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Teachers' Implementation of Constructivist Teaching: Does Career Motivation Make a Difference?

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TEACHERS' IMPLEMENTATION OF CONSTRUCTIVIST TEACHING:

DOES CAREER MOTIVATION MAKE A DIFFERENCE?

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This quantitative study used a shortened version of Constructivist Learning Environment Survey and Factors Influencing Teaching Choice Scale to investigate the extent to which teachers implemented constructivist teaching in their classes and whether teachers' career motivation had any relationship with that implementation. The researcher also explored demographic factors, such as gender, age, years of teaching, etc., to see whether they had certain effects on teachers' implementation of constructivist teaching.

Overall, teachers perceived their teaching as relatively high level of constructivist-based. Among the five constructs of Constructivist Learning Environment Survey, teachers taught critical voice most often, and personal relevance and student negotiation followed. Uncertainty and shared control were taught less often in classes. It was found that motivation factors of teachers' self-perception of teaching ability, make social contribution, and prior teaching and learning experience, teachers' beliefs about expertise of teaching, social status, and salary, and satisfaction with career choice were significantly correlated with different constructs of constructivist teaching. Gender, age, years of teaching, grade level, and subject area were found to be influential factors.

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CHAPTER ONE

INTRODUCTION

The No Child Left Behind (NCLB) Act started to be criticized only right after it was implemented in 2002. This law started with good intentions, yet the forms of implementation were found to be detrimental to schools and students in a broad sense. As Amrein and Berliner (2003) reported, the nationwide, mandated, high-stakes testing has contributed to the decline of students' motivation to learn and to the increase of student retention and dropout rates. NCLB uses measurable goals and standards to promote individual learning. Achieving high test scores have been a significant goal for many schools and teachers. However, what do high test scores really mean? If students do well on tests, does that mean they are well educated? There are no certain answers for these two questions. Testing may be necessary in teaching and learning, but scores are only a small part of the results of education. It is hard to measure how well students are educated, as well as how well a teacher has taught.

Traditional behavioral teaching which is based on rewards and punishment is still popular in many schools and among many teachers (Schunk, 2008). Rewards and punishments are regularly used for students, although they have been criticized considerably (Jenkins, 2004). No Child Left Behind creates a supportive environment for "rewards and punishments" strategies. In order to achieve those measurable goals established for schools, teaching to tests is common (Musoleno & White, 2010). Many teachers focus on those measurable results and ignore other immeasurable things, which may be more important in education. Brooks and Brooks (1999) pointed out that students did not learn to apply knowledge and abilities to new settings or solve real life problems when instructional

strategies were intended to promote students' test taking skills. Regardless of the assignments they have done and test scores they have received, "too many students are simply not learning" (Brooks & Brooks, 1999, p. viii). Teaching to tests is prevalent in schools under the current standardized test systems. In their study, Brooks and Brooks found that students tried their best to seek "rightness" and avoid "wrongness". Methods of assessment, as they are applied in schools, communicates to students that there are always standardized or correct answers provided by teachers in their learning (Kohn, 2004). They memorize required content and forget it all after exams (Jenkins, 2004). As education scholars such as Kohn and Jenkins claim, students seem to lose their control over learning, and their innate curiosity of the world is gradually eliminated because they are not provided opportunities to explore the knowledge in which they are interested and which is meaningful to them.

Are there teachers endorsing other approaches in classrooms in spite of the overwhelming standardized test pressure? For example, does teaching from constructivist perspectives instead of behaviorist perspectives occur? Constructivist approaches for teaching embrace the idea of student-centered instruction, experiential learning, and action-oriented learning. It fits well with the nature of how learners learn: people construct their understanding of reality in different ways. Every person is entitled to have doubts about any statement called "truth" (Schunk, 2008).

There is nonstop criticism on the harmfulness of the standardized testing system from educators and people of other fields (Jenkins, 2004; Kohn, 2004), yet it is hard to change the current policy quickly enough to see short-term results. There is substantial evidence

(Ormrod, 2008; Schunk, 2008) showing that meaningful learning is fundamentally constructive, though it is an idea that is not unanimously agreed upon. Nevertheless, creating a constructivist learning environment for learners seems critical in education.

Statement of the Problem

Motivating students to learn is one of the most difficult problems in teaching, as many teachers reported (Ormrod, 2008). Low motivation is a critical reason that many adolescent students do not perform well academically and drop out (Meece & Daniels, 2007). Especially, because of No Child Left Behind, the standardized test system has been driving teachers to focus on measurable skills and learning outcomes. Kohn (2004) maintained that students are drifting away from in-depth learning and critical thinking. Moreover, they are losing interest in learning.

Authorities like Jenkins (2004) argued that students do not enter schools to be motivated; they are originally and naturally full of curiosity and enthusiasm. Teachers' responsibility is to unleash this innate curiosity. If motivating students to learn is one of the difficult problems in teaching, as many teachers report (Ormrod, 2008), it will be the responsibility of educators to reflect on the determining factors causing students to lose their motivation and stop such practices (Jenkins, 2004; Sullo, 2007; Svinicki & McKeachie, 2012).

Traditional perspectives about students as passive learners and teachers as experts controlling the learning environment have been agreed upon as a narrow teaching philosophy (Jacobsen, Eggen, & Kauchak, 2009). However, the problem under such conditions is that people's acceptance and practice of constructivist pedagogy has been limited despite the

evident benefits (Kenny & Wirth, 2009). More knowledge on constructivist teaching needs to be presented to people. Most research on the practice of constructivism focuses on science and mathematics classes. Constructivist pedagogy is rarely discussed in teaching other subject matters. Evidence is needed for people to examine whether teachers in different subject areas are implementing strategies to promote constructivist learning, as well as reasons for doing so. Based on expectancy-value theory, individuals' motivation for certain tasks has strong effects on their decision making and perseverance in the task (Eccles, Adler, Futterman, Goff, Kaczala, Meece, & Midgley, 1983). What motivates people to decide to be a teacher has been discussed since the 1960s (Mori, 1965; Watt & Richardson, 2007). Missing from the literature are studies that examine whether teachers' motivation for choosing teaching as career is an influencing factor when teachers determine their instructional strategies; in this case, it is the strategy of constructivist perspective.

Purpose of the Study

This study intends to examine the extent to which teachers are implementing constructivist teaching practices. The researcher will explore whether there is a relationship between teachers' teaching choices and their constructivist teaching, as well as other factors that are related to the constructivist practices. Teachers' motivation is a significant aspect to study because it influences people's decision making, dedication, and perseverance in certain tasks (Watt & Richardson, 2007; Wigfield & Eccles, 2000; Yu, 2011). To determine whether in-service teachers' instruction in Pennsylvania schools is based on constructivist principles, a survey combining the existing Factors Influencing Teaching (FIT)-Choice Scale and

Constructivist Learning Environment Survey (CLES) was disseminated to in-service teachers in Pennsylvania schools.

Theoretical Framework

Two theoretical perspectives form the foundation for this research: constructivist learning theory and expectancy value theory. The following paragraphs provide a synthesis of these two perspectives.

Constructivist Learning Theory

"Constructivism is a theory about knowledge and learning; it describes both what 'knowing' is how one 'comes to know'" (Fonsnot, 2005, p. 1). From a constructivist perspective, learning is not stimulation-response but an actively and internally constructing process that makes connections between learners and their environments (Julyan & Duckworth, 2005; von Glasersfeld, 1995). People construct knowledge and meaning through their own experiences, and learning is active and adaptive, so the process of learning should serve learners' personal experiences (Geary, 1995; J. S. Kim, 2005; Mayer, 2004; Riegler & Quale, 2010).

Traditionally, knowledge is considered as representation of the objective world, which is independent from learners. Constructivism does not deny the objectivity, but it proposes that there should be a connection between the objective world and learners themselves. The connection is the action of knowing which is associated with people's existing experiences (von Glasersfeld, 1995). The existence of the real world only makes sense when it enters a person's experiential world. Human knowledge is not made until people successfully conceptualize the reality (von Glasersfeld, 1995, 2005). As stated by Schunk (2008),

> Knowledge derives from interactions between persons and their environments. Constructions are not invariably tied to the external world nor wholly the workings of the mind. Rather, knowledge reflects the outcomes of mental contradictions that result from one's interactions with the environment. (p. 238)

People have a variety of understandings and definitions of constructivism. Constructivist theorists believe that learners construct their understanding of the world in different ways, and they reject the notion of "truths" which should be perceived with "reasonable doubt" (Schunk, 2008). From an educational perspective, the common view of constructivist educators is that students are active learners who construct and organize meanings of the world in their own way. Activities should give learners autonomy and control over their learning (Jacobsen et al., 2009). The constructivist approach focuses on learners' cognitive changes other than behavioral changes (Fosnot & Perry, 2005). Classes are student-centered rather than the teacher controlling the whole learning process and environment (Jacobsen et al., 2009).

In the current study, the researcher used the existing Constructivist Learning Environment Survey scale that defined constructivist approaches with five constructs: personal relevance, uncertainty, critical voice, shared control, and student negotiation. A teacher who teaches his/her class based on the five areas is determined to teach from constructivist perspective.

Expectancy-Value Theory

Expectancy-value theory is an important theory on achievement motivation. The basic idea of this theory is that individuals' decision making, dedication, and perseverance in

upcoming tasks are based on their expectation of how well they will perform in the activities and the value of the outcomes to them (Eccles et al., 1983; Schunk, 2008; Wigfield & Eccles, 2000; Yu, 2011). The expectancy construct refers to people's personal beliefs or perceptions on their possibilities to succeed in the future tasks. The value constructs refer to perceived significance of the task or people's beliefs about the importance to engage in certain behaviors. It is comprised of four subcomponents: attainment value, intrinsic or interest value, utility value, and perceived cost.

This framework was first developed to measure high school students' academic achievements, but it was extended by Watt and Richardson (2007) and applied to the choice of a teaching career (Richardson & Watt, 2006; Watt & Richardson, 2007). The FIT-Choice Scale was developed and validated by Watt and Richardson (2007), aiming to investigate factors that influence Australian pre-service teachers' decision to choose teaching as career.

Research Questions

This study intends to explore the following research questions.

Research Question #1: To what extent do teachers report their implementation of facilitating constructivist learning in class?

Research Question #2: What are the motivation factors that influence in-service teachers' career choice?

Research Question #3: What is the relationship, if any, between teachers' motivation for choosing teaching as a career and their implementation of constructivist teaching?

Research Question #4: What other factors are related to teachers' practices of promoting students' constructivist learning?

Significance of the Study

Theoretically, this study provides deeper understanding of constructivism and its significance for educators. This study was one of the first to investigate in-service teachers in all subject areas on their constructivist approach to teach using the Constructivist Learning Environment Survey (Taylor, Fraser, & White, 1994), which was originally designed for mathematics and science teachers to measure whether their instructional strategies were designed to promote constructivist learning. This survey was modified as a general questionnaire to measure teachers' professional practices of constructivist approach. Factors that influenced teachers' practice of constructivist approach were discussed. Additionally, Factors Influencing Teaching Scale (Watt & Richardson, 2007) was used for the first time to investigate its connection with constructivist approach practice according to literature review. Teachers' motivation for choosing teaching has been paid much attention, but whether and how it influences teachers' professional practice were rarely explored.

Practically, the study provides valuable information about the relationship between factors of teachers' career motivation and their constructivist teaching that was measured in five aspects: personal relevance, uncertainty, critical voice, shared control, and student negotiation. As role models for pre-service teachers to some extent, teacher educators will benefit from this study, which will help them with new understanding of constructivist learning and their use of a constructivist approach for teaching. This study also provides perspectives that enable in-service teachers to reflect on their teaching strategies and classroom management. School administrators will see the importance of teachers'

satisfaction with their job according to the study result. They may also gain practical ideas that help with their faculty hiring.

Delimitations of the Study

Participants enrolled in this study were limited to K-12 in-service teachers in five school districts in Pennsylvania. The generalization of the study results may be limited to K-12 teachers in Pennsylvania schools.

Limitations of the Study

There are four primarily limitations to this study. First, geographically, the participants were sampled from five school districts in Pennsylvania. Generalization of the results may be limited and may not be able to be generalized to K-12 teachers in other geographic regions. Moreover, teachers who participated in the study may be those that were more interested in constructivist teaching since the basic design of the study was introduced before they entered the survey. Second, participants' understanding of survey questions was subjective, though we have quantitative results of teachers' implementations of constructivism using Constructivist Learning Environment Survey. No further interviews were conducted based on the results. Therefore, there was no in-depth knowledge of how teachers comprehended the survey and in what specific ways they implemented constructivist practices in their classrooms, nor the reasons for their practices. Third, due to the relatively small sample size, some in-depth statistical analyses could not be conducted in order to gain more information about factors that influenced teachers' implementation of constructivism. For example, the Linear Regression analysis. Last but not least, the first part of revised FIT-Choice Scale in the current study was about the factors that influenced teachers' career choice

in the past. According to the data, most participating teachers have been a teacher for more than 5 years. Their understanding of original career motivation might be changed after many years of teaching. Therefore, the data might not be accurate.

Definitions of Terms

Constructivist Learning Environment Survey

The Constructivist Learning Environment Survey (CLES) was developed by Taylor, Fraser, and White in 1991 in order to provide an instrument to help teachers observe their constructivist based teaching in science and mathematics classes. The survey includes a student form and a teacher form. The goal was to provide an efficient way for teachers to reflect on their instructional approaches and classroom management both from self-reflection and students' perceptions. Specifically, it is for teachers to reflect to what extent they have created a learning environment that facilitates students' development as autonomous learners. The survey was revised in 1994 to address social-cultural constraints (Taylor, Dawson, & Fraser, 1995; Taylor et al., 1994). In this study, only the teacher form of the survey was used to investigate practicing teachers in all subject areas.

Personal Relevance

Taylor et al. (1994) aimed to assist teachers to design and practice constructivist pedagogy beyond students learning abilities and skills. This subscale is to measure whether students' personal experiences and background are taken into account as part of instructional materials in classrooms. Any personal life experiences could contribute to students' understanding of math and science. However, the subject matters were expanded to any subject instead of only math and science in this study.

Uncertainty

The construct of uncertainty is about limitations of scientific knowledge such as math and science. In this study, it is about the knowledge of different subject areas that can be questioned and doubted. Students should be provided opportunities to understand any truth could be doubted. Knowledge is evolving and changing due to social and cultural development and diversity (Taylor et al., 1994).

Critical Voice

Students feel free to express themselves in class, such as questioning teachers' instructional contents and methods or asking questions about their study or things relevant in appropriate and beneficial ways (Taylor et al., 1994). This construct also reflects the idea of self-determination. However, under standardized test system, there are scripted curricula in most classes. Having a voice in teachers' instruction sometimes is not easy for students to actualize.

Shared Control

One of the goals of education is to facilitate students to develop as autonomous learners (Jacobsen et al., 2009; Taylor et al., 1994). On the contrary of traditional classroom management, students have opportunities to share control of the learning environment including making decisions on activity design, learning assessment determination and application, and classroom rule agreement, etc. (Taylor et al., 1994). Students have control over their learning is one of the key concepts both in constructivist based teaching and self-determination theory (Deci & Ryan, 1985; Jacobsen et al., 2009). The sense of autonomy activates people's intrinsic motivation.

Student Negotiation

Student negotiation refers to student-student negotiation which involves each student has opportunities to express themselves to peers. It goes beyond the traditional activity in which students help each other to find out correct answers. It is about students exchanging ideas with one another and given opportunities to articulate and reasoning. Students try to understand peer's ideas and make themselves understood as well (Taylor et al., 1994).

FIT-Choice Scale

FIT-Choice Scale (Factors Influencing Teaching Choice Scale) was developed and validated by Watt and Richardson (2007) in Australia. This survey was designed to investigate factors that motivated pre-service teachers to choose teaching as their career based on expectancy-value theory. It is a significant survey that was developed based on a psychological framework, and a useful instrument to investigate pre-service teachers' career motivation empirically. The scale includes three parts, which are "factors influence teaching", "beliefs about teaching", and "satisfaction with the choice". Sixty-one items comprise the scale, including 18 first-order and 4 higher-order motivational factors. This scale was modified in the current study since the subject was in-service teachers instead of pre-service teachers.

Ability Beliefs

In expectancy-value model, ability beliefs refer to personal evaluation of their current competence at certain tasks in different domains (Wigfield, 1994; Wigfield & Eccles, 2000). More specifically, in the model of Factors Influencing Teaching Choice, Watt and

Richardson's (2007) has defined ability belief as people's self-perception of their capability (Yu, 2011)

Attainment Value

Eccles et al. (1983) defined it as "the importance of doing well on the task" (p. 89). It is associated with personal identity or self-concept (Eccles et al., 1983; Wigfield, 1994; Wigfield & Eccles, 2000). When creating the FIT-choice scale, Watt and Richardson (2007) proposed that individuals tended to associate their personal goals with the importance of certain tasks. That means the reason for people to choose teaching as their career usually is not dependent on the career content, but relates to their personal life goals. Therefore, they rename the corresponding construct in the FIT-choice scale as *personal utility value*. Factors comprise this construct were termed as *time for family, job security, and job transferability*.

Antecedent Socialization

Based on previous research, the developers of FIT-Choice Scale added antecedent socialization to the expectancy-value motivational model. Antecedent socialization in FIT-Choice scale includes factors of prior teaching and learning experiences, social influences, and social dissuasion. They were designed to measure the extent to which teachers' prior teaching and learning experiences influence their choice of a teaching career, the extent to which the significant others influence them to enter teaching career, and the extent to which social dissuasion discourage them from teaching career (Watt & Richardson, 2007).

Fallback Career

Based on previous research, Watt & Richardson (2007) included the factor of fallback career into the FIT-Choice Scale. The construct of fallback career measures the extent to

which teachers have entered teaching career due to their failure to be accepted to other career choices or their uncertain of what they want.

Intrinsic Career Value

In the expectancy-value model, intrinsic value refers to the pleasure of participating in certain activities without considering external value of doing the activity. It is the process that matters when conducting the task (Eccles et al., 1983; Wigfield& Eccles, 2000; Wigfield, Eccles, Schiefele, Roeser, & Davis-Kean, 2007). In the FIT-Choice Scale, the construct of intrinsic career value was designed to measure participants' innate desire to involve in teaching and work with children/adolescents (Watt & Richardson, 2007).

Perceived Cost

To accomplish certain goals, individuals have to spend time and make efforts. They may have to sacrifice else opportunities for the goals. All of these are the cost a person has to take if they want to have achievements. The cost was identified as negative aspects of involving in an activity (Eccles et al., 1983). Based on research, Watt and Richardson (2007) expected that highly demanding work to teaching would discourage a lot of people to decide to be teachers. Cost refers to the discrepancy between task demand and task return in the FIT-Choice Scale.

Task Perceptions

Watt and Richardson (2007) renamed "perceived task difficulty", which was one of the higher order factors in the expectancy-value theory, to task perceptions. The construct of task perceptions contains two higher-order factors in the FIT-Choice Scale: task demand and task return. The two constructs were included in the second part of the scale called teachers'

beliefs about teaching. Task demand measures the extent to which teachers believe teaching as a highly skilled occupation with highly specialized knowledge, as well as an emotionally demanding career. Task return measures the extent to which teachers consider their occupation with high social status, well paid, and valued.

Utility Value

Utility value refers to the usefulness of certain tasks to one's goals or career plans. It does not necessarily have anything to do with an individual's interest, but rather, it has to be important and helpful for some future goal (Eccles et al., 1983). For this construct, Watt and Richardson (2007) renamed it as social utility value, as people's perception of usefulness of teaching is usually related to contribution to the society. Factors that make this construct were termed as make social contribution, enhance social equity, shape future of children/adolescents, and work with children/adolescents.

Summary

In this chapter, the researcher argued that there are significant challenges to well-rounded education under the current context of No Child Left Behind. This standardized testing system has ignored many immeasurable but significant aspects of student learning and education and focused on measurable results that may be important to some extent but not a complete indicator of educational quality. Under the overwhelming test-centered and teacher-controlled learning environment, students seem to be losing their motivation to learn. Based on those criticisms about behavioral perspective strategies, constructivist approaches are introduced. Creating a constructivist learning environment, in which students are the center of classes and teachers are responsive to student needs, seems to be helpful for

promoting student motivation to learn. Teachers play a significant role in protecting and promoting students' learning motivation. Based upon expectancy-value theory, the researcher proposed that teachers' motivation for choosing teaching as career has impact on their decision about different approaches to teaching, such as constructivist teaching. Seeking the relationship between teachers' career motivation and their constructivist teaching practices has been investigated limitedly before. The study intended to explore new information about constructivist practices, whether teachers' career motivation has connections with those practices, and other possible influential factors.

In the next chapter, a comprehensive literature review is presented about constructivism, classroom learning environment, and teachers' career motivation.

