Lehr-Lern-Prozess an deutschen und chinesischen berufsbildenden Schulen im Vergleich: Eine koordinierende Unterrichtsbeobachtungsstudie (Comparison of the Teaching and Learning in German and Chinese VET Schools: A Systematic Classroom Observation Study)

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List of Abbreviations

Cedefop	European Centre for the Development of Vocational Training
DGfE	Die Deutsche Gesellschaft für Erziehungswissenschaft
IVET	Initial Vocational Education and Training
IEA	International Association for the Evaluation of Educational Achievement
ISCED	International Standard Classification of Education
KMK	die Kultursministerkonferenz (Standing Conference of Ministers of Education and Cultural Affairs, Germany)
MoE	Ministry of Education (China)
NRW	Nordrhein-Westfalen (North Rhine-Westphalia, a state in Germany)
OECD	Organization for Economic Co-operation and Development
PISA	Programme for International Student Assessment
TALIS-Video	Teaching and Learning International Survey – Video Study
TIMMS	Trends in International Mathematics and Science Study
UNESCO	United Nations Educational, Scientific and Cultural Organization
VET	Vocational Education and Training

Chapter One: Introduction

Comparative pedagogy is a crossing research domain which involves two fields: comparative education and pedagogy study (Alexander, 2001). Its significance was not realized until the beginning of the 21st century and appears in discussions within some comparativists' studies (e.g., Alexander, 2001; Broadfoot, 2000; Little, 2000).

Since the end of the 20th century, various international assessment-based comparative studies have been carried out. Trends in International Mathematics and Science Study (TIMSS) and The Programme for International Student Assessment (PISA) are seen as the most important and influential research projects worldwide. In these studies, compelling and meaningful findings were derived. However, an explanation to why the students' achievements were various from countries has not been given. Then some scholars attempted to find answers by taking a glimpse of classroom pedagogic practice, due to its characteristic of being more salient and easier to reform (Elliott, Stankov, Lee, & Beckmann, 2019).

A series of insights that might be gained from a comparative pedagogy study were listed out in an introduction document of the newly-developed international research project – The Teaching and Learning International Survey (TALIS; OECD, 2017). For example, it is beneficial for better understanding the relationship between pedagogical practice and student outcomes as well as for understanding the validity and policy relevance of findings from international surveys.

Another advantage that is particularly significant in this kind of studies is to deepen the understanding of the contextual differences between the compared countries (Aldridge, Fraser, & Huang, 1999; OECD, 2017). In the field of comparative education, contextual factors such as teacher education and curriculum that might definite affect teaching and learning are often regarded as the compared subjects. In most cases, one purpose of these studies is to glean hints for improving teaching quality, as the situation between the compared countries (i.e., Germany and China) in this study.

The German VET is famous world-wide and is regarded as a good practice that should be learned by others, including China. As a result, a majority of Chinese scholars have intended to compare those contextual subjects (e.g., Gao, 2014; Tang, 2016; Xu, 2017). However, to what extent these contextual differences is reflected in the classroom is unknown. If the teaching and learning in the compared countries are different, how might these differences be attributed to those contextual differences? If they are the same, then is it still meaningful to drawing lessons from other countries? Therefore, from the perspective of policy-borrowing, comparing pedagogical practice is a meaningful approach to understand the degree of implementation of often-praised teaching approaches and then find the proper approach to borrow lessons (OECD, 2017).

At the moment, most of the comparison studies in this field are confined to the discipline of mathematics and science in general education (see Chapter Two). In the field of Vocational Educational Training (VET), the amount is still insufficient (Pilz, 2016). Furthermore, a gap can be also seen among comparison studies where Germany and China are the two compared countries.

With such a background, this preliminary study was carried out in the aim to contribute to the field of comparative study of teaching and learning in VET and to strengthen the mutual understanding between Germany and China in the area of VET.

1.1 The Aim of This Study

The fundamental aim of this study is to compare teaching and learning in German and Chinese VET schools. In Chapter Five, it is elaborated that the adoption of teaching methods and media are the proper dimensions for reflecting teaching and learning. This purpose might be, therefore, rephrased as comparing the utilization of teaching methods and instructional media in the classroom (**Third Aim** in Figure 1.1).

In addition, three other aims are subordinate to this main one. As described in Chapter Two, in the individual countries there is indeed literature in which teaching and

learning in commercial VET schools was described. However, these data are incomparable in that the studies concerning this topic from China are comparatively poor quality and the studies from Germany have the drawback of being region-confined. As such, collecting suitable data is the key point of this study.

Quantitative classroom observation is regarded as the proper method for data collection (see Chapter Five). An observation instrument was needed as the prerequisite to conduct such an observation as one that fulfilled the requirements of this study is currently not available. Therefore, a new instrument that had the possibility of future adoption was developed. This is seen as the first subordinate aim of this study (**First Aim** in Figure 1.1). As mentioned previously, teaching and learning both in German and Chinese VET schools is seldom presented to the rest of world, and thus describing teaching and learning in these two countries respectively is the second subordinated aim of this study (**Second Aim** in Figure 1.1).

Lastly, a final aim of this study is to relate the comparison outcomes derived from observation to the contextual differences between Germany and China (**Fourth Aim** in Figure 1.1). In fact, the ultimate objective behind this step is to determine the proper approach for policy-borrowing between Germany and China.

| **First Aim:** |
| Development of an Observation Instrument |

↓

| **Second Aim:** |
| Description of Teaching and Learning in German and Chinese schools |

↓

| **Third Aim:** | |
| Compare the Adoption of Teaching Methods | Compare the Adoption of Instruction Media |

