objectives? (if yes, how do you address such conflicts with the group?)

Do you have any collaborations with peer teachers in order to achieve the collective objectives?

Do you have other collaborations other than achieving the collective objectives?

How do you negotiate different opinions in collaborations?

What is, in your own opinion, a teacher’s professional moral?

Why do you consider these as teacher’s professional moral?
Second round:

1. Teacher agency and curriculum development

   The reform requires teachers to become curriculum designer and developer. In practice, to what extent can teachers get involved in curriculum development?

   What do you think of the curriculum development process?

   The reform requires teachers to develop curriculum with the intention that teachers could develop suitable curriculum for their own students, to what extent do you see such intention could be achieved in practice?

   What factors constrained and enabled you to develop curriculum?

   Would you change the sequence of the units in the textbooks if you feel the textbook arrangement is not appropriate?

2. Teacher agency and other factors in the reform

   In teaching, how do you decide which parts/units are important and which are not?

   To what extent do you think you have the room to try new/different things in the context of the reform?

   What factors enabled and constrained you to try new/different things in practice?

   What are your struggles in teaching?

   What are students’ and teachers’ expectations to you as a teacher?

   Is there any case that you have experienced or witnessed that teachers attempted to change a system or certain rules?

   Do you think, in general, it is more of teachers change the system or the system shape teacher’s actions? Why is that the case?
3. Plans and implementations

In last interview, you mentioned your objective/plan in teaching is…, do you think you have achieved such plans/objectives now? What factors helped/stopped you to achieve your objectives/plans?

I observed you use…strategies in your class. Why do you use such strategies in that class?

What do you think are the distinctiveness of your current students?

Please note this protocol provided a frame for the interviews. The questions were changed or extended based on how the information emerged as well as contextual factors.