CHAPTER TWO

LITERATURE REVIEW

Constructivism has been well known for a long time. People's understanding about it has been varied, especially when it is used in teaching. There are educators endorsing it and educators resisting it. How have teachers applied it in classes? How can we measure it objectively? The researcher tried to seek the answers from previous studies and tried to find answers from the current study. As introduced in the previous chapter, this study intended to explore the degree to which teachers were practicing constructivist approach of teaching in their classrooms, as well as the relationships, if any, between teachers' practices and their motivation for choosing teaching. In this chapter, the author aimed to provide a comprehensive background of this study. The literature review included three different areas. In the first section, the researcher briefly reviews studies of classroom learning environment and discusses the importance of positive and supportive learning environment since the Constructivist Learning Environment Survey was the instrument of the current research. The next section reviews constructivist learning theory which was a major theoretical framework in the study, as well as constructivist teaching practices in classrooms. In the third section, the teacher as a key factor in student learning is emphasized. This section reviews different motivations for teachers to choose teaching, the development and use of the FIT-Choice scale, and the expectancy-value theory.

Classroom Learning Environment

One of basic goals of education is to promote student learning. The learning environment created for children is one of the significant factors influencing students'

everyday learning. The teacher is the key element in the quality of school education and student learning.

Definitions of Classroom Learning Environment

Learning environment has drawn considerable attention in the past four decades internationally since it is one of the strongest determinants of student learning (Fraser, 2002). Researchers have found it useful to study dimension of learning environment as a significant criterion to measure the effectiveness of teaching or curricula (Aldridge, Fraser, & Sebela, 2004; Kim, Fisher, & Fraser, 1999; Taylor et al., 1997).

A limited number of early studies discuss the definition of learning environment. Learning environment usually comprises physical, psychological, and social aspects. For the latter two aspects, some researchers simply state them as psychosocial environment (Goh, Young, & Fraser, 1995; Wong et al., 2006). Physical environment involves class resources and materials and classroom arrangement which are related to student learning (Milkie & Warner, 2011; Oluwatelure, 2010). Psychosocial environment, which is the focus of most studies, involves teacher and student behaviors, teacher-student interaction and relationships, peer relationships, classroom activities, and teaching strategies.

As Fraser (1998a) stated, "learning environment refers to the social, psychological and pedagogical contexts in which learning occurs and which affect student achievement and attitudes" (p. 3). Learning environment embraces teaching materials and methods, classroom activities, and any platforms of learning (Schaber, Wilcox, Whiteside, Marsh, & Brooks, 2010). In university settings, class structure and perceived workload are significant elements in learning environment (Lizzio, Wilson, & Simons, 2002).

As Fraser (1994, 1998, 2002) reviewed, a variety of instruments were created to measure student and teacher perceptions of classroom learning environments, such as Learning Environment Inventory (LEI), Classroom Environment Scale (CES), My Class Inventory (MCI), What Is Happening In this Class (WIHITC), Individualized Classroom Environment Questionnaire (ICEQ), and Constructivist Learning Environment Survey (CLES). Many of them are widely applied in different types of learning environment research. There are also diverse scales created or modified and used in specific fields such as science, mathematics, labs, and online classes (Arbaugh, 2000; DeVaney, Adams, & Elliott, 2008; Goh et al., 1995; Henderson, Fisher, & Fraser, 2000; McRobbie & Fraser, 1993). Different scales describe components of classroom learning environment in different ways, but they share common grounds in essential ideas.

LEI, developed in the late 1960s (Fraser, 1998b), was one of the oldest questionnaires to assess learning environment. Many questionnaires were developed based on it. This survey has three dimensions: relationship, personal development, and system maintenance and change. It included the following constructs of "cohesiveness, friction, favoritism, cliqueness, satisfaction, apathy, speed, difficulty, competitiveness, diversity, formality, material environment, goal direction, disorganization, democracy" (Fraser, 1998b, p. 10). Later questionnaires modified the survey as needed by including fewer items and simplifying the sub-scales. However, the basic constructs and essential ideas maintain the same. Two scales are popularly used: WIHITC and MCI. Constructs of WIHITC are "student cohesiveness, teacher support, involvement, investigation, task orientation, cooperation, and equity," and MCI's are "cohesiveness, friction, satisfaction, difficulty, and competitiveness"

(Fraser, 1998b, p. 10). And the components of Science Laboratory Environment Inventory (SLEI) are student cohesiveness, open-endedness, integration, rule clarity, and material environment.

From the development of instruments for measuring classroom environment, people can see a paradigm shift in education from behaviorist perspective to cognitive perspective (Fraser, 2002; Wanpen & Fisher, 2006). LEI, CES, and MCI were designed for teacher-centered classrooms at the earlier age, but ICEQ and CLES were shifted to the emphasis of the learning process of individual learners (Fraser, 2002).

Learning Environment and Student Achievement

To discuss student achievement, the measurement of learning outcome needs to be addressed first. Based on different research, learning outcomes includes cognitive and affective aspects. Cognitive outcome usually is measured through academic tests and subject relevant or general skill scales, while affective outcome usually contains students' attitude and motivation in learning, which are measured by different scales (Allen & Fraser, 2007; Goh & Fraser, 1998; Goh et al., 1995; Henderson et al., 2000; Lizzio et al., 2002; McRobbie & Fraser, 1993; Opolot-Okurut, 2010). For example, in Allen and Fraser's (2007) study, student outcomes included attitudes towards science and academic tests results, which were measured through three tests: an attitude test called Test of Science-Related Attitudes, an annual standardized test called Stanford Achievement Test, and a school-based test. Goh, Young, and Fraser (1995) investigated students' learning outcomes by measuring their interest for mathematics and results from an academic test.

Studies have shown that students' perceptions of their learning environment is proven to be one of contributing determinants in student learning, even when other variables are controlled (Dorman, 2001; Goh et al., 1995; Gordon & Mejia, 2006; Henderson et al., 2000; Lizzio et al., 2002; Waxman, Rivera, & Powers, 2012). That is to say, "students learn better when they perceive the classroom environment positively" (Dorman, 2001, p.244). For example, student perceptions of their chemistry lab environment are a contributing factor to their basic chemistry skills and their attitude towards this subject (McRobbie & Fraser, 1993). In a biology class, students' perception of some aspects of learning environment, including "the integration of practical and theory work, the degree of open-endedness, the teacher's leadership behavior, and the level of student responsibility and freedom", were proved to be statistically correlated with students' learning outcomes(Henderson et al., 2000, p. 37).

For more specific factors in classrooms, studies using different scales found that some classroom elements such as cohesiveness, task orientation, rule clarity, satisfaction, and teacher support positively associated with students' academic learning (Waxman & Huang, 1998). It was shown that "teacher support, student involvement, task orientation, and equity" significantly influenced student motivation in math learning (Opolot-Okurut, 2010, p. 267). Friction among students was examined to be the strongest predictor of student achievement in math (Bennett, 2001). Cohesion among students was positively related to students' attitudes towards mathematical learning and their achievement in this subject (Goh et al., 1995). Teachers' efforts to teach and support students were significant factors in students' learning. This applied to both online and traditional classes (Wong et al., 2006). Researchers even applied interventions to behavioral problems through changing classroom environments (e.g.

seating change, improving class material arrangement) which proved to be helpful to reduce disruptive behaviors and increase student engagement (Guardino & Fullerton, 2010).

Most studies measured classroom learning environment from students' perspectives. It is worth noting that students' perceptions of learning environment vary in different cultural backgrounds such as race, gender, class, grade levels, and school type (Goh & Fraser, 1998; Koul & Fisher, 2005; Trickett, 1978; Waxman & Huang, 1998).

Preferred Classroom Learning Environment

Research shows that students prefer cooperative activities that bring them fun and keep them active instead of passive (L. M. Johnson, 2006). Being controlled by teachers in the traditional way of lecturing, students are treated as passive learners and their potential abilities can be stifled (Levine, 1994). When students feel pressured by the environment their brains are restricted from learning new information. However, when students study in an open and supportive environment created by educators, their brains stay active and positive, which helps them to learn more and learn fast (Rushton & Juola-Rushton, 2008). In a university context, Lizzio et al. (2002) found that good teaching was the strongest predicting factor in learning environment to student learning outcomes. Good teaching refers to "clear goals and standards, appropriate assessment and emphasis on independence" in the research (Lizzio, Wilson, & Simons, 2002, p. 37). Students enjoy meaningful and useful instruction and feedback within an intrinsically motivating environment, which is student-centered and engaging. Students' preferences bring our discussion to constructivist learning.

Constructivist Learning Theory

Constructivism

Dewey, Piaget, Vygosky, and Bruner's classic works about how knowledge develops in learners are commonly recognized as the basis of constructivist learning theory (Fosnot &Perry, 2005; Mayer, 2009; Tobias & Duffy, 2009). The basic idea of constructivism suggests that learners construct their knowledge through interaction with the environment (Schunk, 2008). People establish their mental representation of the objective world through active cognitive processing when engaging in different types of activities (Mayer, 2009).

Usually perceived as opposing behaviorism, constructivism considers learners to be active, and learning happens through interaction between learners' experiences and their ideas, instead of observing and listening to explanations (Fosnot & Perry, 2005; Schwartz, Lindgren, & Lewis, 2009). That means human beings constructing their own version of reality, and thus transforming themselves at the same time (Fosnot & Perry, 2005). People with constructivist perspectives believe learners use their existing knowledge to comprehend new information and develop their personal understanding of the world. That requires us to inquire the meaning of learning.

Learning is not about memorizing facts, but about learners being able to conceptualize facts (von Glasersfeld, 1995). Learning involves permanent change, which learners are aware of, in learners' knowledge through their experiences (Mayer, 2009). From the constructivist view, doing is the key element in learning, and participation is the key word (Duffy, 2009). The learning process is active construction, not passive reception. It does not mean learners need to be given absolute freedom to build their own knowledge. Teachers

play a significant role to provide well-balanced guidance that facilitates learners' meaning making and information organization (Kintsch, 2009).

Constructivism in Teaching

Constructivism is a theory about learning and knowledge. It does not provide strategies to teach but principles in teaching. Brooks and Brooks (1999) urged that constructivist practice in classrooms is imperative. They suggested teachers need to respect and encourage student autonomy and initiative, listen to student responses and teach accordingly, encourage students to ask questions, create opportunities for conversations and communications among students, and promote students to explore uncertainty of knowledge. As Fosnot and Perry (2005) abstracted from constructivism, the following statements should be principles in constructivist classrooms:

a. Learning requires invention and self-organization in information process. Teachers need to allow students to question and think critically, as well as provide opportunities to verify their ideas;
b. Errors and conflicts cannot be avoided but need to be perceived opportunities to learn. Teachers need to create platforms that allow students to explore, discuss, and express;
c. Experiences or prior knowledge plays a significant role in human learning. Teachers should provide opportunities for students to reflect and make connections to personal experiences in classrooms in order to facilitate their learning; and
d. Students are the center during learning process. They are responsible for themselves and the learning community. Activities engaging students in dialogue and negotiation need to be promoted.

In short, a constructivist classroom values students' autonomy and give students' ownership of learning, which means students are the center of learning and teachers are not the class controller and play as students' learning facilitator (Jacobsen et al., 2009).

One of the goals of instruction is to facilitate students' long-term memory in learning, and it is not deniable that this process has to be constructive (Kirschner, Sweller, & Clark, 2006). From the constructivist perspective, instruction is most effective when practitioners respect the view of learning as active (Kintsch, 2009). Direct instruction seems to be considered as the approach that is on the opposite side of constructivism. Emphasizing discovery, problem-based, experiential, and inquiry-based learning is widely recognized as constructivist approaches in classrooms (Gresalfi & Lester, 2009; Kirschner et al., 2006; Klahr, 2009). This does not mean direct instruction should not be used in classrooms. Like Simpson (2002) stated, "No single strategy exists that will achieve success with all students" (p. 351). Surely, there is certain time at which teachers need to tell and show students what and how to do something. The only thing teachers need to do is to balance different strategies thus optimizing student learning (Klahr, 2009).

Instructional strategies like "cooperative learning, performance assessments, product-oriented activities, and hands-on learning" are commonly recognized teaching methods that are consistent with constructivist theory (Simpson, 2002, p. 352). There have been controversies on constructivist instructions (Tobias & Duffy, 2009). Kirschner et al. (2006)criticized failure of constructivist instruction due to the minimal guidance during practices. However, the importance of guidance has been consistently emphasized in research. The real problem was, as Duffy (2009) pointed out, the definition of constructivist

instruction was never well defined. Understanding and implementation of constructivist approaches vary among teachers.

Reasons for Choosing Constructivist Approaches in Teaching

It has been well recognized that behaviorist educators tend to control students' learning, while constructivist instructors tend to give ownership of learning to students. As a matter of fact, both schools of theorists agree that "people control their own learning" (Ormrod, 2008, p. 190), the basic difference is that behaviorists focus on behavioral activity and external influence rather than mental activity and human initiative in teaching. Behaviorists like Skinner also agreed with the fact that people need to make active responses if they want to learn rather than being passive recipients (Ormrod, 2008). The cognitive view that students' actively construct their knowledge through making connections between personal experience to the new information in the world is generally accepted (Cobb, 2005). The views of using constructivist approaches in teaching emphasize that the learning environment needs to promote learners' cognitive activity and self-determination that goes with the nature of learning agreed by both behavioral and cognitive perspectives. Constructivist teaching is important because people's control over their own action is the key to their intrinsic motivation (Deci & Ryan, 1985).

Different studies have proved the effectiveness of constructivist based pedagogies. In Mader's (2009) informal experiment of over 4 semesters with more than 100 students in university classes, she let students grade themselves and then gave them substantial guidance and feedback. A survey was administered at the end of each semester. Most of students reported they had learned more through the process and felt like they were learning what they

wanted to learn, because they did not have to worry about teachers' judging their works. In addition, they were more honest both with themselves and teachers. In an after-school math program, Nelson-Johnson (2007) used constructivist teaching methods as treatment on 30 seventh grade participants. Both experimental group and control group included 15 students. It was found that the experimental group of students had significant improvement in a state standardized test. They had higher school attendance and more positive attitudes toward math compared to the control group who were taught in traditional ways.

Impact of traditional teaching and constructivist teaching on student achievement were compared in different empirical studies. Gatlin (1998) compared two high school biology classrooms and found that, in the researcher-designed tests, students taught traditionally had significantly higher scores than students taught in constructivist ways. However, scores of students in constructivist group increased in delayed posttest, while traditional group's scores decreased. Students taught by constructivist approaches had higher retention in learning. Using researcher-designed tests based on the class content, Bimbola and Daniel's (2010) experiment over 120 junior secondary school students had slightly different results. The different test results showed that scores of students who were taught in constructivist approaches were significantly higher than those of students who were taught by lecturing, in both posttest and delayed posttest. That meant students taught by constructivist approaches learned more and retained more than their counterpart taught by lecturing did. The authors in both studies suggested that constructivist teaching could be able to improve student achievement.

By using a mixed method, Makanong (2000) conducted a study involving 9th Grade high school algebra classrooms. The quantitative statistical results found that student achievement in both constructivist and traditional treatment groups had no significant difference. However, qualitative data indicated students in constructivist method group were more engaged in classrooms and worked harder in this subject. Granas (2006) had similar results in her quantitative study on 9th Grade high school algebra classrooms. She found that teacher-centered and student-centered approaches had no significantly different impact on student achievement, which was assessed in a traditional end-of-course test. But there was significant evidence that students in student-centered classrooms performed better in open-ended tasks than students in teacher-centered classrooms. The author raised the issue of assessment when measuring teachers' instruction.

Constructivist approaches present a promising influence on student learning as these studies showed. However, the issue of the accountability of traditional school assessment needs to be addressed. As Schwartz et al. (2009) argued, constructivist pedagogies should be measured in constructivist ways so that their advantages and benefits can be effectively shown.

Challenges of Constructivist Teaching

Despite all the advantages constructivist instruction has, there are different obstacles and challenges that hinder teachers' practices of constructivism. Resistance to constructivist pedagogy usually comes from three aspects: "commitment to present instructional approach, concern about student learning, and concern about classroom control", as Brooks and Brooks (1999, p. 101) pointed out. Some teachers who have taught for many years tended to

continue their traditional ways of teaching rather than shifting to a new paradigm and rebuilding their instructional practices (Aldridge et al., 2004; Brooks & Brooks, 1999). Some teachers see no reason to change because their present approach works well, and it means students are getting good grades on tests and performing well on different tasks in or outside of classrooms. Some teachers have more concern for themselves with behavior management than student learning in classrooms (Brooks & Brooks, 1999). Constructivist-based approaches seem to cause uncertainty that may make teachers lose control of the whole learning environment. For example, it takes time to let students voice themselves and share management of classroom, both of which may lead to unexpected results due to students' immaturity (Anagun & Anilan, 2013; Brooks & Brooks, 1999).

Teaching belief has been a significant element in education (Beck, Czerniak, & Lumpe, 2000; Kim, 2005). As Hsiao and Yang (2010) pointed out, teaching beliefs were key factors that affect teachers' decision making in their teaching behaviors. Sometimes their beliefs can be obstacles. Teachers who believe that objective reality is independent of human experiences will find hindrance in constructivist teaching (Taylor et al., 1995; Taylor et al., 1994). Even more specifically, Haney and McArthur (2002) used Constructivist Learning Environment Survey to investigate teachers' beliefs in five aspects of a constructivist classroom: personal relevance, critical voice, shared control, uncertainty, and student negotiation, and they found that personal relevance, scientific uncertainty, and student negotiation were teachers' core beliefs in constructivist based instruction that were implemented in teachers' practices. However, shared control was a peripheral belief to some teachers who claimed it was difficult to be incorporated in instruction. As Beck et al. (2000)

pointed out in their study; teachers' beliefs about constructivist teaching strongly influence their intent to implement constructivism.

Constructivist Learning Environment Survey

Introduction of the Survey

Constructivist Learning Environment Survey (CLES) is a widely used instrument to measure both students and teachers' perceptions of the degree to which the teachers established the learning environment in constructivist ways. The CLES was first developed by Taylor and Fraser in 1991 in Australia (Taylor & Fraser, 1991). It is an instrument for teachers to reflect on their teaching strategies. Thereby, they are able to improve their instruction and students' learning through modifying classroom learning environment. It was found to be useful for providing insights about classroom learning environments according to different studies (Taylor et al., 1997). It also showed cultural constraints in later research. Therefore, CLES was modified with significant changes by adding socio-cultural items to the questionnaire (Taylor et al., 1995; Taylor et al., 1994). The original scale had only four scales: autonomy, prior knowledge, negotiation, and student-centeredness with seven items in each scale. Based on the socio-cultural framework, the new CLES developed the survey into five scales: personal relevance, shared control, student negotiation, critical voice, and uncertainty, with seven items in each (Taylor et al., 1995). After using this new survey on a big group of science and mathematics students, Taylor et al. (1995) received complaints from student subjects and found misunderstandings happened among them when answering the questionnaire. In order to make the questionnaire more reliable, refinements were made to the new CLES by reducing items to six for each scale and minimizing items of negative

wording and clarified expressions of each item for participants (Taylor et al., 1995; Taylor et al., 1997). For example, a prompt "in this class" was added to the instrument to help students focus their thinking on the immediate classroom.

Two forms of CLES were developed to collect data from students. They were named student actual and student preferred (Taylor et al., 1995). Wording of the preferred form was slightly different from the actual form. The phrase "I wish" was added at the beginning of each item. The preferred form was designed to gather students' perceptions of ideal learning environment. Some educators used the two forms to understand the differences between students' ideas of actual and ideal constructivist classrooms in order to improve their teaching accordingly (Aldridge et al., 2004; Wanpen & Fisher, 2006). There was also a teacher form together with the student form created to gather teachers' perceptions on classroom learning environment, though it had been rarely used for formal research. The whole constructs of the teacher form was the same as the student form. The only difference was in the wording. B. Johnson and McClure (2004) revised CLES teacher form to a shorter version called CLES2. The five scales were maintained, but items in each scale were reduced from six to four. The current study used this shortened one to collect data with the authors' permission. The specific content of the survey will be introduced in the coming Chapter Three.

The new version of CLES has been translated, modified and validated in various countries outside of Australia, including Korea (Kim et al., 1999), South Africa (Aldridge et al., 2004), Turkey (Anagun & Anilan, 2013), Malaysia (Luan, Bakar, Mee, & Ayub, 2010), Thailand (Wanpen & Fisher, 2006), Singapore (Wilks, 2000), United States (Dryden & Fraser, 1998; Nix, Fraser, & Ledbetter, 2005). There were cross-national studies conducted

among Australia, the USA, and the UK (Dorman, Adams, & Ferguson, 2002), as well as Australia and Taiwan (Aldridge, Fraser, & Taylor, 2000).

CLES has been introduced to elementary, secondary, and higher education in different subject areas, such as computer (Luan et al., 2010; Wanpen & Fisher, 2006), English (Wan, Tanimoto, & Templeton, 2008; Wilks, 2000), translation (Ebrahimi, 2013), and Environmental Education (Zandvliet, 2012). An on-line version of CLES was also developed to assess on-line teaching (Maor & Fraser, 2005; Taylor & Maor, 2000).