↓

| **Fourth Aim:** |
| Explain the Differences by Analyzing the Contextual Differences |
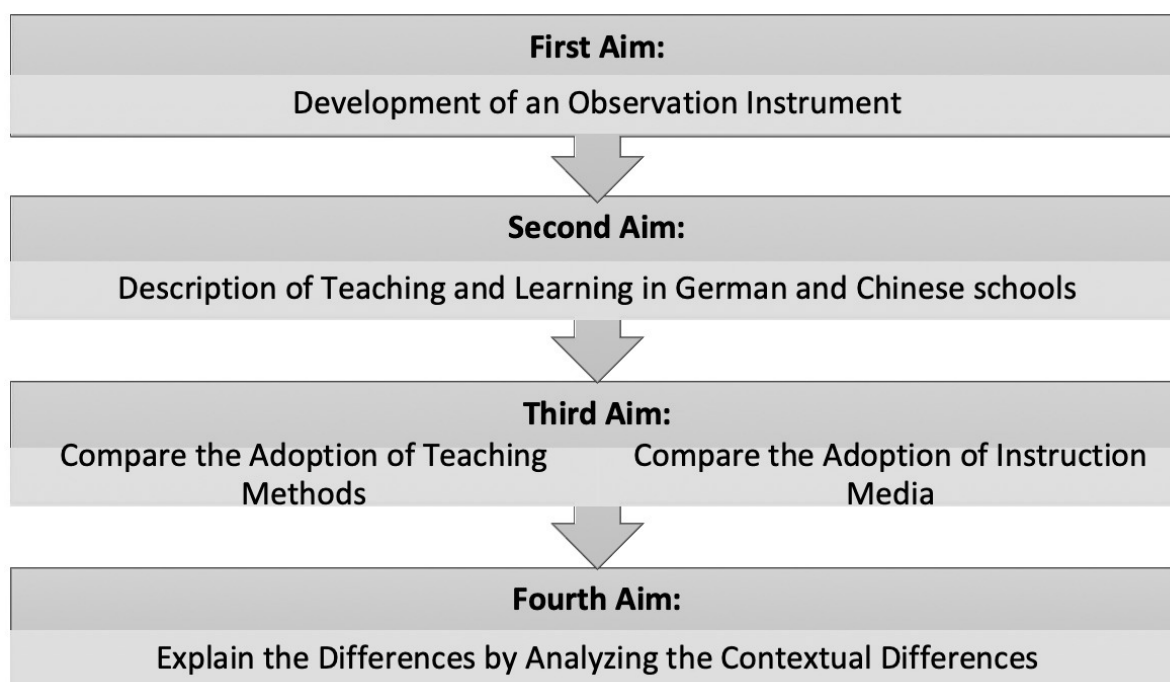
Figure 1.1. The aim of this study.

1.2 The Structure of this Study

The overall structure of this study takes the form of nine chapters, including this introductory chapter (see Figure 1.2 below). In Chapter Two, the relevant studies are presented in order to stress the research gap and the necessity for collecting data in both of the compared countries. In Chapter Three, issues concerning the theories underpinning this study are addressed, and it also outlines how to define the compared subject and how to reflect upon it, as well as how to explain it. The fourth chapter is concerned with the methodology used for this study. In the same chapter, it is concluded that observation is the suitable data collection method in this study. In Chapter Five, a new observational instrument is developed, which is the first aim elaborated upon in the previous section. In Chapter Six and Chapter Seven, the observation results derived from German and Chinese schools are presented (i.e., the second aim). In Chapter Eight, a comparison is firstly made between some contextual factors. The purpose is to select those factors which show differences between the compared countries. Additionally, a comparison is made on the adoption of teaching methods and instructional media – two dimensions for reflection of

teaching and learning in a lesson (i.e., the third aim). Lastly, the relationship between the contextual differences and different teaching and learning styles is addressed (i.e., the fourth aim). The final chapter, Chapter Nine, draws upon the entire thesis, and advice regarding policy-borrowing between Germany and China is provided on the basis of the findings produced from this study. In this same final chapter, theoretical and empirical strands are presented and the implications of the findings to the future research into this area are discussed.

Chapter One: Introduction

Chapter Two: Research Status

Chapter Three: Theoretical Consideration

Chapter Four: Methodology and Research Design

Chapter Five: Development of the Observation Instrument
(First Aim)

Chapter Six:
Teaching and Learning in German Schools (Second Aim)

Observational Data Presentation

Description in the Relevant Studies

Comparison
(First Aim)

Chapter Seven:
Teaching and Learning in Chinese Schools (Second Aim)

Observational Data Presentation

Description in the Relevant Studies

Comparison
(First Aim)

Chapter Eight:
Comparison and Interpretation

Comparing the Adoption of Teaching Methods and Instructional Media
(Third Aim)

Interpreting Comparing Outcomes by Analyzing Contextual Differences
(Fourth Aim)

Chapter Nine: Conclusion, Implication, Limitation and Prospect

Figure 1.2. The structure of this study.

Chapter Two: Research Status

This chapter is comprised of two sections. In Section 2.1, previous studies comparing the teaching and learning between different cultures, either in general education or vocational education training (VET), are briefly introduced. One purpose for doing so was to stress the gap in existing research in the field of VET. The other purpose was to determine which aspects have been used for reflecting teaching and learning, as well as which dimensions have been adopted for interpreting the comparison outcomes. In Section 2.2, the studies that describe the teaching and learning in German and Chinese VET schools are presented respectively. In this step, the basic situation of classroom life in the two compared countries is initially described. In addition, the researcher sought to determine whether the comparative data of interest was available, and whether it was necessary to collect data in both of the compared countries.

2.1 Cross-Cultural Comparison of Teaching and Learning in Classroom

There is a scant history of comparing classroom life or a lesson's process data collected from an objective perspective (Pauli & Reusser, 2006). Two trends in the International Mathematics and Science Study (TIMSS) video studies can be seen as the starting point in this field. The TIMSS study was an international education evaluation research project initiated by The International Association for the Evaluation of Educational Achievement (IEA). It was a large-scale assessment project that compared students' achievement between different countries. The TIMSS video study was one subsequent project which explained the assessment results. As stated by Zhang (2008), the focus of these video studies was shifted from comparing the results of teaching and learning to the process data in classroom. At the moment, only two large-scale video studies have been completed.

The first TIMSS video study was carried out in 1995, in which 231 mathematics lessons from Germany, Japan, and the United States were videotaped (Stigler et al., 1999). In this study, three aspects – mathematical contents, organization of instruction, as well as the

process of instruction – in the teaching and learning process were coded and then compared. In the end, numerous differences were identified. However, with respect to the possible reasons for these differences, further examination was not conducted.

Following the same project framework, another similar study was conducted in 1999 but in the discipline of science (Roth et al., 2006). This study compared 638 lessons from five countries which were videotaped: Australia, Czech Republic, Japan, the Netherlands, and the United States. In the coding steps, three aspects – science contents, teacher's actions, and students' actions – were coded and compared. As in the former study, an interpretation was not attached to the comparison outcomes.

Recently, another project which is the Teaching and Learning International Survey (TALIS) Video Study was issued (OECD, 2017, 2018). In this project, teaching and learning from up to nine countries or economies are going to be compared. As a new project, the aspects used for reflecting the teaching and learning and the aspects for interpretation are still unknown. Nevertheless, from this project it might be acknowledged that keeping a watchful eye on the classroom is the trend. At the same time, the importance of making a cross-cultural comparison of pedagogical practice in the classroom might be further stressed.

Considering this background, similar studies have been conducted but on a comparatively smaller scale (Table 2.1). Having a glimpse of them, it might be found that all of them focused on the comparison in the discipline of mathematics, science and biology in general education. Then from a broad sense, the research gap, which is the comparison of teaching and learning in VET, exists. In addition, though in the field of general education, the two compared countries in this study were seldom compared in previous literature. The only study uncovered was from Liu and Neuhaus (2017). Thus, a comparison of teaching and learning is also insufficient in studies between Germany and China.