CLES as Teaching/Training Guidance

As introduced earlier, CLES was created for teachers and researchers to understand students' thoughts on teachers' constructivist teaching in classrooms. Being used as teaching guidance is one salient application of CLES. Many educators and researchers used CLES to collect student perceptions of classroom environment for the purpose of improving teaching and learning towards constructivist approaches. Sometimes CLES were modified to fit certain courses or programs (Lee & Tsai, 2005; Nix et al., 2005; Wilks, 2000), or were combined with other research instruments (Beck et al., 2000; Gatlin, 1998; Ibarra, 2005; B. Johnson & McClure, 2004).

Aldridge et al. (2004) used CLES to measure mathematics teachers' constructivist teaching in South Africa from students' perspective. After the questionnaire was validated, data were collected from 44 teachers' classes using the actual and preferred forms. Two teachers volunteered to participate in case studies. Based on students' responses, they identified the aspects of constructivist learning environment that students expected to improve. Strategies were designed and plans were made as the interventions. During the

process, they needed to do serials of self-reflective journals, which was a significant part of qualitative data. Results demonstrated the CLES could guide teachers to be more constructivist based in teaching through reflective practices.

In a mathematics methodology class for pre-service teachers in college, the instructor (Shirvani, 2009) used CLES to monitor classroom environment he created, in order to monitor his own instructional strategies and promote students' constructivist learning. The goal was to demonstrate the application of constructivist epistemology to those future math teachers. Shirvani (2009) used direct instruction in the first half semester, and then changed to hands-on activities and collaboration-based instruction in the second half semester. Pre-test and post-test of CLES were conducted to examine students' response at the beginning and the end of the second half semester. Mean scores of each scale of CLES were significantly higher for posttest. Another similar study (Wanpen & Fisher, 2006) was conducted in a college computer class in Thailand by using the CLES. The gap between students' ideal environment and the actual environment was found. Thus, the instructor adjusted teaching strategies through encouraging students to do self-reflection and providing more opportunities for discussion and collaboration.

CLES also was used as a tool to evaluate the effectiveness of teacher professional development programs (Beamer, Van Sickle, Harrison, & Temple, 2008; Nix et al., 2005; Singh, Yager, Yutakom, Yager, & Ali, 2012). They used this questionnaire to investigate the students whose teachers participated in a professional program in order to find out whether constructivist practices were improved after the training. Dryden and Fraser (1998) used this instrument to assess school education reform in Dallas school district, which was part of

Urban Systemic Initiative funded by the National Science Foundation. The reform aimed to promote constructivist teaching in high school science classes. Students' perceptions in science classrooms of constructivist learning environment were investigated to evaluate the effectiveness of the reform during 1994 and 1997. The results showed that levels of every scale did not improve in the three years although teachers were trained to promote "personal relevance, uncertainty, student negotiation, shared control, critical voice" in classrooms. Especially mean scores of the scale of "shared control" stayed at a low level. The authors indicated the reasons were rooted in the traditional system, which has accountability issues in its assessment system.

CLES for Teachers

Since the teacher is one of the essential factors that influence student learning, improving teacher quality has been one of the most important methods to raise student achievement (Jennings, Snowberg, Coccia, & Greenberg, 2011). Understanding teachers' perspectives of the learning environment they create would be greatly helpful for the constructivist reform movement that promotes constructivist practices in teaching (Anagun & Anilan, 2013). Studies on perceptions of teachers using CLES seemed to be rare according to literature that was found. CLES was mostly used to investigate student perceptions among studies mentioned above. As CLES was originally designed for science and mathematics classrooms, it was mostly used in the two fields with a limited number of exceptions.

Only a small number of studies using CLES on teachers have been published currently (Anagun & Anilan, 2013; Beck et al., 2000; Campbell, 2004; Ibarra, 2005). Anagun and Anilan (2013) translated CLES teacher form into Turkish and used it to investigate

teachers' perception of their use of constructivist approaches in the classrooms. The CLES was modified and the Turkish version was developed after data analysis. Due to the scarcity of using CLES on teacher perception, Johnson and McClure (2004) validated the teacher form and revised it to a shorter form based on participants' responses to the questionnaire after investigating a group of in-service and pre-service science teachers. They found that this form needed to be revised to "reduce redundancy and eliminate confusing items" though it did provide valuable information (Johnson & McClure, 2004, p. 72).

Combining CLES and a self-developed questionnaire with open-ended questions on teachers' beliefs of their teaching behaviors, Beck et al. (2000) investigated factors that influence teachers' implementation of constructivism regarding the five basic elements of CLES (personal relevance, uncertainty, critical voice, shared control, and student negotiation) on science teachers. They also studied the relationship between teachers' perceived beliefs about norms and behaviors and their perception about practices of constructivism in their classrooms. The results indicated that teachers' gender, education background, and grade level influenced their implementation of constructivism. Factors like them were used in the current study as well.

As mentioned above, unfortunately, there was limited research looking into the factors that impact educators' practice of constructivist instruction. Based on expectancy-value theory, which will be introduced in the following section, this study focuses on motivations of becoming teachers. The goal is to explore their relationships with teachers' implementation of constructivism.

Constructivism in Special Education

Constructivism for learners with special educational needs is another field to explore. The constructivist pedagogy aims to facilitate students' active learning, but whether it has taken learners with special needs into account should be considered. Sadat Sajadi (2011) found that learners with ADHD had trouble to meet the requirements of constructivist educational pedagogy to succeed in learning. Educators need to address the limitations of learners with ADHD when applying constructivist approaches. In the field of special education, inclusive schooling has been a significant challenge in education system (Dixon &Verenikina, 2007). Researchers have introduced social constructivist view for teaching learners with disabilities, which was developed by Vygotsky in Russia. The social constructivist theory implies instructors should provide children with special educational needs with social and cultural enlightenment and support, and at the same time, focus on their competencies rather than their deficits (Trent, Artiles,&Englert, 1998; Rodina, 2006).

Reasons for Entering Teaching Career

Different Motivations

Human motivation is a basic element that influences people's behaviors (Mori, 1965; Schunk, 2008). This is one of the important reasons for researchers studying teachers' decision making process on entering and leaving this profession. Motivating factors for teachers to choose teaching have been studied since the 1960s (Eren & Tezel, 2010; Watt & Richardson, 2007). One of the goals is to solve the problem of teacher shortages and maintain teacher quality. Educational administrators are trying to attract capable individuals into teaching track and retain them in teaching profession by understanding the factors that

influence people who decide to become teachers (Fokkens-Bruinsma & Canrinus, 2012; Watt & Richardson, 2007; Yu, 2011). As Brookhart and Freeman (1992) pointed out, understanding the motivations teachers bring to their work helps researchers, teacher educators, and educational administrators to have better understanding about both pre-service and in-service teachers, thus having better insights into teacher education process and curriculum development.

For decades, teachers' motivations for entering their occupation have been recognized as multidimensional (Brookhart & Freeman, 1992; Mori, 1965; Watt & Richardson, 2007). Mori's study (1965) was one of the earliest studies that attempted to investigate motivations for becoming a teacher. She found that the economic, social, interpersonal, intellectual, and ethical conditions were the most influential factors for prospective teachers to choose teaching profession as a career in North America. Those five aspects, respectively, refer to "salary, retirement system, and all related financial arrangements", "relationships between the occupation and society or other occupations", "human interactions that result in the performance of the occupation", "intellectual acts involved in the work", and "moral actions inherent in the work" (p. 176).

Since Mori's study, there has been a growing number of studies exploring teachers' reasons for entering the career. Intrinsic, altruistic, and extrinsic motivation are highlighted themes in the past research regarding reasons of becoming teachers (Brookhart & Freeman, 1992; Watt & Richardson, 2012). Love for children or desire to work with children, love for subject, and love for teaching or learning are considered as major components of intrinsic motivation (Jarvis & Woodrow, 2005; Manuel & Hughes, 2006; McCray, Sindelar, Kilgore,

& Neal, 2002). Altruistic motivation has played a significant role in teachers' decisions to become teachers. It was shown in factors such as "serving others, making a difference in children's lives, or making a contribution to the society" (Yu, 2011, p. 116). Altruistic motivations have been proved to be influential elements (Brookhart & Freeman, 1992; Sinclair, Dowson, & M., 2006). However, as Watt and Richardson (2007) pointed out, the definition of intrinsic motivation and altruistic motivation has not been consistent in previous studies. The operational items included in both motivations presented overlaps at times in research. External rewards have been also demonstrated as significant reasons for choosing teaching profession. Factors like job security, salary, time schedule, and perceived social status have been reported as motivations (Manuel & Hughes, 2006; Spittle, Jackson, & Casey, 2009). Perceived teaching ability, social influences, and previous teaching experience are also important factors contributing to people's choice of becoming teachers (Manuel & Hughes, 2006; Spittle et al., 2009; Wang, 2006).

Although a variety of studies shed some light on reasons for why people choose teaching, Watt and Richardson (2007) were the only researchers who developed a comprehensive model, Factors Influencing Teaching Choice (FIT-Choice), to measure those factors. It used expectancy-value theory as "integrative theoretical framework" (Eren & Tezel, 2010). As an important theory that explores achievement motivation, the expectancy-value theory refers to people's perceived significance of a task or their beliefs about the capabilities to engage in certain behaviors (Wigfield & Eccles, 2000). The following section looks into the theory and the scale in details.

Expectancy-Value Theory

The expectancy-value theory is one of the most important theories about the nature of people's achievement motivation. It is based on Atkinson's (1957) original expectancy-value theory, which proposes that individuals' decisions on academic choices are determined by their anticipation towards success and the "incentive value of success" (Maehr & Sjogren, 1971, p. 144). Different researchers have expanded this theory, which is called modern expectancy theory (Wigfield, Eccles, Roeser, &Schiefele, 2008). This paper focuses on the expectancy-value model that was developed by Eccles and her colleagues.

To understand adolescent students' performance and choice in mathematics achievement, Eccles et al. (1983) established an expectancy-value model of achievement related choice, which is well known as a practical motivation framework. It suggests people's choice, persistence, and performance are significantly influenced by their belief of their ability (expectancies) to succeed on certain tasks and how much they value the tasks they do (Wigfield & Eccles, 2000). It was found that values were the strongest predictors of choices, while ability/expectancy beliefs were better predictors of performance (Eccles et al., 1983). The major constructs of the model are subjective task values, expectancies for success, achievement goals, and beliefs about ability or competence. As Watt and Richardson (2007) pointed out, though researchers conceptually distinguished expectancies for success (for future tasks) and ability belief (for current activities), they have not been empirically distinguished.

In this expectancy-value model, attainment value or importance, intrinsic value, utility value or usefulness of the task, and cost are four components of subjective task values.

Researchers have defined attainment value as the importance of doing well on a certain task; intrinsic value as the enjoyment of engaging in a task; utility value as the usefulness that serve one's goals in certain tasks; and cost as time and effort spent in certain tasks to achieve one's goals with limited access to other opportunities (Eccles et al., 1983; Wigfield & Eccles, 2000; Wigfield et al., 2008).

Expectancy-value theory is the theoretical framework to understand the relationship between teachers' career motivation and their implementation of constructivist based teaching. As stated by the designers of FIT-Choice Scale, "All parts of the model are proposed to work together to predict choice of a teaching career and professional engagement outcomes" (Watt & Richardson, 2012, p. 188).

FIT-Choice Scale

Due to the absence of theoretical framework to explain teachers' career motivation and the inconsistent understandings of different motivations such as extrinsic, intrinsic, and altruistic motivations, Watt and Richardson (2007) developed the scale of Factors Influence Teaching Choice guided by the expectancy-value theory to explore the factors that influence people to enter teaching career. FIT-Choice scale is based on three constructs that are included in Eccles et al.'s model: values, ability beliefs, and perceived task difficulty.

The value construct consists of three sub-constructs in the expectancy-value model, intrinsic value, subjective attainment value and utility value, which were renamed by Watt and Richardson (2007). Subjective attainment value was renamed as personal utility value, including job security, time for family and job transferability. Utility value was renamed as social utility value, including the desire to shape the future of children, enhance social equity,

make a social contribution, and work with children. As shown in literature, social utility value is similar to altruism (Watt & Richardson, 2012).

The construct of ability beliefs refer to teachers' perceptions of their teaching abilities and the task perceptions consist of task demand (expertise and difficulty) and task return (social status and salary). As Watt and Richardson pointed out, the discrepancy between task demand and task return is connected to cost which is one of the four components of subjective task values in Eccles et al.'s expectancy-value model (Eccles et al., 1983).

Prior learning and teaching experiences and social influences are three other constructs of FIT-Choice scale. They have also been recognized in the expectancy-value theory model. As a negative motivation construct, fallback career was drawn from previous literature on teachers' motivation to become teachers. Choice of teaching career (satisfaction with the choice) is included as an outcome variable in the scale in the end.

The FIT-Choice model has been internationally used in teacher education field since the scale was developed. The scale has been popularly applied in Turkey in the past decade to understand Turkish pre-service teachers' career motivations in different teaching programs such as early childhood education, primary school education, secondary education, and English education (Eren & Tezel, 2010; Kılınç, Watt, & Richardson, 2012; Topkaya &Uztosun, 2012; Yenilmez & Çemrek, 2008). It has been used in English-speaking countries such as the United States (Lin, Shi, Wang, Zhang, & Hui, 2012; Yu, 2011), and translated to different languages in different countries other than Turkey such as Netherland (Fokkens-Bruinsma & Canrinus, 2012), Croatia (Jugović, Marušić, Pavin Ivanec, & Vizek Vidović, 2012), and China (Lin et al., 2012).

As FIT-Choice scale was originally designed to test pre-service teachers, relevant studies (like studies mentioned above) found by the author were conducted to investigate pre-service teachers' career motivations in teacher education program. As far as can be found, very limited research has been done on in-service teachers using the scale. Only Watt and Richardson (2010a, 2010b, 2010c) have three conference papers presenting their study results about in-service teachers' first five years of teaching experiences, yet the papers have not been published.

Summary

This chapter reviewed literature in three major aspects: classroom learning environment, constructivist learning theory, and teachers' career motivations. The review indicated that students learn better when they perceive their learning environment positively. Emerging from other research, key elements in the preferred positive learning environment were teachers' support and their effort to create an open and supportive environment that encourages meaningful learning. That finding seems to align with the theme of this study: constructivist based teaching. This chapter also introduced why the author decided to study the role of teachers' career motivations plays in their choice of implementing constructivist approaches in teaching. The literature review showed there was a gap in this area. Meanwhile, CLES was mainly used in science and math settings. Only quite a small number of researchers used it in other fields. This study intended to expand the use of CLES to different subjects. Therefore, the author claimed the need and significance to conduct the study. Research methods for answering the research questions are described in the next chapter.

CHAPTER THREE

METHODOLOGY

This chapter builds on a comprehensive review of substantial research. It presents the research design of the study in detail. As stated in Chapter One, the purpose of the study was to examine the extent to which teachers were implementing constructivist teaching in classes and also explore the potential factors that influenced their implementation of constructivist practices, especially the role of their career motivations. This was done, in this study, by using the teacher form of Constructivist Learning Environment Survey (CLES) and the Factors Influencing Teaching (FIT) Choice Scale. The author employed a quantitative design for the study. The following content depicts a specific research design, including participants, instruments, and procedures of data collection and analysis.

Research Design

As proposed in Chapter One, there are four research questions for this study:

1) To what extent do teachers report their implementation of facilitating constructivist learning in class?
2) What are the motivation factors that influence in-service teachers' choice of a teaching career?
3) What is the relationship, if any, between teachers' motivation for choosing teaching as career and the ways in which they facilitate students' constructivist learning?
4) What other factors are related to teachers' practices of promoting students' constructivist learning?

To answer these questions, a quantitative study was designed. An online survey was developed to collect data by combining the existing scales of the Factors Influencing Teaching (FIT)-Choice Scale and the Constructivist Learning Environment Survey (CLES), to investigate in-service teachers' perceptions and practices in Pennsylvania schools. Statistical analyses were conducted at multiple levels to answer the research questions.

Participants and Study Sites

Potential participants were randomly sampled from five school districts in Pennsylvania. The target population of the study was K-12 in-service teachers with internet access in Pennsylvania school districts and based on voluntary participation. The survey link was sent through emails and posted on Facebook pages. Participants had their full privacy maintained and participation in the study was completely voluntary. The whole process of data collection happened in an online environment only. A total 116 in-service teachers from different subject areas and grade levels completed the survey.

Instruments

Two surveys, CLES (20) and FIT-Choice scale, were combined into one as the data collection instrument for this study to collect quantitative data. Permissions for using the CLES (20) and FIT-Choice scale were received from the authors.

Constructivist Learning Environment Survey. As introduced in Chapter Two, there were teacher and student forms of CLES originally created in order to evaluate classroom learning environment comprehensively (Taylor et al., 1995; Taylor et al., 1994). A revised version of the CLES consists of five scales (see Table 1) with six items in each. Therefore, the CLES survey (both student and teacher forms) consists of six scales and 30

items in total. It is a five point Likert-type scale with responses for each item as "almost always" (5), "often" (4), "sometimes" (3), "seldom"(2), and "almost never" (1). The survey was used to measure the extent to which teachers are implementing constructivist approaches of teaching in classrooms from their perspectives, which answered research Question 1.

Table 1

Descriptions of CLES Constructs

Scale	Description
Personal Relevance	The extent to which teachers take students' personal experiences and background into account as part of instructional materials in classrooms.
Shared Control	The extent to which students have opportunities to share control of the learning environment including making decisions on activity design, learning assessment determination and application, and classroom rule agreement, etc.
Student Negotiation	The extent to which students are provided opportunities to exchange ideas with one another, as well as given opportunities to articulate and reasoning
Critical Voice	The extent to which students feel free to express themselves in class, such as questioning teachers' instructional contents and methods or asking questions about their study or things relevant in appropriate and beneficial ways.
Uncertainty	The extent to which students are provided opportunities to understand any truth could be doubted due to evolving human experiences and social and cultural values.

After the refinements to the student version of the CLES, Taylor et al. (1995) again examined the viability of the 30-item survey in a large scale study and determined that there was a high degree of internal consistency and independence. For the teacher form of CLES that was used in the current study, Johnson and McClure (2004) assessed the validity and reliability of the survey by conducting a study among 290 elementary, middle, and high school in-service and pre-service science teachers. Participants were also asked to make comments on the survey, especially about items that were not easy to understand.

Exploratory Factor Analysis was conducted to examine factor loadings, which were helpful for eliminating items with low loadings. For the CLES, most negatively worded items were found to be in that low loading category. Cronbach's alpha reliability coefficients for the five scales were also examined to determine the internal consistency and the extent to which items contribute to the scale reliability. Low contribution items were eliminated in the CLES. Based on the data analysis, it was found there was redundancy and some items were confusing. A decision was made to reduce the number of items in each scale and eliminate negatively worded items. During the survey revision of their study, the researchers gathered comments from participating teachers on items of the original scale in two ways: requesting them to write comments on the survey and having conversations with them. The problems found from those comments about the survey were consistent with results of factor analysis. The study team had discussions before team members revising the scale. Each subscale of the survey was assigned to different team members.

The revised CLES maintained five scales but merely 20 items in total. Each scale has four items. Therefore, a shortened version of CLES was created and was named CLES 2(20). Johnson and McClure (2004) administered the revised survey to both teachers and students in another study. Reliability analysis of the teacher form was precluded due to the small sample. Yet, the results of the student form showcased high internal consistency. See Table 2 for specific coefficients.

Table 2

Alpha Reliability Coefficient of CLES (20) With Students

Scale	Alpha coefficient	
	CLES 2(20)[a]	CLES 2(20)[b]
Personal relevance	0.89	0.90
Uncertainty	0.75	0.81
Critical voice	0.87	0.88
Shared control	0.72	0.76
Student negotiation	0.87	0.81
Overall instrument	0.93	0.94
N	110	354

Note: a: 110 upper elementary, middle and high school students.
b: 354 upper elementary, middle and high school students.
Adapted from Johnson, B., & McClure, R. (2004). Validity and reliability of a shortened, revised version of the Constructivist Learning Environment Survey (CLES). *Learning Environments Research, 7*(1), 65-80.

In this study, the researcher used the shortened version CLES(20) with minor revisions. As mentioned above, the survey was created to investigate science classrooms. Nevertheless, it was used to study teachers in all subject areas in the current research. Therefore, five items with the word "science" were modified to include language that would apply to all subjects. Table 3 shows the specific changes to those items of the survey. The survey did not include the word "constructivism" or the names of five sub-scales of CLES. Instead, there was a stem expression before each sub-scale. This design was taken from the revised survey from Johnson and McClure (2004). The stem expressions were "learning about the world" for *personal relevance*, "learning about the subject" for *uncertainty*, "learning to speak out" for *critical voice*, "learning to learn" for *shared control*, and "learning to communicate" for *student negotiation* (B. Johnson & McClure, 2004).