As the research gap has been revealed, subsequent attention should then be shifted to the dimensions for reflecting teaching and learning as well as the dimensions for

interpretation. Essentially, a lesson has both visible and invisible structure. Kunter and Trautwein (2013) described the visible structure (German: *Sichtstrukturen*) as the organizational structure, the teaching model, and social form of lessons, all of which are observable in the classroom. Certain aspects such as cognitive activation, which are not directly observable, belong to the invisible structure (German: *Tiefenstrukturen*) of a lesson. In all of the existing studies, the lessons' visible structure was compared (Table 2.1). Such an approach is also applicable to this current study.

It has been widely accepted that the invisible structure has a closer relationship with teaching effectiveness (Hattie, 2009; Helmke, 2012; Klieme, 2006; Seidel & Shavelson, 2007). However, the fundamental purpose of this study is to present the actual classroom life and then interpret the comparison outcomes from the contextual differences, instead of making an evaluation or a judgement regarding which country has more efficient lessons. Such a purpose could be perfectly achieved by describing the visible structure of a lesson, because a visible structure is observable in a short time by an outsider and low-inference data can be collected (Kunter & Trautwein, 2013). Then as in other cross-cultural comparative studies, this study also focuses on the lesson's visible structure. The adoption of teaching methods and instructional media were used as the concrete reflect dimensions as elaborated in Chapter Three.

Regarding the dimensions for interpreting the differences, culture is usually used as the sole or main consideration for interpretation (Cai & Lester, 2007; Liu & Neuhaus, 2017; Tao, Oliver, & Venville, 2013). Besides, other factors were mentioned in some individual studies. For example, five factors – curriculum, pressures experienced by teachers, respect for teacher, questioning techniques, and educational aims – were identified from teachers' interviews in a study by Aldridge et al. (1999). In another study, students' socioeconomic status was embedded in the research design and the results indicated that this would definitely affect the organization of instruction (Tao et al., 2013).

Table 2.1

Overview of Relevant Comparative Studies

Author (year)	*Discipline*	*Compared Countries*	*Dimensions for Reflecting the Teaching and Learning Process.*	*Dimensions for Interpretation*
Stigler et al. (1999)	Mathematics	Germany, Japan, the United States	Mathematical content; organization of instruction; process of instruction.	-
Aldridge et al. (1999)	Science	Taiwan, Australia	-	Nature of curriculum; pressures experienced by teachers; respect for teacher; questioning techniques; educational aims.
Roth et al. (2006)	Science	Australia, Czech Republic, Japan, Netherlands, the United States	Science teaching content; teachers' action (organization of instruction); students' action (the way in which students were involved).	-
Cai and Lester (2007)	Mathematics	China and the United States	The choice of representations that students use to solve problems.	Culture
Tao et al. (2013)	Science	China and Australia	Organization of instruction.	Culture and socioeconomic status
Liu and Neuhaus (2017)	Biology	Germany and China	Question strategies; use of real-life instance.	Culture
OECD (2018)	Mathematics	Chile, China, Colombia, Germany, Japan, Mexico, Spain (Madrid) and the United Kingdom	-	-

Generally speaking, there are two approaches for interpretation, which are interpretation only from cultural influence and abstraction factors from another subsequent studies, such as teachers' or students' interviews (e.g., Aldridge et al., 1999) or imbedding the dimension for interpretation in the research design, such as socioeconomic status in the study from Tao et al. (2013). In fact, both of them are not appliable in this study.

As was outlined in Section 1.1, the fundamental purpose of interpretation in this study is to provide suggestions for policy-borrowing between the compared countries. Although culture is a significant factor to understand the different teaching and learning, it is not discussed in this study. As culture is a factor that cannot be changed from the perspective of policy-borrowing, and it is meaningless to draw the conclusion that culture is the main reason to explain the different pedagogic practice in German and Chinese schools. Besides, this research project was undertaken as a doctoral dissertation and due to time and resource limitations, it was not possible to conduct a separate investigation for answering why-question.

To resolve such a dilemma, another approach was adopted (Figure 2.1). Firstly, a conceptual model is firstly constructed and subsequently some dimensions are isolated as the interpretation dimensions as shown in Chapter Three. Then, the situations of these dimensions in the compared countries are described and compared (Chapter Eight), in order to find out whether the differences really exist. Lastly, those contextual differences are related to the different teaching and learning styles in German and Chinese schools.
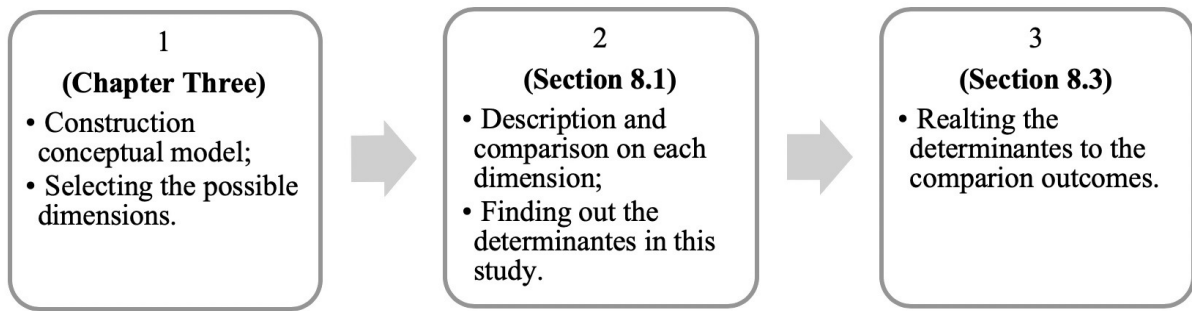
Figure 2.1. The approach for localizing the determinants.

2.2 Teaching and Learning in Accounting in the Compared Countries

In this section, in accordance with the description in the relevant studies, teaching and learning in accounting lessons in the compared countries is presented. The ultimate purpose for doing so is to emphasize the necessity for conducting this comparative study in the case when the comparable data is not available[1]. Additionally, obtaining a preliminary understanding of classroom life in German and Chinese schools is another purpose that is subordinate to the main one.

2.2.1 Teaching and learning in accounting in German VET schools.

In Germany, there is a long history of studying lessons (Klieme, 2006). Within this background, a large number of valuable research results are available. Additionally, lesson research in the field of accounting is also rich. Many scholars have analyzed lessons from different dimensions, as summarized by Helm (2016). However, only a minor portion of these studies have been focused on describing the adoption of teaching methods and instructional media in the classroom.

2.2.1.1 The adoption of teaching methods in German VET schools.

In relevant studies when the adoption of teaching methods is discussed, social form (German: *Sozialform*), which is a special German concept, is typically mentioned and used as the reflection of teaching method. Differentiation is typically made between four social

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[1] It should be pointed out that accounting in commercial VET is the focus of this study. As such, only the studies that investigated teaching and learning in accounting lessons in VET schools were regarded as relevant.

forms, which are frontal teaching (German: *Frontalunterricht*), partner study (German: *Partnerarbeit*), group study (German: *Gruppenarbeit*), and individual study (German: *Einzelarbeit*). It is a common practice to investigate the time allocation to these four social forms. The consistent conclusion drawn from these studies is that teacher still dominates the classroom using the social form of frontal teaching. This is seen due to the time allocation being much more than for other forms.

In Seifried, Grill, and Wagner's (2006) study, questionnaire and observation were both adopted to describe the teaching and learning process. Data collected from these two methods indicated that frontal teaching was the most often utilized in accounting lessons (see Table 2.2; 47% from the questionnaire and 67.4% from observation). In another observational study, a similar result, 68.6%, was received (Götzl et al., 2013; Jahn & Götzl, 2014).

Aside from these two studies, accounting was not examined as a separate field in commercial VET schools. Instead, the overall situation in commercial VET schools was investigated. Nevertheless, a similar result was observed where the teacher dominated the classroom with frontal teaching (e.g., Götz, Lohrmann, Ganser, & Haag, 2005; Kozina & Pilz, 2018; Pätzold, 2003; Wild, 2000).

In one word, the data of interest in this study, which is the time allocation to different teaching methods in accounting lessons in German commercial VET schools, is already available. However, it is rather limited, and the data is not current. Therefore, it was necessary to collect this data group. Additionally, it was mentioned that a special German concept, the social form (German: *Sozialform*), was adopted. As stated, one challenge of a comparative pedagogy study is to develop a shared understanding of the terms and concepts to describe and make comparison across countries (Roth et al., 2006). The transformation of social form into another cultural context like the one in China has to be carefully considered.

In order to guarantee the data comparability, a shared concept system should be constructed and then utilized to collect data in German schools.

2.2.1.2 The adoption of instructional media in German VET schools.

Regarding the adoption of instructional media, no similar quantified data can be retrieved from the relevant studies. However, the adoption of digital media in the classroom has attracted some German scholars' attention. This trend can be traced back to the discussion of media competence (German: *Medienkompetenz*; Gapski, 2001). In some relevant empirical studies, a portion of the samples involved were from VET schools (e.g., European Commission, 2006; Welling & Stolpmann, 2007; Wiedwald, Büsching, Breiter, & Nöckel, 2007). In others, the VET schools were the focus. For example, in Pätzold's (2003) study, the adoption of digital media in different occupational areas such as technical occupations, commercial occupations, and IT occupations in VET schools was investigated.

Though these studies focus on the adoption of media, their relevance to this study was rather limited in that the aim of this study is to present an overall picture of the adoption of instructional media instead of merely focusing on digital media. Additionally, unlike the studies mentioned above, this study is subject-specific. In other words, it is the media adoption in accounting lessons of interest. A similar structure might be seen in Hayen's (2008) study in which the utilization of media (i.e., traditional and digital media) in subject-specific field was investigated, but in an irrelevant occupation area of textile engineering.

In Seifried et al.'s (2006) study, the adoption of instructional media was mentioned, and they concluded that blackboard (whiteboard) and worksheet were more welcomed in accounting lessons. However, time allocation in different media sources was not received. Therefore, the second data group, which is time allocation to the instructional media in German schools, is not available and should be collected.

Table 2.2

Overview of the Relevant German Studies

Author (Year)	*Methods*	*Outcomes*
Teaching and Learning in Accounting		
Seifried et al. (2006)	Questionnaire Observation	questionnaire: frontal teaching 47%; partner and individual study 28%; group study 13%; case study 8%; others 4%. observation: frontal teaching 67.4%; individual study 18.2%; partner study 6.4%; group study 6.2%; case study 8%; others 1.8%.
Götzl et al. (2013) Jahn & Götzl (2014)	Observation	frontal teaching 68.6%; partner study 5.3%; group study 3%; individual study 22.1%.
Teaching and Learning in Commercial VET Schools		
Wild (2000)	Video	teacher-centered teaching 66%; individual study 15%; talking after individual study 7.2%; others 11.8%.
Pätzold (2003)	Questionnaire	results from teachers' questionnaire (how often is a social form used per week?): - frontal teaching: ten or more hours (39%); five to ten hours (29,4%); less than five hours (20.9%); - individual study: in every or almost every teaching hour (55.9%); - group study: rarely (75.7%) Results from students' questionnaire (how often is a social form used per week?) - frontal teaching: always (94.4%)
Götz et al. (2005)	Questionnaire	frontal teaching 47.1%; partner study 15.6%; group study 13.4%; individual study 18.2%; others 5.7%.
Seifried (2008)	Observation	frontal teaching 67%; partner study /; group study /; individual study 17%.
Kozina & Pilz (2018)	Observation	frontal teaching 61.06%; student-interaction 1.96%; individual learning 32.8%; partner study 1.9%; group study 2.28%.

2.2.2 Teaching and learning in accounting in Chinese VET schools.

In China, both scholars and school teachers have presented information on classroom life. Literature from these two groups present different characteristics. For scholars, it is a common practice to regard VET as one single unified research subject, and a difference is seldom made between different occupation areas as German scholars do. Sometimes, technical education has been more emphasized (Guo, 2018). With this background, the subject of accounting as one major of commercial education has been merely regarded as one part of their studies or may even be neglected. Regarding the utilization of teaching methods and instructional media in accounting lessons, even fewer relevant studies exist. Additionally, articles authored by teachers can merely be regarded as a kind of self-perception or self-report due to their insufficient knowledge of academic research. Although both have their limitations for studying classroom teaching and learning of accounting lessons, they can be used together to present an initial impression of classroom life in Chinese schools.

2.2.2.1 The adoption of teaching methods in Chinese VET schools.

Generally speaking, the reporting of teaching and learning in accounting lessons is unsatisfied. From the teachers' view, the cramming technique is still widely used (Cheng, 2015; Gou, 2016; He, 2016; Wang, 2016). Some teachers may recite the contents or read books to their students (Wang, 2017). In one empirical study from He and Liu (2016), the adoption of teaching methods in VET schools was investigated. Though no difference was made between occupation areas or majors, lecture dominated the teaching and learning process in accounting lessons because only minor differences could be seen between occupational areas (He & Liu, 2016). This hypothesis is consistent with school teachers' statements.

In Jiang (2016)'s study, a contrary conclusion was presented. In accounting lessons, teachers and students shared the same dominance level. However, it should be pointed out

that only a high-performing class was videotaped and analyzed and therefore this result cannot be used to reflect the general situation in China.

From these studies, it might be surmised that teaching and learning in accounting lessons is always criticized. But, due to the comparatively low volume of the existing literature, the adoption of teaching methods in accounting lessons was not clearly presented and the data of interest, which is time allocation to the different teaching methods, was not available. Therefore, collecting a data group of the utilization of teaching methods in Chinese schools is necessary.

2.2.2.2 The adoption of instructional media in Chinese VET schools.

The single relevant study that described the utilization of media was from Chen (2011). As mentioned previously, Chinese scholars usually regard VET as a whole, which is the situation in Chen's (2011) study. The relevant major cluster in this study is finance and economics to which accounting belongs. The result indicated that information of cases and enterprise, multimedia, PowerPoint, textbook, and simulation software were particularly popular. Similar to the description of the adoption of teaching methods (Section 2.2.2.1), accounting was seldom separately studied and the time allocation to different instructional media is also not attainable. Then, the data group, which is the adoption of instructional media in Chinese schools, needs to be collected.