Table 3

Specific Modifications to CLES (20)

Item #	Original items	Modified items
3	Students learn how science is a part of their inside- and outside-of-school lives.	Students learn how learning new things is a part of their inside- and outside-of-school lives.
5	Students learn that science cannot always provide answers to problems.	Students learn that there are not always answers to problems.
6	Students learn that scientific explanations have changed over time.	Students learn that explanations to things have changed over time.
7	Students learn that science is influenced by people's cultural values and opinions.	Students learn that ideas are influenced by people's cultural values and opinions.
8	Students learn that science is a way to raise questions and seek answers.	Students learn that there are different ways to raise questions and seek answers.

Factors Influencing Teaching (FIT)-Choice Scale. The second instrument was the FIT-Choice Scale that was developed and validated by Watt and Richardson in a serial of studies in Australia (Richardson & Watt, 2006; Watt & Richardson, 2007, 2008). It was designed to measure teachers' motivation to enter teaching career. The scale is made of three parts that tested different factors related to people's motivations for choosing teaching as a career. It includes 61 items, which measure 18 first-order and 4 higher-order motivational factors. Each item asks respondents to indicate their level of agreement from "not at all" (1) to "extremely" (7). A seven point Likert-type response format was used in the scale.

The first part of the scale is *Influential Factors*. It consists of 12 first-order factors. Among them, *job security*, *time for family*, and *job transferability* belong to the higher-order factor of personal utility value. *Shape future of children/adolescents, enhance social equity,*

make social contribution, and *work with children/adolescents* belong to another higher order factor of *social utility value*. The rest of first order factors, *self-perceptions of teaching ability, intrinsic career value, fallback career, prior teaching and learning experiences*, and *social influences* are non-higher order factors. Each of these 12 factors is comprised of some specific items. There are 41 items in this part. The second part is *Beliefs about Teaching*. Two higher order factors are included, *task demand* and *task return*. Task demand consists of first-order factors of expertise and difficulty, while task return contains social status, teacher morale, and salary. There are 14 items in this part. The third part is *Your Decision to Become a Teacher* with six items only. This part has no higher-order factors but only measures two first order factors of *social dissuasion* and *satisfaction with the choice* of becoming a teacher. Table 4 shows the FIT-Choice subscales and factors.

Table 4

FIT-Choice Scale and Subscales

Higher order factors	First order factors	Items
Part A: Influential factors		
N/A	Ability	3
N/A	Intrinsic career value	3
N/A	Fallback career	3
Personal utility value	Job security	3
	Time for family	5
	Job transferability	3
Social utility value	Shape future of children/adolescents	3
	Enhance social equity	3
	Make social contribution	3
	Work with children	3
N/A	Prior teaching and learning experiences	3
N/A	Social influences	3
Part B: Beliefs about teaching		
Task demand	Expertise	3
	Difficulty	3
Task return	Social status	6
	Salary	2
Part C: Your decision to become a teacher		
N/A	Social dissuasion	3
N/A	Satisfaction with choice	3

Richardson, P. W., & Watt, H. M. G. (2006). Who chooses teaching and why? Profiling characteristics and motivations across three Australian universities. *Asia-Pacific Journal of Teacher Education, 34*(1), 27-56.

To assess the reliability and validity of the FIT-Choice Scale, Watt and Richardson (2007) conducted a large-scale study on pre-service teachers in two Australian universities with two cohorts respectively. After two initial exploratory factor analysis (EFA) with the two cohorts separately in the first university, the researchers modified the scale step by step with theorized constructs. Then a confirmatory factor analysis (CFA) was performed across the two combined cohorts on the full set of first-order factors. The convergent and divergent construct validity was established across all factors of the FIT-Choice scale through this analysis. The whole set of first-order factors and higher-order factors were next validated by

a nested CFA across the two combined cohorts. After all of these, first-order factor CFA and nested CFA was performed again on the combined cohorts of the second university which was an independent sample from the first one. Overall, analysis results showed factor loadings ranging from .54 to .91 at first-order level, and .49 to .95 at higher-order level, indicating high validity of the scale. The Cronbach's alpha reliabilities ranging between .62 and .89 presented good internal consistency of the scale. After the first test of scale validation in one university with pre-service teachers in teacher education program in 2002, the developers (Watt & Richardson, 2007) conducted another investigation to another group of pre-service teachers in another university in 2003. The survey results demonstrated consistency of the same instrument.

The FIT-Choice Scale was also used in the study with minor modifications. The survey was created to investigate pre-service teachers originally; however, the subject of the current research was in-service teachers rather than pre-service teachers. The tense of expressions of all items in the first part of "influential factors" was changed to past tense. For example, "I am interested in teaching" was changed to "I was interested in teaching". And "teaching will be a useful job for me to have when travelling" was changed to " I thought teaching would be a useful job for me to have when travelling."

Overall, the whole (combined) survey used in this study contains three sections. Section One included FIT-Choice scale which contained three parts. There were 61 items in total. Section Two included CLES which contained five subscales and 20 items in total. Section Three included demographic information which contained nine questions, including

participants' gender, age, highest academic qualification to date, language spoken, current subject area, current grade level, years of teaching, school area, and school types.

The survey combing CLES2(20) and FIT-Choice scale was developed online using Qualtrics Survey Software (Qualtrics Labs Inc., 2009).The program provided a link to the survey that participants could access wherever with internet. There is a consent letter in front of the survey. Participants indicated their consent by clicking the "I consent" option at the bottom of the letter before entering the survey. Time frame of data collection was 4 weeks.

Procedures

This study included two phases. Firstly, a pilot study was conducted to test the reliability of the whole survey since minor modifications were made to the two surveys. The survey was sent to a small group of in-service teachers. After the survey was validated, the survey was sent to a large group of potential participants to collect data for this study.

Data collection procedure. For the pilot study, to recruit participants, the researcher first contacted a professor of an education doctoral program whose students were mostly in-service teachers at Indiana University of Pennsylvania to obtain contacts. The professor provided nine email addresses of those who were willing to be contacted. And then the researcher requested the administrator of one of a Facebook page (the researcher has received permissions to post the survey on two teacher association Facebook pages) to share the survey with some teachers in the Facebook group. In the end, there were 10 valid responses. The reliability test was run for the survey.

For the study itself, the researcher intended to reach out to in-service teachers in schools of different areas in Pennsylvania. The data was collected in three ways. First, the

researcher obtained email addresses of 130 teachers from Philadelphia with the help of the coordinator of Philadelphia Urban Seminar at Indiana University of Pennsylvania. The survey link was sent by email. Second, the researcher obtained permissions to post the survey on two Facebook pages of two school districts' teacher associations. The administrators helped to repost the survey three times during two weeks and invited teachers to participate. Third, when there were not sufficient responses to the survey, the researcher requested superintendents of different school districts to assist with the data collection. The request letter was sent out to 22 superintendents whose email addresses were public on their school district websites. Two of them agreed to forward the survey link to their school teachers. The responding rate was not high. A total of 116 valid response was obtained. Overall, participants from these five school districts taught in different parts of Pennsylvania.

Data analysis procedure. Data collected through the online Qualtrics survey were exported into SPSS (Statistical Product and Service Solutions) format for later analysis. The first step was to transform variables by using Compute Variables in SPSS for the sake of data analysis. For the FIT-Choice Scale, there were 18 first order factors and four higher order factors, each of which contained different number of items. Therefore, the researcher obtained 22 new variables in the data set. For CLES(20), there were five sub-scales in the survey and each sub-scale included four items. By using Compute Variables, the researcher obtained five new variables. For the question about teachers' subject areas that were collected by text, the researcher had to categorize them and recode them into values. To answer the four research questions of this study, descriptive statistics, bivariate correlation,

one-way ANOVA, and post hoc Tukey HSD were run for data analysis. The specific procedures and results are presented in Chapter Four.

Validity and Reliability of the Surveys

The survey consisted of two surveys: FIT- Choice Scale and CLES. As introduced earlier, the two scales had been validated by their developers and other researchers. For the combined survey applied in this study, the minor modifications of the two surveys were based on the suggestions of the dissertation committee members. A pilot study was conducted to assess the survey before formal study administration.

Cronbach's Alpha was used to test the reliability by verifying the internal consistency of the surveys. Reliability scores of the two original surveys have been provided in the earlier parts. The following section provides the results of reliability tests of the surveys administered during the pilot study and the formal study.

Pilot study. Table 5showcased reliabilities of the surveys: the two scales (FIT-choice scale and CLES (20)) independently and the new combined one. As mentioned above, the pilot study was conducted due to one reason that both scales were modified in minor ways. The new combined survey was sent out to a small group. For the pilot study, the results of data analysis presented that Cronbach's Alpha coefficient of FIT-choice scale was 0.917, CLES (20) was 0.981, and the two combined as one was 0.924. The high values indicated high internal consistency, which means the new combined survey, was reliable enough to be used in the next phase.

Table 5

Reliability of Surveys in the Pilot Study

	Cases total	Cases valid	Cronbach's Alpha	N of items
FIT-choice scale	12	10	0.917	61
CLES (20)	12	11	0.981	20
FIT-choice +CLES	12	10	0.924	81

Formal study. The values of Cronbach's Alpha coefficient of FIT-choice scale, CLES (20), and the whole combined one respectively were 0.914, 0.869, and 0.908. The values maintained at a relatively high level, but the value of CLES (20) decreased from 0.981 to 0.869 as the sample size grew bigger in the formal study. These reliability coefficients were deemed to be acceptable.

Table 6

Reliability of Surveys in the Formal Study

	Cases total	Cases valid	Cronbach's Alpha	N of items
FIT-choice scale	150	104	0.914	61
CLES (20)	150	106	0.869	20
FIT-choice+CLES	150	91	0.908	81

Summary

This chapter described the quantitative approach taken to complete the study and provided details about participants, instruments, and procedures of data collection and analysis. Participants of this study were in-service teachers from schools in different areas of Pennsylvania. The online survey combined the Factors Influencing Teaching Choice Scale and Constructivist Learning Environment Survey with demographic information at the end. A pilot study was conducted for testing the reliability of the instrument before the formal study. In the formal study, a link to the survey was sent out through email and Facebook posts. The results of data analysis are presented in the next chapter.

CHAPTER FOUR

RESULTS OF DATA ANALYSIS

This study intended to examine the extent to which teachers were implementing constructivist teaching practices and explore the factors that are related to teachers' educational practices, especially the factor of teachers' motivation for choosing teaching as career. Other factors that were investigated were gender, age, years of teaching, etc. In this chapter, the researcher presents the results of data analysis of the study based on the four research questions proposed in Chapter One. This study consisted of two phases: pilot study and formal study. Since the pilot study was used to test the instrument without further data analysis, the results were presented in Chapter Three, and only the analysis of the formal study are presented in this chapter. Data collected from the surveys of FIT-choice scale and CLES (20) were analyzed to answer four research questions. The results are presented in five sections. The first section is about demographic information about participants, and the following four sections present the results that answer the four research questions.

Participants

As introduced in the previous chapter, the target population of the study was in-service teachers in Pennsylvania schools. The researcher collected data from five school districts in Pennsylvania. As evident from Table7, the participating teachers include 81.4% female teachers and18.6% male teachers. They were distributed relatively equitably in different age groups according to the data. There were 26.6% of them under the age of 30, 31.9% between the age of 31 and 40, 26% between the age of 41 and 50, and 21% above 50 years old. Most of the participants (65.8%) had a Master's degree and 27.2% of them had

Bachelor's degree. There were six participants (5.8%) with doctoral degrees. Participating teachers came from different grade levels. There were 9.7% of them teaching kindergarten, 37.2% in elementary school, 33.6% in middle school, and 27.4% in high school. Six of them were teaching across different grade levels according to the data. For years of teaching, 38 participants (33.6%) had been teaching for 10 to 20 years and that made the biggest number. About 20% of them were in their first five years of teaching and nearly 23% of them had been teaching for five to 10 years. Another 20% of them had 20 to 30 years of teaching experiences and only four participants had been teachers for more than 30 years. Most teachers (90.3%) came from regular public schools. Almost half of them (45.6%) were from rural areas and 36.8% of them were from suburban areas. Only 17.5% of them were from urban areas. Except four participants, English was dominant language for them at home.

Teachers' subject areas were collected from a question with text answers in the survey. Referring to Certificates in Pennsylvania – Types and Codes (Pennsylvania Department of Education) and professionaladvice, the researcher categorized the participants to seven groups based on the data. Only 103 participating teachers provided their teaching subjects. One reason might be due to the unclear question layout in the survey. Based on the information provided, teachers were categorized into seven groups: teaching all subjects (n=7,6.8%), English (n=31, 30.1%), Social Studies (n=13, 12.6%), Math (n=16, 15.5%), Science (n=9, 8.7%), Special Ed (n=10, 9.7%), and Specials/Electives (n=17, 16.5%). Social Sciences was included in Social Studies and Specials/Electives included Family and Consumer Science, Library Science, Engineering, Technology, Computer, Music, Arts, Health and Physical Education.

Table 7

Demographic Information of Participants

Characteristics		Number (%)
Gender		
	Female	92 (81.4)
	Male	21 (18.6)
Age		
	21-25	15 (13.3)
	26-30	15 (13.3)
	31-40	36 (31.9)
	41-50	26 (23.0)
	>50	21 (18.6)
Education		
	Vocational/technical school (2 year)	1 (.9)
	Some college	1 (.9)
	Bachelor's degree	31 (27.2)
	Master's degree	75 (65.8)
	Doctoral degree	6 (5.3)
Language at home		
	English	109 (96.5)
	Chinese	4 (3.5)
Subject area		
	All subjects	7 (6.8)
	English	31 (30.1)
	Social studies	13 (12.6)
	Math	16 (15.5)
	Science	9 (8.7)
	Special education	10 (9.7)
	Specials/electives	17 (16.5)
Grade level		
	Kindergarten	11 (9.7)
	Elementary school	42 (37.2)
	Middle school	38 (33.6)
	High school	31 (27.4)
Years of teaching		
	Less than 5 years	23(20.2)
	5-10 years	26(22.8)
	10-20 years	38(33.3)
	20-30 years	23(20.2)
	More than 30 years	4(3.5)
School type		
	Regular public school	102 (90.3)
	Charter school	6 (5.3)
	Private school	4 (3.5)
	Religious school	1 (.9)
School area		
	Urban	20 (17.5)
	Suburban	42 (36.8)
	Rural	52 (45.6)

Research Question #1

The first study purpose was to examine to what extent do teachers report their implementation of facilitating constructivist learning in class. As introduced earlier, the five constructs consisted of constructivist learning environment in the study: *personal relevance, uncertainty, critical voice, shared control, and student negotiation*. Table 8 shows that, the means of *personal relevance* (M=4.25, SD=0.74), *critical voice* (M=4.50, SD= 0.45), and *student negotiation* (M=4.14, SD=0.80) were above four points (between often and always), which means that teachers reported they frequently implement those three aspects of constructivist learning in their teaching. The means of *uncertainty* (M=3.93, SD=0.88) and *shared control* (M=3.88, SD=0.69) were lower than four points (between sometimes and often), which showcases teachers had implemented the two aspects of constructivist teaching at a lower level than they did in the other three aspects. The one with the highest mean among five constructs was *critical voice,* and *shared control* was the lowest.

Table 8

Summary of Means of Five Sub-scales for CLES (20)

Sub-scales	Minimum	Maximum	Mean	Std. Deviation
Personal relevance	2.25	5.00	4.25	.74
Uncertainty	1.25	5.00	3.93	.88
Critical voice	3.00	5.00	4.50	.45
Shared control	1.50	5.00	3.88	.69
Student negotiation	1.00	5.00	4.14	.80

Research Question #2

The second research question was: What are the motivation factors that influence in-service teachers' career choice? For the factors that may correlate to teachers' report of constructivist based teaching, teachers' career motivation was the foremost factor to explore

in this study. There were four higher order factors and 18 first order factors consisting of the FIT-choice scale. To answer Question Two, the summary of means of motivation factors was presented in Table 9.

For the 18 first order factors, as introduced in Chapter Three, 12 of them made the first part named *influential factors (to become teachers)*, four of them made the second part named *beliefs about teaching*, and two of them made the last part named *your decision to become a teacher*.

According to the statistical results, among 12 motivation factors, six first order factors were rated between five and six points. That implied they were relatively important factors that influenced teachers' career motivation. They were *teaching ability* (M=5.90, SD=0.91), *prior teaching and learning experiences* (M=5.87, SD=1.34), *make social contribution* (M=5.83, SD=1.18), *intrinsic career value* (M=5.82, SD=1.15), *shape future of children/adolescents* (M=5.72, SD=1.31), and *work with children* (M=5.79, SD=1.34). Teachers beliefs about *expertise of teaching* (M=6.00, SD=0.96) and *difficulty of teaching* (M=6.58, SD=0.77) were rated above six points which indicated they perceived teaching as highly demanding work. In spite of that, the mean score of *satisfaction with the choice* (M=5.9, SD=1.07) told people that they were quite satisfied with their job. Other factors, such as *time for family* (M=2.87, SD=1.53) and *fallback career* (M=1.70, SD=1.06) were rated under three points. *Fallback career* seemed to be considered as the least important motivational factor in this study, which was consistent with the results in previous studies (Yu, 2011, Watt and Richardson, 2006, 2007).

Overall, among the four higher order factors, teachers' perceived beliefs about *Task demand* (M=6.30, SD=0.77) of teaching was high, but the *task return* (M=3.65, SD=1.21) was low. *Social utility value* (M=5.46, SD=1.18) was an important motivator for teachers' career choice. *Personal utility value* (M=3.43, SD=1.25) did not seem to be important factors to influence teachers' career choice. The participating teachers seemed to be quite satisfied with their career choice.

Table 9

Summary of Means of Motivation Factors

Higher order factor	First order factor	Ranking	Minimum	Maximum	Mean	Std. Deviation
N/A	Teaching ability	3	3.00	7.00	**5.90**	.91
N/A	Intrinsic career value	7	1.67	7.00	**5.82**	1.15
N/A	Fallback career	18	1.00	5.33	1.70	1.06
Personal utility value			1.00	6.27	3.43	1.25
	Job security	10	1.00	7.00	4.91	1.58
	Time for family	17	1.00	6.40	2.87	1.53
	Job transferability	16	1.00	7.00	3.00	1.43
Social utility value			1.17	7.00	**5.46**	1.18
	Shape future of children/adolescents	9	1.00	7.00	**5.72**	1.31
	Enhance social equity	11	1.00	7.00	4.53	1.74
	Make social contribution	6	1.33	7.00	**5.83**	1.18
	Work with children	8	1.33	7.00	**5.79**	1.34
N/A	Prior teaching and learning experiences	5	1.67	7.00	**5.87**	1.34
N/A	Social influences	13	1.00	7.00	3.68	1.77
Task demand			1.00	7.00	6.30	.77
	Expertise of teaching	2	1.00	7.00	**6.00**	.96
	Difficulty of teaching	1	1.00	7.00	**6.58**	.77
Task return			1.13	6.38	3.65	1.21
	Social status	15	1.17	6.33	3.56	1.33
	Salary	12	1.00	7.00	3.91	1.44
N/A	Social dissuasion	14	1.00	7.00	3.56	1.67
N/A	Satisfaction with the choice	4	2.67	7.00	**5.9**	1.07

As the developers (Watt & Richardson, 2007) indicated, S*atisfaction with the choice* was an important factor to examine its relationship with future decision making in

professional practices. The researcher conducted a bivariate correlation between *satisfaction with the choice* and the other factors. As the results in Table 10 show, satisfaction with the choice was significantly correlated with twelve first order factors. Among them, self-concept of *teaching ability* (r=.429, p<.01), *intrinsic career value (r=.448, p<.01),* and *make social contribution* (r=.402, p<.01) had relatively stronger correlations with their level of satisfaction with teaching choice comparing to other related factors. Teachers' perceived *personal utility value*, in terms of *job security, time for family*, *job transferability*, and *fallback career* were significantly negatively correlated with their satisfaction with teaching choice. Among the three factors of *personal utility value*, *time for family* (r=-.275, p<.01) was negatively correlated with satisfaction at a significant level.

Table 10

Correlations Between Satisfaction With the Choice and Other Factors in FIT-Choice Scale

Satisfaction	Teaching Ability	Intrinsic career value	Fallback career	Job security	Time for family	Job transferability
	.429**	.448**	-.325**	-.156	-.275**	-.014
	Shape future of children	Enhance social equity	Make social contribution	Work with Children	Prior teaching/learning experience	Social influences
	.397**	.226*	.402**	.361**	.375**	.126
	Expertise of teaching	Difficulty of teaching	Social status	Salary	Social Dissuasion	
	.205*	.062	.346**	.253**	.087	
	Personal utility value	Social utility value	Task demand	Task return		
	-.198*	.387**	.131	.362**		

Note. *p<.05. **p<.01.

Research Question #3

The third research question was: What is the relationship, if any, between teachers' motivation for choosing teaching as career and the ways in which they facilitate students' constructivist learning? Bivariate correlation was performed to examine the correlations between the 22 constructs (the 18 first order factors and four higher order factors) of FIT-Choice scale and the five constructs of CLES (20). Table 11 presents the summary of statistical results of the correlations.

Personal Relevance

This sub-scale measured the extent to which teachers had taken students' personal experiences and background into account as part of instructional process in classrooms. According to the results, among the first order factors, *satisfaction with the choice* ($r=.389$, $p<.01$), *time for family* ($r=-.311$, $p<.01$), *social status* ($r=.240$, $p<.05$) and *salary* ($r=.240$, $p<.05$) had weak correlations with *personal relevance* construct in CLES (20). *Time for family* was the only factor that negatively correlated with this construct.

Uncertainty

Compared with the construct of *personal relevance*, there were more motivation factors correlated with *uncertainty* construct, which measured the extent to which teachers had considered limitations of knowledge and provided opportunities for students to understand any truth could be doubted. The factors were *teaching ability* ($r=.246$, $p<.01$), *expertise of teaching* ($r=.240$, $p<.05$), *satisfaction with the choice* ($r=.240$, $p<.05$), *make social contribution* ($r=.236$, $p<.05$), *salary* ($r=.224$, $p<.05$), and *prior teaching and learning experiences* ($r=.219$, $p<.05$).

Critical Voice

This construct measured the extent to which teachers had created the environment that embraced students' free expressions in class, such as questioning teachers' instructional contents and methods or asking questions about their study or things relevant in appropriate and beneficial ways. The related factors were *teaching ability* ($r=.329$, $p<.01$), *satisfaction with the choice* ($r=.262$, $p<.01$), *make social expertise of teaching* ($r=.231$, $p<.05$), and *contribution* ($r=.203$, $p<.05$).

Shared Control

This construct measured the extent to which teachers had provided students with the opportunities to share control of the learning environment including making decisions on activity design, learning assessment determination and application, and classroom rule agreement. *Teaching ability* ($r=.202$, $p<.05$) was the only factor related to the *shared control* construct.

Others

As higher order factors, *personal utility value* and *social utility value* had no significant correlations with the CLES (20) constructs in the results of data analysis. While both *task demand* ($r=.203$, $p<.05$) and *task return* ($r=.257$, $p<.01$) had weak correlation with the construct of *uncertainty*.

Statistically, overall, all the significant correlations between factors of teachers' motivation in FIT-choice scale and constructs in CLES (20) were weak according to r values. *Teaching ability* and *satisfaction with the choice* were the two factors that were significantly correlated with three constructs of CLES (20). Student negotiation, which measured the

extent to which teachers had provided opportunities for students to express themselves to peers, was the only construct having no correlations with any career motivation factors.

Table 11

Correlations Between FIT-choice Scale and CLES (20)

Higher order factor	First order factor	Personal relevance	Uncertainty	Critical voice	Shared control	Student negotiation
N/A	Teaching ability	.169	**.246***	**.329****	**.202***	.167
N/A	Intrinsic career value	.059	.118	.108	.166	.154
N/A	Fallback career	.062	.033	-.135	.020	-.082
Personal utility value		-.152	-.022	-.037	.100	-.123
	Job security	.034	.072	.053	.133	-.128
	Time for family	**-.311****	-.164	-.102	.014	-.091
	Job transferability	-.031	.056	-.113	.125	-.074
Social utility value		.080	.137	.167	.125	.055
	Shape future of children	.138	.179	.165	.084	.073
	Enhance social equity	.078	.128	.054	.094	.038
	Make social contribution	.185	**.236***	**.203***	.126	.085
	Work with children	-.086	-.047	.171	.151	.009
N/A	Prior teaching and learning experiences	.146	**.219***	.182	.168	.052
N/A	Social influences	.013	.063	-.031	.177	.029
Task demand		.177	**.203***	.141	.029	.032
	Expertise of teaching	.183	**.240***	**.231***	.037	.044
	Difficulty of teaching	.145	.127	.041	.016	.032
Task return		**.257****	.170	.077	-.036	.042

	Social status	**.240***	.124	.079	-.011	.050
	Salary	**.240***	**.224***	.040	-.090	.003
N/A	Social dissuasion	.146	.164	.079	.056	.091
N/A	Satisfaction with the choice	**.389****	**.240***	**.262****	.106	.119

Note. ** Correlation is significant at the 0.01 level (2-tailed).* Correlation is significant at the 0.05 level (2-tailed).

Research Question #4

The fourth research question was: What other factors are related to teachers' practices of promoting students' constructivist learning? Other factors means those demographic information included at the end of the survey. Namely, participants' gender, age, education background, grade level, language spoken at home, years of teaching, subject area, school type, and school area. To answer the research question, one-way ANOVA and Post hoc tests were conducted. The statistical results are presented in tables. For the factor of *language spoken at home*, there were 109 (96.5%) participants speaking English and four participants (3.5%) speaking Chinese. Therefore, data analysis was not performed for this factor due to the significant difference between the two group sizes.

Gender

A one-way ANOVA between subjects was conducted to examine the effect of gender on teachers' perceived implementation of the five constructs of constructivism. There was a significant effect of gender on the construct of *shared control* at the $p<.05$ level for the three conditions [$F(1, 111) = 5.82$, $p = 0.018$]. According to the results in Table 12 and 13, female teachers (M=3.96, SD=0.69) perceived their implementation of *shared control* to be significantly higher than that of male teachers (M=3.56, SD=0.66).

In this study, the researcher used Eta squared (η^2) to measure the effect size in one-way ANOVA. Effect size means the proportion that was accounted for by the main effects. Eta squared (η^2) is defined as follows:

$$\eta^2 = \frac{SS_{between}}{SS_{total}}$$

Where: SS_{effect} = the sums of squares for whatever effect is of interest

SS_{total} = the total sums of squares for all effects, interactions, and errors in the ANOVA (Brown, 2008, p. 38).

ANOVA for gender and *shared control* in the current analysis,

$$\eta^2 = \frac{SS_{between}}{SS_{total}} = \frac{2.70}{54.13} = 0.05$$

Though the p value was <0.05, the Eta squared turned out to be 0.05 only, which meant the effect size was 5%. Only 5% of the variance was accounted for gender' effect on teachers' implementation of *shared control*. The reason might lie in the relatively small sample size of the study.

In the following analysis, the values of Eta squared (η^2) were presented as effect sizes directly without the process of calculation.

Table 12

One-way ANOVA for Gender and CLES (20)

		Sum of Squares	df	Mean Square	F	Sig.
Personal Relevance	Between Groups	1.938	1	1.938	3.610	.060
	Within Groups	57.985	108	.537		
	Total	59.923	109			
Uncertainty	Between Groups	.000	1	.000	.001	.981
	Within Groups	85.416	109	.784		
	Total	85.417	110			
Critical Voice	Between Groups	.033	1	.033	.158	.692
	Within Groups	22.592	108	.209		
	Total	22.625	109			
Shared Control	Between Groups	2.695	1	2.695	5.815	**.018***
	Within Groups	51.439	111	.463		
	Total	54.134	112			
Student Negotiation	Between Groups	1.664	1	1.664	2.594	.110
	Within Groups	71.215	111	.642		
	Total	72.879	112			

Note. *p<.05.

Table 13

Descriptive Statistics for Shared Control by Gender

				Std.		95% Confidence Interval for Mean	
		N	Mean	Deviation	Std. Error	Lower Bound	Upper Bound
Shared Control	Male	21	3.5595	.65624	.14320	3.2608	3.8582
	Female	92	3.9565	.68601	.07152	3.8145	4.0986
	Total	113	3.8827	.69523	.06540	3.7532	4.0123

Age

One-way ANOVA was also conducted to examine the effect of age on teachers' perceived implementation of the five constructs of constructivism. As shown in Table 14, there was a statistically significant effect of age on the construct of *uncertainty* at the p<.01 level for the three conditions [F (4, 106) = 4.73, p = 0.001]. The effect size (Eta squared) was 15.2% after calculation.

Table 14

One-way ANOVA for age and CLES (20)

		Sum of Squares	df	Mean Square	F	Sig.
Personal relevance	Between Groups	5.304	4	1.326	2.549	.044
	Within Groups	54.619	105	.520		
	Total	59.923	109			
Uncertainty	Between Groups	12.941	4	3.235	4.732	**.001****
	Within Groups	72.476	106	.684		
	Total	85.417	110			
Critical voice	Between Groups	.502	4	.125	.596	.667
	Within Groups	22.123	105	.211		
	Total	22.625	109			
Shared control	Between Groups	1.407	4	.352	.721	.580
	Within Groups	52.726	108	.488		
	Total	54.134	112			
Student negotiation	Between Groups	2.152	4	.538	.821	.514
	Within Groups	70.728	108	.655		
	Total	72.879	112			

Note. **p<.01.

Levene's statistic indicated that there were no Homogeneity of Variances violation for all sub-scales. Follow up Post hoc comparisons using Tukey HSD was performed for the *uncertainty* construct to examine the differences between specific age groups. The statistical results (Table 15and 16) indicated that teachers in the age group of 31-40 (M=3.62, SD=0.93) perceived their implementation of uncertainty significantly lower than their counterparts who were at the age of 41-50 (M=4.29, SD=0.69) and above 50 (M=4.36, SD=0.70) at p<.05 level. However, teachers in the age group of 21 to 30 did not differ significantly from other age groups. Overall, teachers above 41 years old perceived higher implementation of *uncertainty* than those younger than 40 years old according to mean scores.

Table 15

Multiple Comparisons for age and Uncertainty in CLES (20)

Tukey HSD

Dependent Variable	(I) age	(J) age	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Uncertainty	21-25	26-30	.08333	.30193	.999	-.7546	.9213
		31-40	.06190	.25518	.999	-.6463	.7701
		41-50	-.60513	.26810	.167	-1.3492	.1389
		>50	-.67917	.28243	.122	-1.4630	.1047
	26-30	21-25	-.08333	.30193	.999	-.9213	.7546
		31-40	-.02143	.25518	1.000	-.7296	.6868
		41-50	-.68846	.26810	.084	-1.4325	.0556
		>50	-.76250	.28243	.061	-1.5463	.0213
	31-40	21-25	-.06190	.25518	.999	-.7701	.6463
		26-30	.02143	.25518	1.000	-.6868	.7296
		41-50	**-.66703***	.21409	.020	-1.2612	-.0729
		>50	**-.74107***	.23178	.015	-1.3843	-.0978
	41-50	21-25	.60513	.26810	.167	-.1389	1.3492
		26-30	.68846	.26810	.084	-.0556	1.4325
		31-40	**.66703***	.21409	.020	.0729	1.2612
		>50	-.07404	.24594	.998	-.7566	.6085
	>50	21-25	.67917	.28243	.122	-.1047	1.4630
		26-30	.76250	.28243	.061	-.0213	1.5463
		31-40	**.74107***	.23178	.015	.0978	1.3843
		41-50	.07404	.24594	.998	-.6085	.7566

Note. *p<.05.

Table 16

Descriptive Statistics for Uncertainty by age

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	95% Confidence Interval for Mean Upper Bound
Uncertainty	21-25	15	3.6833	.85287	.22021	3.2110	4.1556
	26-30	15	3.6000	.91515	.23629	3.0932	4.1068
	31-40	35	3.6214	.93023	.15724	3.3019	3.9410
	41-50	26	4.2885	.69171	.13566	4.0091	4.5678
	>50	20	4.3625	.69526	.15547	4.0371	4.6879
	Total	111	3.9167	.88120	.08364	3.7509	4.0824

Grade Level

The researcher examined the effect of the factor of teachers' grade levels by using the same method, one-way ANOVA. The statistical results in Table 17 indicate there was a significant effect of *grade level* on the construct of *student negotiation* at the p<.01 level for the three conditions [F (3, 110) = 4.63, p = 0.004]. The effect size was 11.2% after calculation.

Table 17

One-way ANOVA for Grade Level and the CLES (20)

		Sum of Squares	df	Mean Square	F	Sig.
Personal relevance	Between Groups	2.820	3	.940	1.759	.159
	Within Groups	57.171	107	.534		
	Total	59.991	110			
Uncertainty	Between Groups	5.231	3	1.744	2.315	.080
	Within Groups	81.349	108	.753		
	Total	86.580	111			
Critical voice	Between Groups	.407	3	.136	.654	.582
	Within Groups	22.218	107	.208		
	Total	22.625	110			
Shared control	Between Groups	2.001	3	.667	1.407	.245
	Within Groups	52.150	110	.474		
	Total	54.151	113			
Student negotiation	Between Groups	8.173	3	2.724	4.630	**.004****
	Within Groups	64.724	110	.588		
	Total	72.897	113			

Note. **p<.01.

The statistical results (Table 18 and 19) of the follow-up Post hoc comparisons using Tukey HSD indicated that teachers in kindergarten (M=3.19, SD=1.07) perceived their

implementation of student negotiation significantly lower than the other three groups of teachers from elementary school (M=4.15, SD=0.82), middle school (M=4.30, SD=0.62), and high school (M=4.17, SD=0.75). The results implied student negotiation is not a frequent occurrence in participating teachers' classrooms in kindergarten.

Table 18

Multiple Comparisons for Grade Level and Student Negotiation

Tukey HSD

Dependent Variable	(I) Grade	(J) Grade	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Student Negotiation	Kindergarten	Elementary	**-.96494***	.29648	.008	-1.7384	-.1915
		Middle school	**-1.11397***	.30142	.002	-1.9003	-.3276
		High school	**-.98185***	.30419	.009	-1.7754	-.1883
	Elementary	Kindergarten	**.96494***	.29648	.008	.1915	1.7384
		Middle school	-.14903	.17792	.836	-.6132	.3151
		High school	-.01692	.18257	1.000	-.4932	.4594
	Middle school	Kindergarten	**1.11397***	.30142	.002	.3276	1.9003
		Elementary	.14903	.17792	.836	-.3151	.6132
		High school	.13212	.19049	.899	-.3648	.6291
	High school	Kindergarten	**.98185***	.30419	.009	.1883	1.7754
		Elementary	.01692	.18257	1.000	-.4594	.4932
		Middle school	-.13212	.19049	.899	-.6291	.3648

Note. *p<.05.

Table 19

Descriptive Statistics for Student Negotiation by Grade Level

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	95% Confidence Interval for Mean Upper Bound
Student negotiation	Kindergarten	8	3.1875	1.06695	.37723	2.2955	4.0795
	Elementary	41	4.1524	.82325	.12857	3.8926	4.4123
	Middle school	34	4.3015	.62395	.10701	4.0838	4.5192
	High school	31	4.1694	.74830	.13440	3.8949	4.4438
	Total	114	4.1338	.80319	.07523	3.9847	4.2828

Years of Teaching

One-way ANOVA was conducted for *years of teaching* and the five constructs of CLES (20) to examine whether teachers' length of teaching experience had an effect on their perception of constructivist based teaching. The statistical results (Table 20) implied there was a significant effect of the factor of *years of teaching* on teachers' perceived implementation of the construct of *personal relevance* at the p<.05 level for the three conditions [F (4, 106) = 3.25, p = 0.015]. Statistically, there were significant differences among teachers with different length of teaching experience in their implementation of *personal relevance*. The effect size was 10.9% after calculation.

Table 20

One-way ANOVA for Years of Teaching and CLES (20)

		Sum of Squares	Df	Mean Square	F	Sig.
Personal relevance	Between Groups	6.557	4	1.639	3.252	**.015***
	Within Groups	53.434	106	.504		
	Total	59.991	110			
Uncertainty	Between Groups	7.099	4	1.775	2.389	.055
	Within Groups	79.480	107	.743		
	Total	86.580	111			
Critical voice	Between Groups	.257	4	.064	.305	.874
	Within Groups	22.368	106	.211		
	Total	22.625	110			
Shared control	Between Groups	2.341	4	.585	1.231	.302
	Within Groups	51.810	109	.475		
	Total	54.151	113			
Student negotiation	Between Groups	.731	4	.183	.276	.893
	Within Groups	72.166	109	.662		
	Total	72.897	113			

Note. *p<.05.

Because the statistical results of Levene's, Welch, and Brown-Forsythe all indicated the violation of Homogeneity of Variances for the sub-scale of *personal relevance*, Games-Howell was performed for the follow-up Post hoc comparisons to examine the differences between specific groups of years of teaching. The statistical results (Table 21 and 22) show that both teachers with less than 5 years of teaching (M=4.10, SD=0.72) and teachers with 10-20 years of teaching experience (M=4.10, SD=0.79) taught personal relevance significantly less often than those with 20-30 years (M=4.60, SD=0.43) and more than 30 years of teaching (M=4.87, SD=0.25). Teachers with 5-10 years of teaching experience (M=4.13, SD=0.81) also taught personal relevance significantly less often than their counterpart with more than 30 years of teaching experience. Overall, teachers with more than 30 years of teaching experience were significantly different from those with less than 20 years of teaching experience. However, it is important to note that there were only four teacher participants in the group of "having been a teacher for more than 30 years." The practical value of the statistical result regarding this group may be limited.

Table 21

Multiple Comparisons for Personal Relevance and Years of Teaching

Games-Howell

(I) Years of teaching	(J) Years of teaching	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
<5	5 —10	-.03679	.21842	1.000	-.6563	.5828
	10—20	.00060	.19963	1.000	-.5643	.5655
	20—30	**-.53854***	.17600	.032	-1.0438	-.0333
	>30	**-.77717***	.19567	.010	-1.3869	-.1675
5 —10	<5	.03679	.21842	1.000	-.5828	.6563
	10—20	.03739	.20551	1.000	-.5429	.6177
	20—30	-.50175	.18264	.065	-1.0239	.0204
	>30	**-.74038***	.20167	.016	-1.3604	-.1204
10—20	<5	-.00060	.19963	1.000	-.5655	.5643
	5 —10	-.03739	.20551	1.000	-.6177	.5429
	20—30	**-.53914***	.15970	.011	-.9894	-.0889
	>30	**-.77778***	.18115	.008	-1.3553	-.2003
20—30	<5	**.53854***	.17600	.032	.0333	1.0438
	5 —10	.50175	.18264	.065	-.0204	1.0239
	10—20	**.53914***	.15970	.011	.0889	.9894
	>30	-.23864	.15472	.571	-.7976	.3203
>30	<5	**.77717***	.19567	.010	.1675	1.3869
	5 —10	**.74038***	.20167	.016	.1204	1.3604
	10—20	**.77778***	.18115	.008	.2003	1.3553
	20—30	.23864	.15472	.571	-.3203	.7976

Note. *p<.05.

Table 22

Descriptive Statistics for Personal Relevance by Years of Teaching

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
						Lower Bound	Upper Bound
Personal	<5	23	4.0978	.72197	.15054	3.7856	4.4100
Relevance	5 —10	26	4.1346	.80694	.15825	3.8087	4.4605
	10—20	36	4.0972	.78667	.13111	3.8311	4.3634
	20—30	22	4.6364	.42767	.09118	4.4467	4.8260
	>30	4	4.8750	.25000	.12500	4.4772	5.2728
	Total	111	4.2410	.73849	.07009	4.1021	4.3799

Subject Areas

Subjects that participating teachers teach was another important factor to examine for its effect on teachers' implementation of constructivism. According to the statistical results of one-way ANOVA in Table 23, there is a significant effect of *subject area* on teachers' perceived implementation of *student negotiation* at the p<.01 level for the three condition [F (6, 96) = 4.20, p = 0.001]. The effect size was 20.8% after calculation.

Table 23

One-way ANOVA for Subject Areas and CLES (20)

		Sum of Squares	df	Mean Square	F	Sig.
Personal relevance	Between Groups	6.004	6	1.001	1.942	.082
	Within Groups	48.434	94	.515		
	Total	54.438	100			
Uncertainty	Between Groups	8.299	6	1.383	1.853	.097
	Within Groups	70.925	95	.747		
	Total	79.224	101			
Critical voice	Between Groups	1.193	6	.199	1.148	.341
	Within Groups	16.104	93	.173		
	Total	17.297	99			
Shared control	Between Groups	2.353	6	.392	.786	.583
	Within Groups	47.878	96	.499		
	Total	50.231	102			
Student negotiation	Between Groups	12.987	6	2.164	4.195	**.001****
	Within Groups	49.528	96	.516		
	Total	62.515	102			

Note. **p<.01.

The follow-up Post hoc comparisons using the Tukey HSD test indicated teachers in Special Education area (M=3.23, SD=0.95) perceived their implementation of student

negotiation in classrooms significantly lower than teachers from English (M=4.18, SD=0.64), Math (M=4.61, SD=0.52), and Specials/Electives (M=4.34, SD=0.73) (shown in Tables 24 and 25). Statistically, *student negotiation* did not often happen for teachers in Special Education area in this study. For teachers in the other six subject areas, their perceptions of implementation of *student negotiation* were relatively positive.