2.2.3 Conclusion: Comparative data not available.

According to the description in Section 2.2.1 and Section 2.2.2, a 2*2 matrix was drawn and shown in Table 2.3 below. Apart from Data Group 1, other three groups were not available. Then the necessity to collect information from these three groups data was confirmed. Although the data in Group 1 were available, they could not directly be used to compare with the data collected from Chinese schools. As explained in Section 2.2.1.1, the data are not current, and a special German concept was used as the reflection of teaching

methods. Therefore, in order to guarantee the comparability of the data collected, it was also necessary to collect the data of time allocation to the teaching methods in German schools.

Table 2.3

Comparison of the Data Availability in Germany and China

	Germany (Accounting in VET schools)	China (Accounting in VET Schools)
Time Allocation to Teaching Methods	✓ (data group 1)	✗ (data group 3)
Time Allocation to Instructional Media	✗ (data group 2)	✗ (data group 4)

Note. "✓" means data available; "✗" means data not available.

Chapter Three: Theoretical Considerations

In this comparative study, pedagogical practice in the classroom is of interest. The research field that covers this topic is empirical lesson research (German: *empirische Unterrichtsforschung*), which is an important sub-field of empirical educational research (Semper, Mende, & Berkemeyer, 2017). With respect to the theory of empirical lesson research, a unified theory does not exist due to a lesson's complicated characteristics (Ditton, 2000). However, it does not mean that there is no theory of lesson research. Which theory being adopted depends on a series of considerations, such as the research paradigm and research interest (Semper et al., 2017). In other words, making decisions regarding these aspects is the prerequisite for further theoretical analysis.

In Section 3.1, the research paradigms of empirical lesson research are briefly introduced and the one underpinning this study is outlined. In Section 3.2, how to understand a lesson is discussed. Afterwards, on the basis of the discussion, two other significant questions are answered. The first question, shown in Section 3.3, is regarding how to analyze a lesson's inner structure and establish the boundary between the compared subject, which is teaching and learning, from other activities in a lesson. In the same section, dimensions for reflecting teaching and learning are also established. This is particularly important for the development of the observation instrument in Chapter Five. In Section 3.4, a conceptual model for selecting the interpretation dimensions is constructed. These dimensions are further analyzed in Chapter Eight in order to explain the different teaching and learning styles in the compared countries.

3.1 Paradigms of Empirical Lesson Research

Generally speaking, three paradigms might be adopted in an empirical lesson study. They are the process-product-paradigm, the personal-characteristics paradigm, and the descriptive paradigm (Dubs, 2009; Lotz, 2016). Prior to the 1980s, the process-product paradigm played a dominant role in empirical lesson studies (Dubs, 2009). With this

paradigm, the purpose was to investigate the relationship between a certain teacher's behavior (process) and the teaching effectiveness (product; Dunkin & Biddle, 1974). Since the 1980s, this research paradigm has been widely criticized for many reasons and a new research paradigm aimed at investigating teachers' cognition was developed (Dubs, 2009). Though this research paradigm has some advantages over the process-product paradigm, it has been questioned whether it is meaningful to figure out "proper" teachers' behavior or set forward a regulation of good teaching instead of having a glimpse of how teaching and learning is occurring in an actual situation. With such a background explored, the descriptive paradigm was put forward. The fundamental aim of a study with this paradigm was to answer the "how-question" (Schröder, 2000) by observing and describing the interaction process that takes place between a teacher and his or her students in a lesson systematically, as well as the analysis of the relationship between the interaction process and personal characteristics (Klieme, 2006).

The choice of the paradigm is not at a random decision, but primarily depends on the research purpose. As stated in Chapter One, the fundamental purpose of this study is to compare the actual classroom life in German and Chinese schools. To achieve this purpose, it is the how-question that matters. Therefore, the **descriptive paradigm** was selected as the one that should drive this study.

3.2 Understanding of Lesson (Offer-Use Model)

This section addresses the question of how to understand a lesson (German: *Unterricht*). For this purpose, the offer-use model was utilized. This model was first constructed by Helmke and Weinert (1997) on the basis of Fend's (1980) concept. Subsequently, it was restructured by other scholars (e.g., Arnold, 2009; Kohler, 2011; Lipowsky, 2015; Reusser & Pauli, 2010; Seidel, 2014). Though the structures changed, the core concept of this model is the same. In the offer-use model, a lesson is understood as a teachers' offer which should be used by students (Seidel, 2014). A series of factors that

might affect this offer-use relationship are embedded in this model. They together construct

a framework which might be used for understanding the complex process in a lesson (Kunter

& Trautwein, 2013). In Figure 3.1, a simplified model from Lipowsky (2015) is presented.

```
┌─────────────────┐                              ┌─────────────────┐
│ cultural, economic,                            │ students' family
│ and school                                     │ background, peer-
│ background      │                              │ related condition
└─────────────────┘                              └─────────────────┘
           ↓        ┌──────────────────┐          ↓
           │        │ class composition │          │
           │        └──────────────────┘          │
           ↓                  ↓                    ↓
┌─────────────┐   ┌──────────────────────────┐  ┌─────────────┐
│             │   │         Lesson           │  │             │
│  teachers'  │ → │ teacher:  ← - - → student:│ ← │  students'  │
│characteristics│ │ quantitative  perception │  │characteristics│
│             │   │ and           and use of │  │             │
└─────────────┘   │ qualitative of the       │  └─────────────┘
                  │ the                      │
                  │         Offer            │
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           ↓              ↓              ↓
┌──────────────────────────────────────────────────────────────┐
│ teaching effectiveness: achievement, interest, motivation, joy of learning, self-concept │
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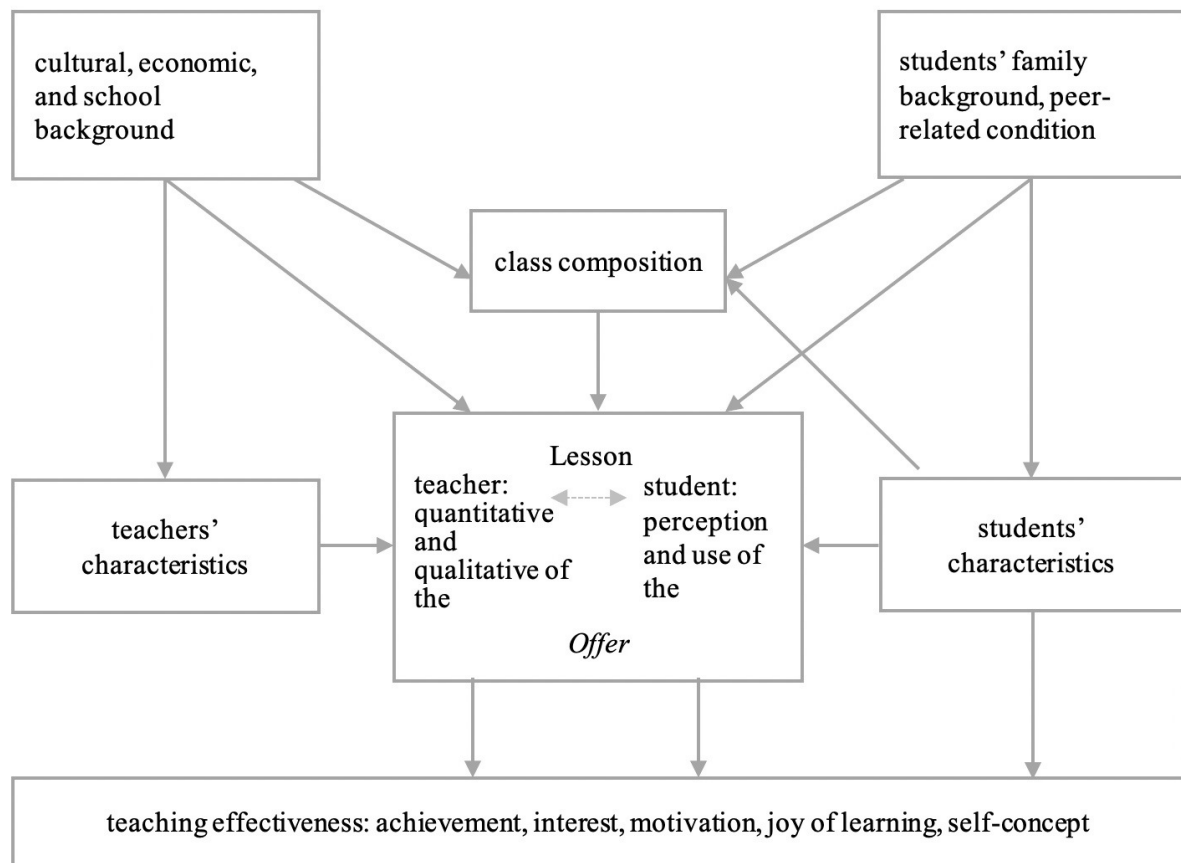
Figure 3.1. A simplified offer-use model.
Note. Adapted from Lipowsky (2015, p. 77).

In this study, the offer-use model serves two functions. First, it is beneficial for

understanding the compared subject, which is teaching and learning in a lesson. As

mentioned previously, in the offer-use model a lesson is regarded as teacher's offer that

should be used by students (Figure 3.1). Second, teachers' teaching and students' learning

take place simultaneously and influence each other. Based on this understanding, in this

study the term *teaching and learning* is adopted rather than teaching *or* learning. This means

that neither teachers' teaching behavior nor students' learning behavior is of interest. Instead,

teaching and learning are regarded as an integral whole to be investigated.

Furthermore, the offer-use model presents an overview of the contextual factors (Figure 3.1). In this study, the teaching and learning in the compared countries are going to be described and compared, the obvious differences between them will be pointed out. However, this study does not stop at this stage. The comparison outcomes are going to be interpreted from those contextual differences. In the offer-use model, possible contextual factors are embedded. From this respect, this model is useful for having glimpse of these aspects.

Nevertheless, this model is not clear enough as a research guide for this study. As presented in Figure 3.2, the prerequisite for carrying out this study was answering two questions: (1) how to describe a lesson (or teaching and learning); and (2) how to interpret the comparison outcomes. In the offer-use model, more emphasis is put on presenting the new understanding of a lesson, and the discussion within the lesson is absent. More specifically, how to describe the inner structure of a lesson was not regulated. Therefore, in a study that deals with a lesson's inner structure, it is necessary to consider how to describe it and point out those describing dimensions (Section 3.3).

Regarding those contextual factors, the emphasis on the offer-use model lies in the correlation among those factor groups, which is, however, not the focus of this study. Additionally, all of the factors listed might not be related to the compared subject of this study. Then, it is also important here to determine the interpretation dimensions by elaborating their relationships with the research focus of this study (Section 3.4).
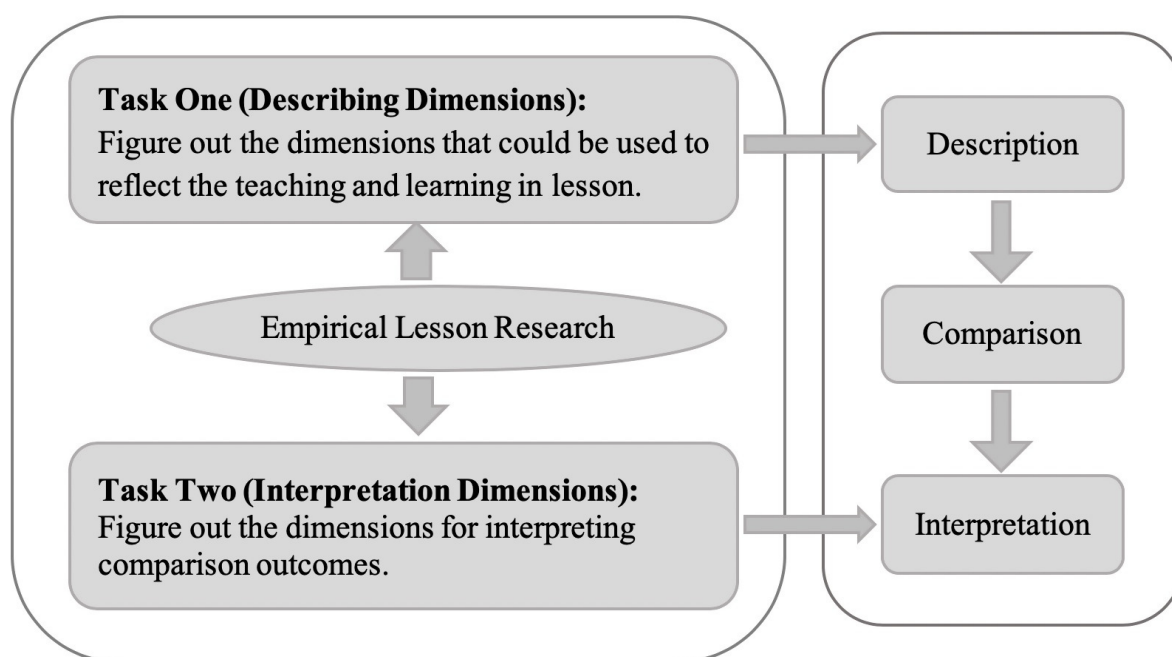
Figure 3.2. Two theoretical considerations involved into this study.

3.3 Dimensions for Describing Teaching and Learning

Teaching and learning is the compared subject. But, in the above section, the concept of lesson was utilized. Then, the foremost task of this section is to establish the boundary between "lesson" and "teaching and learning" (Section 3.3.1). Afterwards, focus is shifted into teaching and learning. The describing dimensions are pointed out in Section 3.3.2.

3.3.1 Teaching and learning as one significant segment group in a lesson.

A lesson can be seen as being composed of sequences of lesson segments or a block of time (Burns & Anderson, 1987). These segments are used for different purposes. Burns and Anderson (1987) listed nine possible segments purposes in a lesson[2], which are further categorized to teaching-and-learning segments and teaching-and-learning supportive-segments.

In this classification, another important segment group was not taken into consideration which is used for those teaching-and-learning non-related activities. Time for these non-related activities was usually referred to as *time loss* in a lesson (Saloviita, 2013).

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[2] The nine segments are procedural, direction, testing, transition, closing, development, review, practice or enrichment (Burns & Anderson, 1987). They are further elaborated in Chapter Five.