Table 24

Multiple Comparisons for Subject Areas and Student Negotiation

Tukey HSD

Dependent Variable	(I) subject area	(J) subject area	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Student negotiation	All subject	English	.10829	.30057	1.000	-.7970	1.0136
		Social Studies	.26648	.33673	.985	-.7477	1.2806
		Math	-.32366	.32549	.954	-1.3040	.6567
		Science	.23016	.36197	.995	-.8600	1.3203
		Special Ed	1.06071	.35397	.052	-.0054	2.1268
		Specials/Electives	-.05252	.32257	1.000	-1.0240	.9190
	English	All subject	-.10829	.30057	1.000	-1.0136	.7970
		Social studies	.15819	.23734	.994	-.5566	.8730
		Math	-.43196	.22110	.451	-1.0979	.2340
		Science	.12186	.27197	.999	-.6972	.9410
		Special Ed	**.95242***	.26122	.008	.1657	1.7391
		Specials/Electives	-.16082	.21677	.990	-.8137	.4921
	Social studies	All subject	-.26648	.33673	.985	-1.2806	.7477
		English	-.15819	.23734	.994	-.8730	.5566
		Math	-.59014	.26820	.305	-1.3979	.2176
		Science	-.03632	.31146	1.000	-.9744	.9017
		Special Ed	.79423	.30212	.129	-.1157	1.7042
		Specials/Electives	-.31900	.26464	.890	-1.1160	.4780
	Math	All subject	.32366	.32549	.954	-.6567	1.3040

	English	.43196	.22110	.451	-.2340	1.0979
	Social studies	.59014	.26820	.305	-.2176	1.3979
	Science	.55382	.29928	.518	-.3475	1.4552
	Special Ed	**1.38438***	.28954	.000	.5123	2.2564
	Specials/Electives	.27114	.25018	.931	-.4824	1.0246
Science	All subject	-.23016	.36197	.995	-1.3203	.8600
	English	-.12186	.27197	.999	-.9410	.6972
	Social studies	.03632	.31146	1.000	-.9017	.9744
	Math	-.55382	.29928	.518	-1.4552	.3475
	Special Ed	.83056	.33002	.165	-.1634	1.8245
	Specials/Electives	-.28268	.29609	.962	-1.1744	.6091
Special Ed	All subject	-1.06071	.35397	.052	-2.1268	.0054
	English	**-.95242***	.26122	.008	-1.7391	-.1657
	Social studies	-.79423	.30212	.129	-1.7042	.1157
	Math	**-1.38438***	.28954	.000	-2.2564	-.5123
	Science	-.83056	.33002	.165	-1.8245	.1634
	Specials/Electives	**-1.11324***	.28625	.003	-1.9754	-.2511
Specials/ Electives	All subject	.05252	.32257	1.000	-.9190	1.0240
	English	.16082	.21677	.990	-.4921	.8137
	Social studies	.31900	.26464	.890	-.4780	1.1160
	Math	-.27114	.25018	.931	-1.0246	.4824
	Science	.28268	.29609	.962	-.6091	1.1744
	Special Ed	**1.11324***	.28625	.003	.2511	1.9754

Note. *p<0.05.

Table 25

Descriptive Statistics of Student Negotiation by Subject Areas

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
All subject	7	4.2857	.91775	.34688	3.4369	5.1345
English	31	4.1774	.63637	.11430	3.9440	4.4108
Social studies	13	4.0192	.83205	.23077	3.5164	4.5220
Math	16	4.6094	.52416	.13104	4.3301	4.8887
Science	8	3.9375	.57864	.20458	3.4537	4.4213
Special Ed	10	3.2250	.94612	.29919	2.5482	3.9018
Specials/Electives	17	4.3382	.72855	.17670	3.9636	4.7128
Total	102	4.1471	.78219	.07745	3.9934	4.3007

One-way ANOVA was also conducted for education background, school type, and school area and the CLES (20). There was no statistically significant difference found in the results. Therefore, it was assumed that education background, school type, and school area had no statistical correlations with teachers' perceptions of their implementation of constructivist teaching in their classes.

Based on the data analysis, Table 26 summarizes all factors having significant correlations with and effect on the five constructs of CLES (20).

Table 26

Factors Having Significant Correlations With and Effect on the CLES (20)

	Higher order	First order	Personal relevance	Uncertainty	Critical voice	Shared control	Student negotication
Pearson Correlation		Teaching ability		r=.246* p=.010	r=.329** p=.001	r=.202* p=.033	
		Time for family	r=-.311** p=.001				
		Make social contribution		r=.236* p=.012	r=.203* p=.034		
		Prior teaching and learning experiences		r=.219* p=.12			
		Expertise of teaching		r=.240* p=.011	r=.231* p=.015		
		Social status	r=.240* p=.011				
		Salary	r=.240* p=.011	r=.224* p=017			
		Satisfaction with the choice	r=.389** p=.000	r=.240* p=.011	r=.262** p=.006		
	Task demand			r=.203* p=.033			
	Task return		r=.257** p=.006				
ANOVA		Gender				p=.018* η^2=.05	
		Age		p=.001** η^2=.152			
		Grade level					p=.004** η^2=.112
		Years of teaching	p=.015* η^2=.109				
		Subject area					p=.001** η^2=.208

Note. ** Correlation is significant at the 0.01 level (2-tailed).* Correlation is significant at the 0.05 level (2-tailed). **Mean difference is significant at the 0.01 level *Mean difference is significant at the 0.05 level

Summary

This chapter reported the results of the data analysis to answer the four research questions. Besides introduction to demographic information of participants, presentation of results made four other sections of this chapter. The results included teachers' report of their

implementation of constructivist teaching by analyzing mean scores of five sub-scales of CLES (20), teachers' report of the factors influencing teaching including their career motivation, teaching beliefs, and satisfaction with career choice, by analyzing the FIT-Choice scale and correlations between constructs of the FIT-Choice scale and CLES (20). Though there was some statistical significance in correlations identified, the results turned out to be weak. In the last section, the researcher analyzed other factors included in demographic information and found that teachers' gender, age, teachers' grade level, subject areas, and years of teaching all played a role in their implementation of constructivist teaching. However, their effect sizes were relatively low. Discussions in the coming chapter will bring more in-depth explanation of the implications of these findings.

CHAPTER FIVE

DISCUSSION AND CONCLUSIONS

This study examined the extent to which teachers were implementing constructivist teaching practices. The researcher explored whether there was a relationship between teachers' teaching choices and their constructivist teaching and explored other factors that were related to the constructivist practices. The two surveys, FIT-Choice scale and CLES (20), were utilized to accomplish the study's purposes. In Chapter Four, the researcher performed data analysis to answer the four research questions by using SPSS. Results were reported in both tables and descriptions. In this chapter, the researcher provides discussions based on the results, makes recommendations for future researchers in this area, and concludes the whole study.

Discussion

In this section, the researcher discusses the four research questions in terms of the results of the data analysis. The four sections include teachers' perceptions of their implementation of constructivist teaching, teachers' perceptions of the factors that influence their teaching choices (career motivation, teaching beliefs, and satisfaction with teaching career), the correlations between constructs (factors) in FIT-Choice scale and CLES (20), and other related factors such as gender, age, and years of teaching.

Teachers' Implementation of Constructivist Teaching

The first research question asked about the extent to which teachers' implementation of constructivist teaching from their own views. The CLES (20) consisted of five constructs which were *personal relevance, uncertainty, critical voice, shared control, and student*

negotiation. As mentioned in Chapter Two, there are challenges to teach from constructivist perspective since it takes time to let students voice themselves and share management of classroom, both of which may lead to unexpected results due to students' immaturity (Anagun & Anilan, 2013; Brooks & Brooks, 1999). In the current study, the participating teachers perceived their students had high degree of freedom to express themselves in classes according to the highest mean score of *critical voice*. Nevertheless, *shared control* embraced the lowest mean score among the five constructs in the current study. This seemed to be consistent with previous studies. In their case study, Haney and McArthur (2002) found that *personal relevance*, *uncertainty*, and *student negotiation* were teachers' core beliefs in constructivist-based instruction, which were implemented more often in teaching. However, *shared control* was a peripheral belief to some teachers who claimed it was difficult to incorporate into instruction. Their investigation focused on science teachers. Dryden and Fraser (1998) found teachers did not improve much on these five constructs of constructivist teaching after three years of professional training. *Shared control* was notably at a low level. The researchers attributed it to the traditional system of student assessment.

There was limited research on teachers' perceptions of their implementation of constructivist teaching. Beck, Czerniak, & Lumpe (2000) had a study on science teachers' beliefs of their implementation of constructivism in their instructions by using CLES as well. The findings were also meaningful to explain to teachers in all subject areas. The researchers found that teachers posessed positive attitudes toward teaching for the five constructs of constructivism which they believed to be helpful for students' learning and development. But for *personal relevance* (with relatively low mean score), science teachers expressed their

need of more external support such as curriculum materials and supplies. In the current study, teachers' perceived implementation of *personal relevance* was relatively high. This could be because teachers were from all different subject areas. Beck et al. (2000) found that *shared control* (with the lowest mean score)wasn't easy for classroom management due to students' immaturity. It might also explain the relatively low mean score of *shared control* in the current study. It should be noted that teachers' positive attitudes and beliefs in constructivistteaching did not always lead to their implementation of it due to various external and internal reasons, as the results of Beck et al.'s (2000) study showed.

Johnson and McClure (2004) compared perceptions of students and teachersin their study and found that teachers' perceptions of their classroom environments were generally higher than that of students. For example, students had quite different attitudes toward *critical voice* construct than their teachers. Students' mean score of this sub-scale was much lower than their teachers'. This tells a limitation of this study. The investigation might help teachers to reflect on their classroom instruction but the results could havedeviated from the reality to some extent. Chapman (2014) used a mixed method approach to investigate both science teachers and students' perception of constructivist teaching by using CLES and interviews. He found that students might have different understandings of some instructional strategies from their teachers in classes. For example, when teachers were providing choices for them to do certain tasks, students might not feel they were being provided options but merely follow teachers' directions. Therefore, people need to be careful when interpreting teachers' ratings on the scale.

Teachers'Career Motivation

The data for teachers' motivation to be in a teaching career were collected from the FIT-Choice scale that was developed by Watt and Richardson (2007). There were limited studies using this scale to measure in-service teachers' motivation to be teachers. In this study, the researcher investigated career motivation of in-service teachers from some schools in Pennsylvania.

The statistical results showed that the important motivational factors for becoming teachers were as following: self-concept of *teaching ability, prior teaching and learning experiences, intrinsic career value,* and three *social utility values*: *make social contribution, shape future of children/adolescents,* and *work with children.* These factors were consistent with the important factors of teachers' career motivations in the previous studies (Fokkens-Bruinsma & Canrinus, 2012; Sinclair, Dowson, &McInerney, 2006; Watt & Richardson, 2007; Richardson & Watt, 2006; Yu, 2011). *Personal utility values* (such as *time for family* and *job security*) were perceived as unimportant motivational factors influencing teachers' choice of teaching career.

The teachers who participated in this study believed teaching was a highly demanding task with the highest mean score of *teaching expertise* and *teaching difficulty* in the scale (the only two factors rated above six points). According to the data of this study, the participating teachers perceived their job as relatively low return in terms of low *social status* and low *salary,* which was not a good sign when referring to Eccle et al.'s (1983) expectancy-value theory. The cost, which refers to discrepancy between teachers' perceptions of task demand and task return in expectancy-value model, seemed to be high according to the data. When

teachers consider their work demanding and their return low, meaning the cost was high; it could be quite discouraging to teachers (Watt & Richardson, 2007; Yu, 2011). However, teachers in this study reported relatively high satisfaction with their teaching career choice, which was consistent with previous research (Richardson & Watt, 2006; Watt& Richardson, 2007; Yu, 2011). The reason was explained by those previous researchers that being different from other careers, there were different kinds of rewards in teaching such as the realization of personal values and making social contributions in the teaching process for many teachers. It was shown in the results that intrinsic career values and social utility values have been found to be important motivators for them to enter teaching career in the current study and previous studies.

Meanwhile, as the results shown in Table 10, among the 12 related factors, teachers' satisfaction with their career choice strongly related to their self-concept of *teaching ability, intrinsic career value, and make social contribution*. For the four higher order factors, teachers' *social utility values* correlated with their career satisfaction positively, while *personal utility values* correlated with teachers' satisfaction level negatively. Teachers' beliefs about their task return were also positively correlated with their career satisfaction. However, it was interesting to find that teachers' beliefs about *task demand* of teaching did not correlate with their satisfaction level at a significant level. The result was different from that of previous studies on pre-service teachers (Watt & Richardson, 2007; Yu, 2011).

Factors Related to Implementation of Constructivism

As discussed earlier in the first part, school systems such as curriculum requirements and assessment can be factors that impede the implementation of constructivism for teachers,

as well as thefear of losing control in the classroom.In this study, the researcher examined teachers' career motivations and some other demographic factors todetermine if these factors correlate or impact teachers' implementation of constructivistteaching. The following sections summarizes all correlated and influential factors of every construct of the CLES (20) and made discussions.

Personal relevance. *Time for family* was negatively correlated with this construct at a significant level. That meant the less time teachers perceived their job provided for their families, the more opportunities they would provide for students to make *personal relevance* in class. For the participating teachers in the current study, *time for family* (belong to *personal utility value*) was not an important factor influencing their career choice. It seems the lower teachers rated the importance of personal benefits as a motivational factor, the higher they would rate importance of students' benefits. *Salary* and *satisfaction with the choice* were significantly correlated factors as well, in a positive way however. In the motivation model, salary belongs to task return. It seems reasonable to see when teaching is deemed to be a high return career, teachers consider more about students' personal relevance in teaching. *Years of teaching* is a significant influential factor. It seemed teachers with longer teaching experiences tended to teach *personal relevance* more frequently. Teachers' teaching experiences have been an important element in recent research about its positive impact on student learning (Ladd & Sorensen, 2015; Papay & Kraft, 2015; Rice, 2010), which connected to teachers' instruction. The results of this study happened to reveal that teachers' constructivist practice was related to their teaching experience to some extent. This could be related to teachers' life experiences. Their understanding about life and teaching is

richer and richer as time goes by. This might help to consider more about students' personal relevance in classes.

Uncertainty. Different factors in all three parts of the FIT-Choice scale positively correlated with teachers' teaching of uncertainty in class, including career motivation factors of self-perception of *teaching ability*, *make social contribution*, *prior teaching and learning experience*, teachers' beliefs about *expertise of teaching*, *social status*, and *salary*, and *satisfaction with career choice*. This construct was designed to examine the extent to which students were provided opportunities to understand any truth could be doubted due to evolving human experiences and social and cultural values. These positively related factors refer to teachers' confidence about their teaching ability, their social utility value, prior experiences, and their perceptions of task demand and return. It seems these factors are consistent with the connotations of the uncertainty construct.

Age was proven to be an impacting factor. Teachers above 40 years old tended to teach uncertainty more frequently, while both groups of teachers at the age of 41-50, and above 50 years old taught uncertainty in class significantly more often than those at the age of 31-40. Teachers younger than 30 years old also taught uncertainty less often than the two groups who were older than 40 years old, but not significantly. This could be because older teachers have richer teaching and life experiences and more teaching skills as well.

Critical voice. Mean score of this construct was the highest among the five sub-scales, which meant the participating teachers perceived that they taught critical voice in their classes quite frequently. This was different from some previous studies. Haney and McArthur (2002) did not find critical voice as teachers' core beliefs. Teachers did not

provide opportunities for critical voice often. Beck etal. (2000) indicated that teachers had concerns with critical voice because students might lack the ability to question and doubt, and if teachers provided more opportunities for critical voice, they might have to change pedagogy to manage the class. The possible reason for the difference between the result of the current study and that of previous studies might be due to the fact that participating teachers of this study were from different subject areas rather than science teachers only. Besides, these participating teachers might be the group of teachers who were more interested in constructivism. The four correlated factors to teachers' teaching *critical voice* were self-perception of *teaching ability, make social contribution, expertise of teaching*, and *satisfaction with the choice.* It seemed teachers who perceived their teaching ability to be higher, who perceived higher intentions to make social contribution, who perceived teaching as higher expertise, and who were more satisfied with their teaching choice tended to teach *critical voice* more frequently in their classes. Teachers' confidence about their teaching and satisfaction with their job might have played a role. They might be more confident to deal with students' immaturity and classroom management. However, as Johnson and McClure (2004) pointed out, what teachers thought they did was not equal to what they really did.

Shared control. Teachers' self-perception of *teaching ability* was the only factor found to be significantly correlated with their implementation of *shared control*. It was shown that teachers who perceived higher teaching ability tended to teach *shared control* in class more often. Gender was found to be an influential demographic factor. Females seemed to score their implementation of *shared control* higher than males. However, the effect size of gender's effect was found to be only 5%. Shared control was implemented the

least often among the five constructs. The possible reasons that were discussed earlier mainly came from external pressures. For example, when asked about providing opportunities for students to make decisions with classroom management and instructional materials, Chapman (2014) found that teachers had a big concern with students' immaturity, school climate, and standardized test, though they may have students in their classes that they share control with to some extent. In Beck etal.'s (2000) study, the researchers had similar findings about the concern of students' immaturity and set of curriculum that discouraged teachers from providing more opportunities for shared control.

Student negotiation. The sub-scale of student negotiation was designed to measure teachers' instruction on promoting communication among students. None of the factors in FIT-Choice scale were found to be correlated with any construct of constructivist teaching. However, two factors were found to be significantly influential: grade level and subject area. Teachers in kindergarten implemented *student negotiation* significantly less often than teachers who taught elementary, middle, and high school. The concern of teachers in kindergarten might be students' immaturity to communicate with and help each other. Beck et al. (2000) found that for student negotiation, teachers had more concern about classroom management, though they generally showed positive attitude toward it. Grade level was found to be an influential factor in Beck et al.'s (2000) study as well. They found primary science teachers had more positive attitude toward student negotiation. However, as the researcher applied CLES (20) to teachers from all subject areas, it was hard to compare the current study with other studies.

Another influential factor was subject area. Teachers in Special Education turned out to teach student negotiation significantly less often than teachers in another three subject areas did. Not only student negotiation, mean scores of other constructs except critical voice for Special Education teachers were all under four points, at relatively low levels. The CLES survey might not be suitable to evaluate teachers who teach students with special needs. As Sadat Sajadi (2011) pointed out, students with special educational needs have limitations when meeting the requirements for constructivist teaching approaches to succeed in classes.

Teachers' self-perceptions of their teaching ability and satisfaction with their career choice were shown to be important factors that were significantly correlated to three constructs of constructivist teaching, according to the statistical results. Drawing upon Eccle et al.'s (1983) expectancy-value theory, ability belief was a better predictor of their performance in relevant tasks. When people have better profile about their own ability, they tend to have higher expectations of success, which motivates them to invest more time and energy into the tasks (Topkaya & Uztosun, 2012). Based on the model, it seems to be easy to understand that when teachers' self-concept of teaching ability is higher, they tend to teach in more constructivist approaches as the data of the current study indicated.

For satisfaction with the choice, as discussed in earlier section, it was positively related to most motivational factors of teachers' career choice at significant levels. Teachers' self-perception of their teaching ability was one of the factors that had relatively strong correlation with their satisfaction level. Therefore, it is not hard to understand that the more satisfied teachers were with their career choice, the better they would perform in constructivist teaching. The factor of teachers' satisfaction with their career choice was an

important indicator in different ways. It was found to be correlated with pre-service teachers' intentions to teach in urban school settings (Yu, 2011), and correlated with pre-service teachers' perception of teaching engagement and professional development aspirations when they were going to exit the teacher education program (Watt &Richardson, 2007).

Both *r* values in significant correlations between factors of FIT-Choice scale and constructs of CLES (20) and Eta squared values in one-way ANOVA for other factors were found to be low in the current study. Either the correlations or influential power of those factors was implied to be weak. The practical significance of the results may be limited. There could be some other factors influencing teachers' implementation of constructivist approaches. For example, teachers' concern with requirements from school system and curriculum could be barriers.

Recommendations for Future Research

As a quantitative study, there were some limitations that had been recognized in the first chapter. In this section, the researcher raises some recommendations for future relevant research.

1) A larger sample size would be better when applying the CLES (20) to teachers in all subject areas. It would be more informative and more generalizable.
2) Only quantitative methods were used in the study. The results were based on statistical data and analysis without in-depth qualitative data and analysis. If some qualitative methods were used based on statistic results, such as interviews and observations, people would gain more insights about certain phenomena in this study. For example, how do teachers understand those

career motivation factors that correlate with their establishment of constructivist learning environment? In what ways do grade level and subject area impact teachers' establishment of constructivist learning environments? Moreover, as previous studies showed that teachers tended to consider their learning environment more positive than the perception of students' (B. Johnson & McClure, 2004; Taylor, Fraser, & Fisher, 1997), the Constructivist Learning Environment Survey was usually perceived as more useful when it was administrated with interviews and class observations or when both teacher and student forms were used in investigation.