Actually, time loss in a lesson is a common phenomenon, as proven in some studies (e.g., Götzl et al., 2013; Kozina & Pilz, 2018). With the aim to present the whole picture of classroom life (Second Aim in Figure 1.1), this part of lesson should not be neglected. Then summarily speaking, a lesson in this study is defined as being composed of three segment groups: teaching-and-learning non-related activities, teaching-and-learning supportive activities, and teaching-and-learning activities.

This classification is not random. It was implicitly reflected by the lesson's time model and adopted in some empirical lesson studies (Götzl et at., 2013; Jahn & Götzl, 2014). The four time-types in a lesson are allocated time, instructional time, engaged time, and academic learning time (Kauchak & Eggen, 1998). They will be briefly introduced below and explained how they are related to the three segment groups mentioned above.

- Allocated Time: the amount of time that a teacher designates for a topic. **In this study**, it refers to the time for a lesson.

- Instructional Time: the amount of time that the teacher devotes to active teaching. It is the allocated time minus the time that is used for the routine management and administrative tasks. **In this study**, it is defined as the allocated lesson time minus the time loss for teaching-and-learning non-related segments.

- Engaged Time (or Time on Task): the portion of instructional time that students spend directly involved in learning activities. It is the instructional time minus the time that teacher is actively preparing but teaching and learning activity does not actually take place. **In this study**, it is the instructional time minus the time for the teaching-and-learning supportive segments.

- Academic Learning Time: the amount of time that students are successful while engaged. This time type, however, will not be further discussed because it deals with a student's cognition which is not a focus of this study.

The relationship between the time types and the segment groups is shown in Figure 3.3. It is usually stated that a high level of engaged time is one characteristic of a good lesson (Meyer, 2007). From this position, it can be inferred that what happens in the engaged time is very important; however, the discussion should not stop at the quantified result, which refers to the time portion. It is more interesting to delve into what happens within this time period. With this in mind, it was decided that the teaching and learning activities taking place in the engaged time is the compared subject in this study. In the following section, the question of how to reflect teaching-and-learning activities is answered.


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┌─────────────────────────────────────────────────────────────────────────┐
│                          Allocated Lesson Time                            │
└─────────────────────────────────────────────────────────────────────────┘
┌──────────────────────────────────────────┐   ┌──────────────────────────┐
│            Instructional Time             │   │   Non-Instructional Time │
└──────────────────────────────────────────┘   └──────────────────────────┘
┌──────────────────────┐ ┌──────────────────┐
│     Engaged Time     │ │ Non-Engaged Time │              ⇕
└──────────────────────┘ └──────────────────┘
          ⇕                      ⇕
┌──────────────────────┐ ┌──────────────────┐   ┌──────────────────────────┐
│ Teaching-and-Learning│ │Teaching-and-Learn│   │  Teaching-and-Learning   │
│      Segments        │ │ ing Supportive   │   │   Non-Related Segments   │
│                      │ │    Segments      │   │                          │
│  [S]  ......  [S]    │ │ [S] ...... [S]   │   │   [S]  ......  [S]        │
└──────────────────────┘ └──────────────────┘   └──────────────────────────┘
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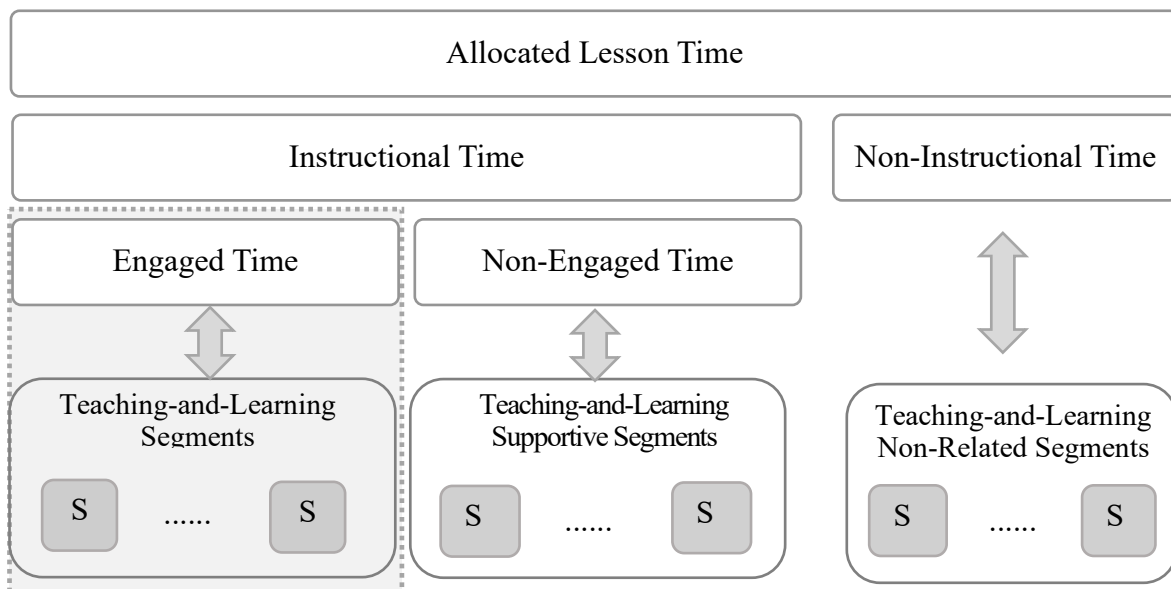
Figure 3.3. Teaching and learning in a lesson.

3.3.2 Reflection of teaching and learning.

In Section 2.1, it was explained that in this study, the visible structure is investigated and compared. In this section, discussion will illuminate the precise visible aspects being emphasized in this study. This selection is also not presented at random but based upon theoretical and practical considerations. Ultimately, the adoption of teaching methods and instructional media were selected as the proper defining dimensions.

Firstly, teaching methods and instructional media are two significant components of pedagogy (German: *Didaktik*). From a broad sense, *pedagogy* refers to the theory and

practice of teaching and learning (Jank & Meyer, 2014). Generally speaking, pedagogy addresses questions from the four fields of intention, contents, teaching method, and instructional media (Figure 3.4). Intention and contents together are regarded as pedagogy from a narrower sense (Hentke, 1995). The other two fields – teaching methods and instructional media – are concerned with how teaching contents is taught in the classroom (Mathes, 2013). Reinhardt (1994) named these two fields, or simply "method" (German: *Methodik*), as a way of teaching and learning which is exactly the target described in this study. Then, analyzing from the top-to-bottom approach, it was reasonable to use the adoption of a teaching method and instructional media as the reflection dimensions.

Additionally, when analyzing from the bottom-up-approach, it is also meaningful to adopt them. Pedagogy can be seen as the theoretical consideration of teaching and learning. In the famous Berlin Model, teaching method and instructional media are highlighted as two fields of decisions that should be taken into consideration by teachers (Heimann, Otto, & Schulz, 1979). More specifically, teachers are usually instructed how to teach and how to use media in teacher education. However, what they really do is seldom mentioned. The results from investigations that explore the real situation in the classroom might be further used by scholars to reconsider the pedagogical questions on the theoretical level.