3) In this study, the first part of the FIT-Choice scale "influencing factors" was modified in the way of changing present tense to past tense. For future researchers, as one of the survey developers, Watt suggested it can be maintained present tense and the stem expression can be change into "I stay in teaching career because…". Only some items in Part One of the FIT-Choice scale need to be rephrased into appropriate expressions. In this way, the researcher will gain the data of in-service teachers' current career motivation.
4) Additional factors can be explored for future researchers to understand more comprehensively about constructivist teaching. Special Education is an area deserving of more attention for researchers and educators.

Conclusions

The study was designed on the basis of the researcher's interest to examine the status of constructivist teaching in American school classrooms. Originally designed for science

and math classes, the Constructivist Learning Environment Survey, including teacher form and student form, opened a window for people to measure teachers' implementation of constructivism. According to the literature review, the survey was rarely used to investigate teachers and students from all subject areas. Researchers either used the survey in science and math classes or in classes of one certain subject (such as English or computer), and mainly used student form to investigate students' perception of classroom environment. The researcher used teacher form in this study and applied it to teachers in all subject areas. Besides investigating the extent to which teachers implementing constructivism in classes, the researcher also explored factors that influenced their implementation. The researcher focused on factors of teachers' career motivation in the current study and investigated relevant demographic factors.

Generally, the participating teachers reported relatively high level of constructivist learning environment in their classes. To a large extent, teachers have created positive environments to facilitate students constructivist learning from their perception, especially in the aspects of *personal relevance*, *critical voice*, and *student negotiation*. Student *uncertainty* and *shared control* were implemented relatively less often, but not down to a low level. However, the data needs to be considered prudently since teachers' perceptions may be more positive than reality.

The participating teachers' important career motivations include their self-concept of *teaching ability*, *prior teaching and learning experiences*, *intrinsic career value*, and three *social utility values* including *make social contribution*, *shape future of children/adolescents*, and *work with children.* They perceived teaching as highly demanding but low return work

in terms of high ratings of beliefs about expertise and difficulty of teaching as well as low ratings of social status and salary. However, teachers were quite satisfied with their career choice.

Among twelve career motivation factors, teachers' self-perceptions of *teaching ability, time for family, make social contribution, prior teaching and learning experiences* were significantly correlated with their implementation of different constructs of constructivist teaching. *Teaching ability* was the factor correlated with three constructs of the constructivist scale, so was their *satisfaction with career choice*. Teachers' beliefs about teaching including *expertise of teaching, social status,* and *salary* correlated significantly with one or two constructs of the constructivist scale. Among all demographic factors, gender, age, grade level, years of teaching, and subject area were found to be influential factors on teachers' implementation of constructivist approaches. However, all correlations or effects seemed to be weak according to the results. There should be other impacting factors on teachers' instructional strategies that are constructivist or not.

The researcher was trying to validate the advantages and benefits of teaching from a constructivist perspective, which helps to promote student motivation to learn if taught properly. This, of course does not mean that constructivist teaching is the only good pedagogy in classrooms. As Duffy (2009) pointed out that teachers' understanding of constructivism could be different, so could their practices. Teachers always need to find a balance in teaching, especially under the current standardized test system. They play a significant role to provide well-balanced guidance that facilitates learners' constructivist learning (Kintsch, 2009). As the results of the current study showed, teachers who have more

confidence in their teaching ability tend to teach in more constructivist ways. So do teachers who are more satisfied with their jobs. Teachers are motivated by social utility values rather than personal utility values. In short: motivation does matter when considering teachers' practices in classes, such as teaching from constructivist perspectives.

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Appendix A

FIT-Choice Scale (Factors Influencing Teaching Choice Scale)

Please briefly state your main reason(s) for choosing to become a teacher:

PART B – INFLUENTIAL FACTORS

For each statement below, please rate how important it was in **YOUR** decision to become teacher, from **1** (not at all important in your decision) to **7** (extremely important in your decision).

Please **CIRCLE** the number that best describes the importance of each.

"I chose to become a teacher because…"

		Not at all						**Extremely**	
B1.	I am interested in teaching.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	B1
B2.	Part-time teaching could allow more family time.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	B2
B3.	My friends think I should become a teacher.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	B3
B4.	As a teacher I will have lengthy holidays.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	B4
B5.	I have the qualities of a good teacher.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	B5
B6.	Teaching allows me to provide a service to society.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	B6
B7.	I've always wanted to be a teacher.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	B7
B8.	Teaching will be a useful job for me to have when travelling.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	B8
B9.	Teaching will allow me to shape child/adolescent values.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	B9
B10.	I want to help children/adolescents learn.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	B10
B11.	I was unsure of what career I wanted.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	B11
B12.	I like teaching.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	B12
B13.	I want a job that involves working with children/adolescents.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	B13
B14.	Teaching will offer a steady career path.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	B14
B16.	Teaching hours will fit with the responsibilities of having a family.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	B16
B17.	I have had inspirational teachers.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	B17
B18.	As a teacher I will have a short working day.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	B18
B19.	I have good teaching skills.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	B19
B20.	Teachers make a worthwhile social contribution.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	B20
B22.	A teaching qualification is recognised everywhere.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	B22
B23.	Teaching will allow me to influence the next generation.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	B23
B24.	My family think I should become a teacher.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	B24

B26.	I want to work in a child/adolescent-centred environment.	**1 2 3 4 5 6 7**	B26
B27.	Teaching will provide a reliable income.	**1 2 3 4 5 6 7**	B27
B29.	School holidays will fit in with family commitments.	**1 2 3 4 5 6 7**	B29
B30.	I have had good teachers as role-models.	**1 2 3 4 5 6 7**	B30
B31.	Teaching enables me to _give back‘ to society.	**1 2 3 4 5 6 7**	B31
B35.	I was not accepted into my first-choice career.	**1 2 3 4 5 6 7**	B35
B36.	Teaching will allow me to raise the ambitions of underprivileged youth.	**1 2 3 4 5 6 7**	B36
B37.	I like working with children/adolescents.	**1 2 3 4 5 6 7**	B37
B38.	Teaching will be a secure job.	**1 2 3 4 5 6 7**	B38
B39.	I have had positive learning experiences.	**1 2 3 4 5 6 7**	B39
B40.	People I‘ve worked with think I should become a teacher.	**1 2 3 4 5 6 7**	B40
B43.	Teaching is a career suited to my abilities.	**1 2 3 4 5 6 7**	B43
B45.	A teaching job will allow me to choose where I wish to live.	**1 2 3 4 5 6 7**	B45
B48.	I chose teaching as a last-resort career.	**1 2 3 4 5 6 7**	B48
B49.	Teaching will allow me to benefit the socially disadvantaged.	**1 2 3 4 5 6 7**	B49
B52.	Teaching is a fulfilling career.	**1 2 3 4 5 6 7**	B52
B53.	Teaching will allow me to have an impact on children/adolescents.	**1 2 3 4 5 6 7**	B53
B54.	Teaching will allow me to work against social disadvantage.	**1 2 3 4 5 6 7**	B54

PART C – BELIEFS ABOUT TEACHING

For each question below, please rate the extent to which **YOU** agree it is true about teaching, from **1** (not at all) to **7** (extremely).

Please **CIRCLE** the number that best describes your agreement for each.

		Not at all	**Extremely**
C1.	Do you think teaching is well paid?	**1 2 3 4 5 6 7**	C1
C2.	Do you think teachers have a heavy workload?	**1 2 3 4 5 6 7**	C2
C3.	Do you think teachers earn a good salary?	**1 2 3 4 5 6 7**	C3
C4.	Do you believe teachers are perceived as professionals?	**1 2 3 4 5 6 7**	C4
C5.	Do you think teachers have high morale?	**1 2 3 4 5 6 7**	C5
C6.	Do you think teaching is a highly skilled occupation?	**1 2 3 4 5 6 7**	C6

C7.	Do you think teaching is emotionally demanding?	**1 2 3 4 5 6 7**	C7
C8.	Do you believe teaching is perceived as a high-status occupation?	**1 2 3 4 5 6 7**	C8
C9.	Do you think teachers feel valued by society?	**1 2 3 4 5 6 7**	C9
C10.	Do you think teaching requires high levels of expert knowledge?	**1 2 3 4 5 6 7**	C10
C11.	Do you think teaching is hard work?	**1 2 3 4 5 6 7**	C11
C12.	Do you believe teaching is a well-respected career?	**1 2 3 4 5 6 7**	C12
C13.	Do you think teachers feel their occupation has high social status?	**1 2 3 4 5 6 7**	C13
C14.	Do you think teachers need high levels of technical knowledge?	**1 2 3 4 5 6 7**	C14
C15	Do you think teachers need highly specialised knowledge?	**1 2 3 4 5 6 7**	C15

PART D – <u>YOUR</u> DECISION TO BECOME A TEACHER

For each question below, please rate the extent to which it is true for **YOU**, from **1** (not at all) to **7** (extremely).

Please **CIRCLE** the number that best describes your agreement for each.

		Not at all	**Extremely**
D1.	How carefully have you thought about becoming a teacher?	**1 2 3 4 5 6 7**	D1
D2.	Were you encouraged to pursue careers other than teaching?	**1 2 3 4 5 6 7**	D2
D3.	How satisfied are you with your choice of becoming a teacher?	**1 2 3 4 5 6 7**	D3
D4.	Did others tell you teaching was not a good career choice?	**1 2 3 4 5 6 7**	D4
D5.	How happy are you with your decision to become a teacher?	**1 2 3 4 5 6 7**	D5
D6.	Did others influence you to consider careers other than teaching?	**1 2 3 4 5 6 7**	D6

For information about this work, please contact Helen M. G. Watt and Paul W. Richardson.

Helen Watt, School of Education, University of Michigan, 610 East University #4204D, Ann Arbor MI 48109-1259 USA. Tel: (+1 734) 647-1082, Fax: (+1 734) 936-1606, Email: hwatt@umich.edu. Paul Richardson, Faculty of Education, Monash University, Clayton Campus, Melbourne VIC 3800, Australia. Tel: (+61 3) 9905-2771, Fax: (+61 3) 9905-5400, Email: paul.richardson@education.monash.edu.au

Appendix B

Constructivist Learning Environment Survey CLES (20)

Response choices for all items are:

A Almost Always
B Often
C Sometimes
D Seldom
E Almost Never

Learning About the World (Personal Relevance)
In this class . . .
1. Students learn about the world inside and outside of school.
2. New learning relates to experiences or questions about the world inside and outside of school.
3. Students learn how science is a part of their inside- and outside-of-school lives.
4. Students learn interesting things about the world inside and outside of school.

Learning About Science (Uncertainty)
In this class . . .
5. Students learn that science cannot always provide answers to problems.
6. Students learn that scientific explanations have changed over time.
7. Students learn that science is influenced by people's cultural values and opinions.
8. Students learn that science is a way to raise questions and seek answers.

Learning to Speak Out (Critical Voice)
In this class . . .
9. Students feel safe questioning what or how they are being taught.
10. I feel students learn better when they are allowed to question what or how they are being taught.
11. It's acceptable for students to ask for clarification about activities that are confusing.
12. It's acceptable for students to express concern about anything that gets in the way of their learning.

Learning to Learn (Shared Control)
In this class . . .
13. Students help me plan what they are going to learn.
14. Students help me to decide how well they are learning.
15. Students help me to decide which activities work best for them.
16. Students let me know if they need more/less time to complete an activity.

Learning to Communicate (Student Negotiation)
In this class . . .
17. Students talk with other students about how to solve problems.
18. Students explain their ideas to other students.
19. Students ask other students to explain their ideas.
20. Students are asked by others to explain their ideas.

Appendix C

Teachers' Career Motivation and Constructivist Learning Environment Survey

This survey consists of four parts. There is a brief direction before each part telling you what is regarding to the following questions. Please read carefully and provide answers that present your thoughts.

Part One:
For each statement below, please rate how important it was in **YOUR** decision to become teacher, from **1** (not at all important in your decision) to **7** (extremely important in your decision).
Please **CIRCLE** the number that best describes the importance of each.

"I chose to become a teacher because…"

		Not at all important						**Extremely important**
1.	I was interested in teaching.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
2.	I thought part-time teaching would allow more family time.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
3.	My friends thought I should become a teacher.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
4.	I thought as a teacher I would have lengthy holidays.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
5.	I thought I had the qualities of a good teacher.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
6.	I thought teaching would allow me to provide a service to society.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
7.	I've always wanted to be a teacher.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
8.	I thought teaching would be a useful job for me to have when travelling.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
9.	I thought teaching would allow me to shape child/adolescent values.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
10.	I wanted to help children/adolescents learn.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
11.	I was unsure of what career I wanted.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
12.	I liked teaching.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
13.	I wanted a job that involves working with children/adolescents.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
14.	I thought teaching would offer a steady career path.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
15.	I felt teaching hours would fit with the responsibilities of having a family.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
16.	I have had inspirational teachers.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
17.	I thought as a teacher I would have a short working day.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
18.	I felt I had good teaching skills.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
19.	I thought teachers made a worthwhile social contribution.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
20.	A teaching qualification was recognized everywhere.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
21.	I felt teaching would allow me to influence the next generation.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
22.	My family thought I should become a teacher.	**1**	**2**	**3**	**4**	**5**	**6**	**7**

23.	I wanted to work in a child/adolescent-centered environment.	**1 2 3 4 5 6 7**
24.	I felt teaching would provide a reliable income.	**1 2 3 4 5 6 7**
25.	I thought school holidays would fit in with family commitments.	**1 2 3 4 5 6 7**
26.	I have had good teachers as role-models.	**1 2 3 4 5 6 7**
27.	Teaching enabled me to give back to society.	**1 2 3 4 5 6 7**
28.	I was not accepted into my first-choice career.	**1 2 3 4 5 6 7**
29.	I felt teaching would allow me to raise the ambitions of underprivileged youth.	**1 2 3 4 5 6 7**
30.	I liked working with children/adolescents.	**1 2 3 4 5 6 7**
31.	I thought teaching would be a secure job.	**1 2 3 4 5 6 7**
32.	I have had positive learning experiences.	**1 2 3 4 5 6 7**
33.	People I worked with think I should become a teacher.	**1 2 3 4 5 6 7**
34.	I thought teaching was a career suited to my abilities.	**1 2 3 4 5 6 7**
35.	I thought a teaching job would allow me to choose where I wish to live.	**1 2 3 4 5 6 7**
36.	I chose teaching as a last-resort career.	**1 2 3 4 5 6 7**
37.	I thought teaching would allow me to benefit the socially disadvantaged.	**1 2 3 4 5 6 7**
38.	I felt teaching was a fulfilling career.	**1 2 3 4 5 6 7**
39.	I thought teaching would allow me to have an impact on children/adolescents.	**1 2 3 4 5 6 7**
40.	I thought teaching would allow me to work against social disadvantage.	**1 2 3 4 5 6 7**

For each question below, please rate the extent to which **YOU** agree it is true about teaching, from **1** (not at all) to **7** (extremely).
Please **CIRCLE** the number that best describes your agreement for each.

		Not at all **Extremely**
41.	Do you think teaching is well paid?	**1 2 3 4 5 6 7**
42.	Do you think teachers have a heavy workload?	**1 2 3 4 5 6 7**
43.	Do you think teachers earn a good salary?	**1 2 3 4 5 6 7**
44.	Do you believe teachers are perceived as professionals?	**1 2 3 4 5 6 7**
45.	Do you think teachers have high morale?	**1 2 3 4 5 6 7**
46.	Do you think teaching is a highly skilled occupation?	**1 2 3 4 5 6 7**
47.	Do you think teaching is emotionally demanding?	**1 2 3 4 5 6 7**
48.	Do you believe teaching is perceived as a high-status occupation?	**1 2 3 4 5 6 7**
49.	Do you think teachers feel valued by society?	**1 2 3 4 5 6 7**

50.	Do you think teaching requires high levels of expert knowledge?	**1 2 3 4 5 6 7**
51.	Do you think teaching is hard work?	**1 2 3 4 5 6 7**
52.	Do you believe teaching is a well-respected career?	**1 2 3 4 5 6 7**
53.	Do you think teachers feel their occupation has high social status?	**1 2 3 4 5 6 7**
54.	Do you think teachers need high levels of technical knowledge?	**1 2 3 4 5 6 7**
55	Do you think teachers need highly specialized knowledge?	**1 2 3 4 5 6 7**

For each question below, please rate the extent to which it is true for **YOU**, from **1** (not at all) to **7** (extremely).
Please **CIRCLE** the number that best describes your agreement for each.

		Not at all	**Extremely**
56.	How carefully have you thought about becoming a teacher?	**1 2 3 4 5 6 7**	
57.	Were you encouraged to pursue careers other than teaching?	**1 2 3 4 5 6 7**	
58.	How satisfied are you with your choice of becoming a teacher?	**1 2 3 4 5 6 7**	
59.	Did others tell you teaching was not a good career choice?	**1 2 3 4 5 6 7**	
60.	How happy are you with your decision to become a teacher?	**1 2 3 4 5 6 7**	
61.	Did others influence you to consider careers other than teaching?	**1 2 3 4 5 6 7**	

In this part, for each question below, please rate the extent to which is true for YOUR CLASS: 1 (almost never), 2(often), 3(sometimes), 4(seldom), 5 (almost always). Before answering questions, please **think about your favorite subject you are teaching or the subject that you teach most frequently**.

Please **CIRCLE** the number that best describes your agreement for each.

	In your class	Almost never	Seldom	Sometimes	Often	Almost Always
1	Students learn about the world inside and outside of school.	1	2	3	4	5
2	New learning relates to experiences or questions about the world inside and outside of school.	1	2	3	4	5
3	Students learn how learning new things is a part of their inside- and outside-of-school lives.	1	2	3	4	5

4	Students learn interesting things about the world inside and outside of school.	1	2	3	4	5
5	Students learn that there are not always answers to problems.	1	2	3	4	5
6	Students learn that explanations to things have changed over time.	1	2	3	4	5
7	Students learn that ideas are influenced by people's cultural values and opinions.	1	2	3	4	5
8	Students learn that there are different ways to raise questions and seek answers.	1	2	3	4	5
9	Students feel safe questioning what or how they are being taught.	1	2	3	4	5
10	I feel students learn better when they are allowed to question what or how they are being taught.	1	2	3	4	5
11	It's acceptable for students to ask for clarification about activities that are confusing.	1	2	3	4	5
12	It's acceptable for students to express concern about anything that gets in the way of their learning.	1	2	3	4	5
13	Students help me plan what they are going to learn.	1	2	3	4	5
14	Students help me to decide how well they are learning.	1	2	3	4	5
15	Students help me to decide which activities work best for them.	1	2	3	4	5
16	Students let me know if they need more/less time to complete an activity.	1	2	3	4	5
17	Students talk with other students about how to solve problems.	1	2	3	4	5
18	Students explain their ideas to other students.	1	2	3	4	5
19	Students ask other students to explain their ideas.	1	2	3	4	5
20	Students are asked by others to explain their ideas.	1	2	3	4	5

Thank you. You have finished our survey. Please take one more minute to complete the following questions regarding your background information. No identifiable information will be collected.

1. What is your gender?
A: Male
B: Female

2. What is your age?
A: 21-25
B: 26-30
C: 31-40
D: 41-50
E: >50

3. What is your highest qualification to date?
A: Vocational/Technical school (2 years)
B: Some college
C: Bachelor's degree
D: Master's degree
E: Doctoral degree
F: Professional degree
G: High school or equivalent
H: Others

4. What language do you mainly speak at home?
A: English
B: Spanish
C: French
D: Italian
E: German
F: Korean
G: Chinese
H: Vietnamese
I: Others

5: What subject are you teaching? Please write down your favorite one or the one you teach most frequently?
_____

6. What is your grade level currently? (you can have multiple choice)
A: Kindergarten
B: Elementary
C: Middle school
D: High school

7: How many years have you been a teacher?
A: <5 years
B: 5—10 years

C: 10—20 years
D: 20—30 years
E: > 30 years

8. What is your school type?
A: Regular public school
B: Private school
C: Religious school
D: Charter school
E: Magnet school

9: What is your school area?
A: Urban
B: Suburban
C: Rural

THANK YOU!

Appendix D

Permission Letter for FIT-Choice scale

Subject: Re: Request for Permission
From: Helen Watt <helen.watt@monash.edu>
Date: 11/07/12 05:50 AM
To: Peizhen Wang <p.wang4@iup.edu>

Dear Peizhen, you are welcome to use our measures (and we agree the relationships with teacher beliefs remains an open area) - wishing you the best with your research.

Please cite the psychometric FIT-Choice scale validation as:
-- Watt, H.M.G. & Richardson, P.W. (2007). Motivational factors influencing teaching as a career choice: Development and validation of the FIT-Choice Scale. Journal of Experimental Education, 75(3), 167-202. [feature article: pdf available]

and the validation sample as:
-- Richardson, P.W. & Watt, H.M.G. (2006). Who chooses teaching and why? Profiling characteristics and motivations across three Australian universities. Asia-Pacific Journal of Teacher Education, 34(1), 27-56. [pdf available]
(also contains a useful Table 1, which summarises items per construct in clear layout)

You may also be interested to use our "PECDA scale", to cite as:
-- Watt, H.M.G. & Richardson, P.W. (2008). Motivations, perceptions, and aspirations concerning teaching as a career for different types of beginning teachers. Learning and Instruction, 18, 408-428. [pdf available]
(all pdf's available for ready download at: www.fitchoice.org)

You may also be interested to refer to the international comparisons using the FIT-Choice scale published in our recent journal special issue of APJTE, volume 40.
best wishes, Helen & Paul.
--
HELEN M. G. WATT |PhD, Associate Professor, Australian Research Fellow
Faculty of Education, MONASH UNIVERSITY
Bldg 6 Wellington Rd, Clayton campus |Monash University
Melbourne VIC 3800|Australia
T +61 3 9905 3276 |F +61 3 9905 5127 |E helen.watt@monash.edu
W http://users.monash.edu.au/~hwatt/

FIT-Choice project: www.fitchoice.org
STEPS project: www.stepsstudy.org

Appendix E

Permission Letter for CLES (20)

Subject: RE: Request for Permission
From: Johnson, Bruce P - (brucej) <brucej@email.arizona.edu>
Date: 05/04/14 07:36 AM
To: Peizhen Wang <p.wang4@iup.edu>
Cc: Johnson, Bruce P - (brucej) <brucej@email.arizona.edu>

Hello Peizhen,

Yes, you may certainly use the Revised CLES in your study. I would be interested in seeing your results when you are finished.

Bruce

Bruce Johnson

University of Arizona

Professor and Head; Teaching, Learning & Socio cultural Studies Department

Co-Director, UA STEM Learning Center

P.O. Box 210069

Tucson, AZ 85721-0069 USA

Phone: 1 520 626-8700

Fax: 1 520 621-1853

Email: brucej@email.arizona.edu

http://www.coe.arizona.edu/faculty_profile/215

http://stem.arizona.edu/

Appendix F

Invitation Email for Pilot Study

Dear Students of….

My name is Peizhen Wang. I am a doctoral student from Curriculum and Instruction Program in the department of Professional Studies in Education. I am currently conducting a study for my dissertation on teachers' practices of constructivist based teaching. One of the goals is to investigate whether there is any relationship between teachers' career motivation and that practice. I sincerely invite you to complete an online survey to help me with the data collection for the pilot study. Your participation means a lot to me.

This survey was developed by Qualtrics program. Before entering the survey you will first read a consent letter. If you are interested, please continue. If you are not interested, you are free to shut down the browser. This survey may take 20 minutes to finish. You are free to leave the survey any time by shutting down the browser and no data will be collected. No identifiable information will be included in the survey. Here is the link to the survey: https://iup.co1.qualtrics.com/SE/?SID=SV_3kfWsavuD8kuJz7

THIS PROJECT HAS BEEN APPROVED BY THE INDIANA UNIVERSITY OF PENNSYLVANIA INSTITUTIONAL REVIEW BOARD FOR THE PROTECTION OF HUMAN SUBJECTS (PHONE 724.357.7730). If you have any questions or concerns, please contact me at 724-357-3285 or thlr@iup.edu

Thank you so much for your time and help.

Sincerely,
Peizhen Wang

Doctoral candidate
Email: THLR@iup.edu
Phone: (724)-357-3285
Department of Professional Studies in Education
Indiana University of Pennsylvania
Indiana, PA, 15701

Faculty Sponsor:
Dr. George Bieger
Professor
Department of Professional Studies in Education
724-357-3285
grbieger@iup.edu
Room 114 Davis Hall, IUP

Appendix G

Permission Email for Pilot Study

Dear Dr._____

My name is Peizhen Wang, a doctoral student from program of Curriculum and Instruction in the department of Professional Studies in Education. I am currently conducting a survey for my dissertation. The topic is on teachers' practices of constructivist based teaching. One of the goals is to investigate whether teachers' career motivation has a relationship with that practice. Teachers in all subject areas and grade levels are eligible to participate. I am respectfully request for permission to do a pilot study in your graduate class with in-service teachers. This will help with my future data collection.

This is an online survey using Qualtrics. The survey will be shown on the website as a URL link. Teachers' participation will be completely voluntary. No identifiable information will be collected. It may take 20 minutes to finish the survey.

With your permission, I will send an invitation email with the survey link to you, so that you can forward it to your students.

Thanks very much for your time and help.

If you have any questions, please don't hesitate to contact me at THLR@iup.edu or 724-357-3285.

Sincerely,

Peizhen Wang
Doctoral candidate
Email: THLR@iup.edu
Phone: (724)-357-3285
Department of Professional Studies in Education
Indiana University of Pennsylvania
Indiana, PA, 15701

Faculty Sponsor:
Dr. George Bieger
Professor
Department of Professional Studies in Education
724-357-3285
grbieger@iup.edu
Room 114 Davis Hall, IUP

Appendix H

Site Approval for Pilot Study

Professional Studies in Education Department
303 Davis Hall
Indiana, Pennsylvania 15705
724-357-2400

August 23, 2015

Ms. Peizhen Wang

114 Davis Hall

Indiana University of Pennsylvania

Indiana, PA 15705

Dear Ms. Wang:

I am pleased to allow you to contact the students in my doctoral class this fall to invite them to participate in your pilot study.

I am willing to contact the doctoral students in my class, all of who are in-service teachers, and inform them of your intent to contact them. I will also ask their permission to give you their email addresses. I will then forward the email addresses of those who agree to be contacted.

Sincerely,

George R. Bieger, Ph.D.

Professor

Coordinator, Philadelphia Urban Seminar

grbieger@iup.edu

Appendix I

Permission Email for Online Survey

Dear President of …

My name is Peizhen Wang, a doctoral student from Indiana University of Pennsylvania. I am studying in the Department of Professional Studies in Education and currently conducting a survey for my dissertation. The topic is on teachers' practices of constructivist based teaching. One of the goals is to investigate whether teachers' career motivation has a relationship with that practice. Teachers in all subject areas and grade levels are eligible to participate. I am sincerely request for a permission to post my survey on the teacher association website of your school district for two weeks. This will help with my data collection.

This is an online survey using Qualtrics. The survey will be shown on the website as a URL link. Teachers' participation will be completely voluntary. No identifiable information will be collected. It may take 20 minutes to finish the survey.

With your permission, I will send an invitation email with the survey link to the administrators of the website so that he/she can post it online.

Thanks very much for your time and help.
If you have any questions, please don't hesitate to contact me at THLR@iup.edu or 724-357-3285.

Sincerely,

Peizhen Wang
Doctoral candidate
Email: THLR@iup.edu
Phone: (724)-357-3285
Department of Professional Studies in Education
Indiana University of Pennsylvania
Indiana, PA, 15701

Faculty Sponsor:
Dr. George Bieger
Professor
Department of Professional Studies in Education
724-357-3285
grbieger@iup.edu
Room 114 Davis Hall, IUP

Appendix J

Brief Invitation for Online Survey

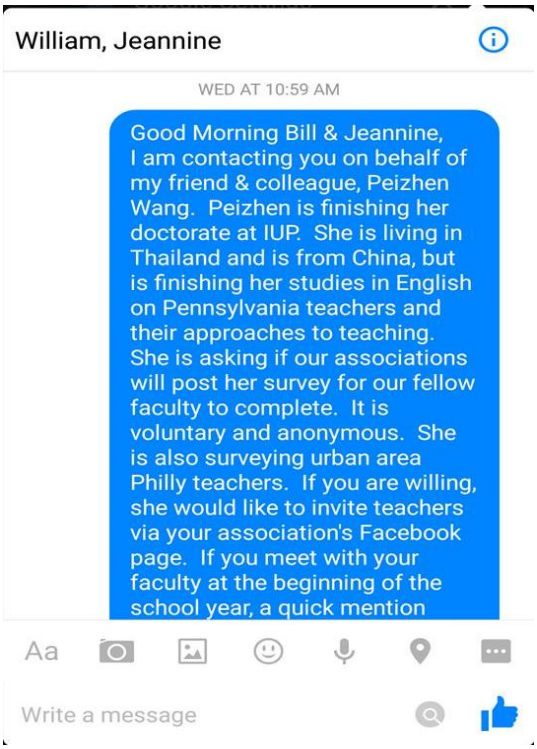
The following paragraph is a brief invitation with survey link to be posted on two Facebook websites.

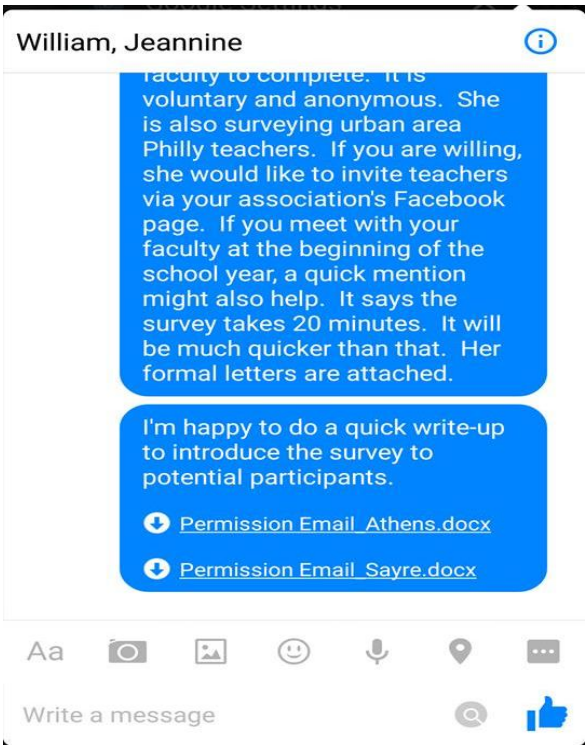
Dear teachers, I am currently studying teachers' practices of constructivist based teaching and career motivations. All K-12 in-service teachers are eligible to participate. If you are interested, please click the link:
https://iup.co1.qualtrics.com/SE/?SID=SV_9NWYc220qnM6TgV
Please do me a favor. Your participation means a lot to me. Thank you so much for your help.

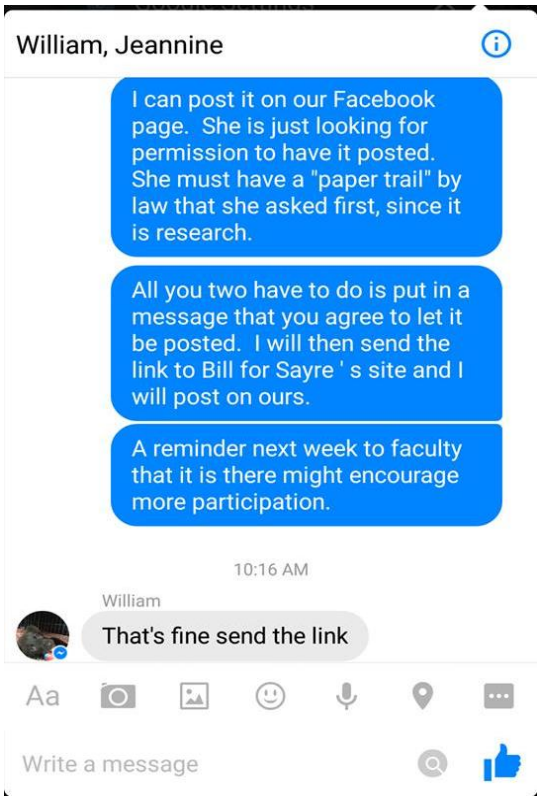
Appendix K

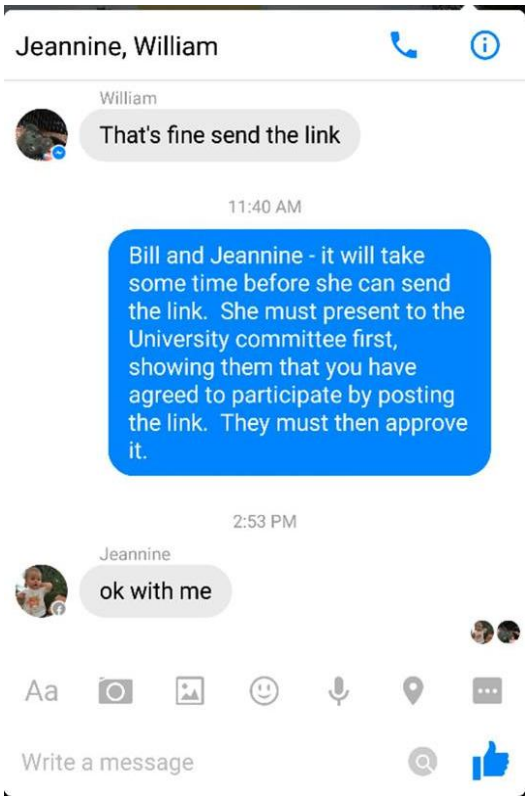
Site Approvals from Presidents of Teacher Associations

of Athens and Sayre's School Districts









Appendix L

Invitation Email for Teachers in Philadelphia

Dear teachers,

My name is Peizhen Wang, a doctoral student from the Department of Professional Studies in Education at Indiana University of Pennsylvania. I am currently conducting a study for my dissertation on teachers' practices of constructivist based teaching. One of the goals is to investigate whether there is any relationship between teachers' career motivation and that practice. I sincerely invite you to complete an online survey to help me with the data collection. Your participation means a lot to me.

This survey was developed by Qualtrics program. Before entering the survey you will first read a consent letter. If you are interested, please continue. If you are not interested, you are free to shut down the browser. This survey may take 20 minutes to finish. You are free to leave the survey any time by shutting down the browser and no data will be collected. No identifiable information will be included in the survey. Here is the link to the survey: https://iup.co1.qualtrics.com/SE/?SID=SV_3kfWsavuD8kuJz7

THIS PROJECT HAS BEEN APPROVED BY THE INDIANA UNIVERSITY OF PENNSYLVANIA INSTITUTIONAL REVIEW BOARD FOR THE PROTECTION OF HUMAN SUBJECTS (PHONE 724.357.7730). If you have any questions or concerns, please contact me at 724-357-3285 or thlr@iup.edu

Thank you so much for your time and help.

Sincerely,
Peizhen Wang

Doctoral candidate
Email: THLR@iup.edu
Phone: (724)-357-3285
Department of Professional Studies in Education
Indiana University of Pennsylvania
Indiana, PA, 15701

Faculty Sponsor:
Dr. George Bieger
Professor
Department of Professional Studies in Education
724-357-3285
grbieger@iup.edu
Room 114 Davis Hall, IUP

Appendix M

INFORMED CONSENT LETTER

My name is Peizhen Wang, a doctoral student from the Department of Professional Studies in Education at Indiana University of Pennsylvania. I am currently conducting a study for my dissertation on teachers' practices of constructivist based teaching. The project title is "Teachers' Implementation of Constructivist Based Teaching: Does Career Motivation Make a Difference?" You are invited to participate in the study. The following information is being provided to help you with your decision to participate or not.

The study is using a survey to collect data which will help the researcher to learn the status of teachers' practices of Constructivist based teaching and explore factors that relate to their practices. Career motivation is the key factor to explore in the study. Therefore, if you participate in the study, you will have an understanding of your own instructional style and have an opportunity to reflect on your career motivation and some beliefs in teaching. No identifiable data will be collected. There are no known risks associated with your participation.

The survey may take 20 minutes to finish. It includes items of career motivation and constructivist learning environment. Several background questions will be asked, but it's anonymous.

Your participation is completely voluntary. If you are willing to participate in this study, please indicate so by selecting the "I consent" option at the bottom of the page. You may choose to withdraw from the study at any point during the survey by simply exiting the web browser and no data will be collected. If you are not willing to participate, feel free to leave the page. Once you submit your results you will not be able to withdraw since there is no way to identify any individual's information.

Thank you for consideration and assistance with the study. If you have any questions please feel free to contact me, the lead author at THLR@iup.edu or 724-357-3285.

Lead Researcher:
Peizhen Wang
Doctoral Student
Department of Professional Studies in Education
Indiana University of Pennsylvania
724-357-3285
THLR@iup.edu

Faculty Sponsor:

Dr. George Bieger
Professor
Department of Professional Studies in Education
724-357-3285
grbieger@iup.edu
Room 114 Davis Hall, IUP

THIS PROJECT HAS BEEN APPROVED BY THE INDIANA UNIVERSITY OF PENNSYLVANIA INSTITUTIONAL REVIEW BOARD FOR THE PROTECTION OF HUMAN SUBJECTS (PHONE 724.357.7730)

Appendix N

Informing Letter from Philadelphia Urban Seminar Coordinator

Professional Studies in Education Department
303 Davis Hall
Indiana, Pennsylvania 15705
724-357-2400

August 23, 2015

Ms. Peizhen Wang
114 Davis Hall
Indiana University of Pennsylvania
Indiana, PA 15705

Dear Ms. Wang:

I am happy to inform you that I was able to develop a list of teachers in the School District of Philadelphia who volunteered to be contacted about participation in your dissertation study.

I contacted all of the teachers who host students as part of the Philadelphia Urban Seminar. I told them that there was the possibility of being contacted to invite them to participate in a research study and asked them to send me their email address if they agreed to be contacted. I did not brief them on the details of your study, but told them that you would provide complete details when you contacted them.

These teachers have not agreed to participate, but only to allow you to contact them and invite them to participate. Once your study is approved by the IUP IRB, you may contact them as approved.

Sincerely,

George R. Bieger, Ph.D.
Professor
Coordinator, Philadelphia Urban Seminar
grbieger@iup.edu

Appendix O

CITI Training Certificate

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COURSEWORK REQUIREMENTS REPORT*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** Peizhen Wang (ID: 4902700)
- **Institution Affiliation:** Indiana University of Pennsylvania (ID: 1711)
- **Institution Unit:** Professional Studies in Education

- **Curriculum Group:** Human Subjects Research
- **Course Learner Group:** Social, Behavioral, Educational Researchers
- **Stage:** Stage 1 - Basic Course

- **Report ID:** 16474581
- **Completion Date:** 06/30/2015
- **Expiration Date:** N/A
- **Minimum Passing:** 80
- **Reported Score*:** 100

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
History and Ethical Principles - SBE (ID:490)	06/27/15	5/5 (100%)
Defining Research with Human Subjects - SBE (ID:491)	06/28/15	5/5 (100%)
The Federal Regulations - SBE (ID:502)	06/28/15	5/5 (100%)
Assessing Risk - SBE (ID:503)	06/29/15	5/5 (100%)
Informed Consent - SBE (ID:504)	06/29/15	5/5 (100%)
Privacy and Confidentiality - SBE (ID:505)	06/29/15	5/5 (100%)
Belmont Report and CITI Course Introduction (ID:1127)	06/29/15	3/3 (100%)
Conflicts of Interest in Research Involving Human Subjects (ID:488)	06/30/15	5/5 (100%)
Students in Research (ID:1321)	06/30/15	10/10 (100%)
Unanticipated Problems and Reporting Requirements in Social and Behavioral Research (ID:14928)	06/30/15	5/5 (100%)
International Research - SBE (ID:509)	06/30/15	5/5 (100%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

CITI Program
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Phone: 305-243-7970
Web: https://www.citiprogram.org

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COURSEWORK TRANSCRIPT REPORT**

** NOTE: Scores on this Transcript Report reflect the most current quiz completions, including quizzes on optional (supplemental) elements of the course. See list below for details. See separate Requirements Report for the reported scores at the time all requirements for the course were met.

- **Name:** Peizhen Wang (ID: 4902700)
- **Institution Affiliation:** Indiana University of Pennsylvania (ID: 1711)
- **Institution Unit:** Professional Studies in Education

- **Curriculum Group:** Human Subjects Research
- **Course Learner Group:** Social, Behavioral, Educational Researchers
- **Stage:** Stage 1 - Basic Course

- **Report ID:** 16474581
- **Report Date:** 06/30/2015
- **Current Score**:** 100

REQUIRED, ELECTIVE, AND SUPPLEMENTAL MODULES	MOST RECENT	SCORE
Students in Research (ID:1321)	06/30/15	10/10 (100%)
History and Ethical Principles - SBE (ID:490)	06/27/15	5/5 (100%)
Defining Research with Human Subjects - SBE (ID:491)	06/28/15	5/5 (100%)
Belmont Report and CITI Course Introduction (ID:1127)	06/29/15	3/3 (100%)
The Federal Regulations - SBE (ID:502)	06/28/15	5/5 (100%)
Assessing Risk - SBE (ID:503)	06/29/15	5/5 (100%)
Informed Consent - SBE (ID:504)	06/29/15	5/5 (100%)
Privacy and Confidentiality - SBE (ID:505)	06/29/15	5/5 (100%)
Research in Public Elementary and Secondary Schools - SBE (ID:508)	06/30/15	No Quiz
International Research - SBE (ID:509)	06/30/15	5/5 (100%)
Unanticipated Problems and Reporting Requirements in Social and Behavioral Research (ID:14928)	06/30/15	5/5 (100%)
Conflicts of Interest in Research Involving Human Subjects (ID:488)	06/30/15	5/5 (100%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

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