The visible characteristic of teaching method and instructional media is another consideration. It was elaborated previously that a lesson's visible structure is of interest in this study. In other words, the describing dimensions should have the characteristic of being observable. Both of the selected dimensions have this characteristic when the proper definition is given (Chapter Five). Also, the boundary among different teaching methods and instructional media could be clearly established. This is particularly important in a systematic classroom observation study (Chapter Five). Then, from a practical perspective, the adoption of teaching methods and instructional media meets this requirement.

Lastly, in many other cross-cultural studies, teaching methods as well as instructional media have been investigated and compared (e.g., Roth et al., 2006; Stigler et al., 1999; Tao et al., 2013). It might be said that it is a common practice to evaluate these two areas. All in all, investigating the adoption of teaching methods and instructional media in the classroom is not only reasonable and meaningful, but also practical in the process of data collection.
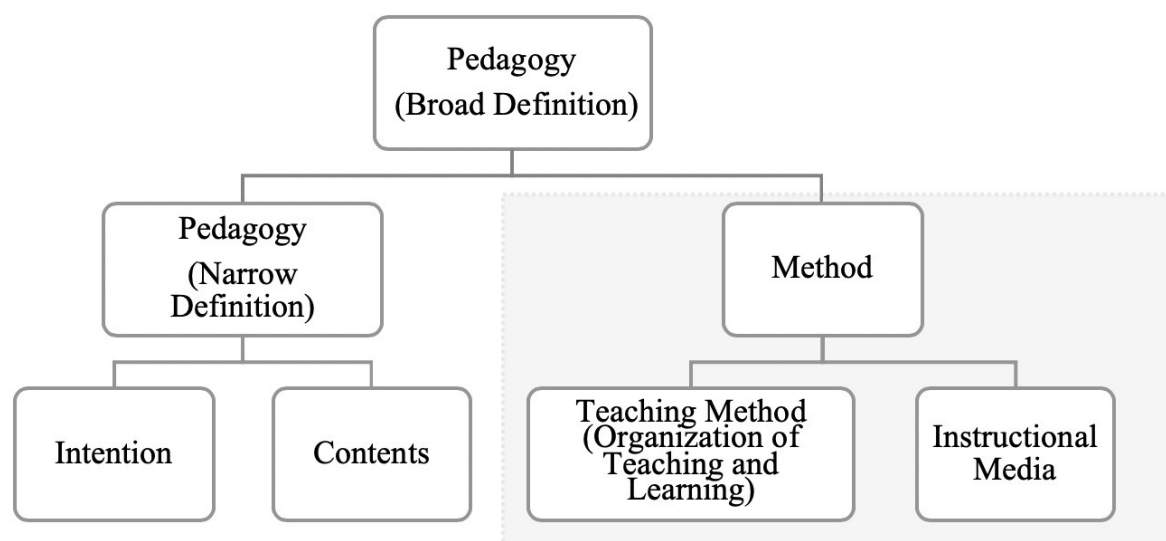
Figure 3.4. Teaching methods and instructional media: Two dimensions for reflection.
Note. Adapted from Mathes (2013, p. 7).

3.4 Dimensions for Interpreting the Comparison Outcomes

In this section, the question of how to interpret the comparison outcomes is addressed. The types of contextual differences that might lead to the different teaching and learning styles in the compared countries are highlighted here.

Firstly, all contextual factors that might affect pedagogical practice should be taken into consideration. Many scholars have previously discussed these factors and intended to construct them in one model. One of these is the offer-use model as described in Section 3.2. Apart from it, there are some others, such as the onion model constructed by Wang (2009), and the elements of sociocultural context identified in Mansour's (2013) study. When the factors or elements in these models were compared, it was found that the main difference lay in the criteria for classifying these factors instead of the actual factors involved. In this study,

the purpose was not to discuss which model is higher-quality. Instead, selecting the proper conceptual model that guides the interpretation was the primary task.

A conceptual model for this study was then adapted from Wang's (2009) onion model. In the original model, teacher, students, and teaching contents comprise the internal circle. The teacher and his/her students are the subjects of teaching and learning, while teaching contents are the object in the teaching and learning process (Wang, 2009). They are the foundation of teaching and learning, and they also insert direct influence on teaching and learning. In the conceptual model developed in this study, a square is integrated inside this circle (Figure 3.5), which presents the research focus of this study.

In the original onion model, three levels – classroom, school, and society - were added to this circle and named as the external factor groups that might affect teaching and learning indirectly (Wang, 2009). The classroom (micro) level factors refer to the environment in which teaching and learning takes place. It includes both the physical (e.g., seat arrangement, class size) and psychological (e.g., teacher-student environment) aspects. Factors on the school (meso) level are those which vary from school to school (e.g., cooperation with the stakeholders outside the school, school culture etc. On the society level, factors include a series of systems and social attitudes (Wang, 2009).

In the newly developed model, the two aspects on the society level are separated. A series of educational systems such as teacher education are categorized as the government (macro) level, and social attitudes are to the culture (meta) level (Figure 3.5).

Since the model has been found out, the next task is to select some aspects from different levels that might be used to interpret the different teaching and learning in the compared countries. It should be pointed out that there are a large number of possible factors, but not all of them are discussed in this study as collecting all of the relevant data within the time limitation of this preliminary project is not feasible. As such, it was decided to focus on several contextual factors.

As elaborated in Section 1.1, the fundamental aim of the interpretation in this study is to determine policy-borrowing clues. Hence, factors on the meta level and those emotion-related characteristics are not taken into consideration. First of all, culture is the nature of society and cannot be changed from the perspective of policy-borrowing. Therefore, it is meaningless to get the conclusion that different cultures lead to the different teaching and learning styles. Emotion-related characteristics, such as students' motivation, are also not further discussed as they it cannot be changed on their own but can be seen as the result of the change on other levels.

In the end, four factors – teacher education, curriculum, media availability, and class size - were selected. In the following sections, their relationship with the compared subject – teaching and learning - are briefly introduced.
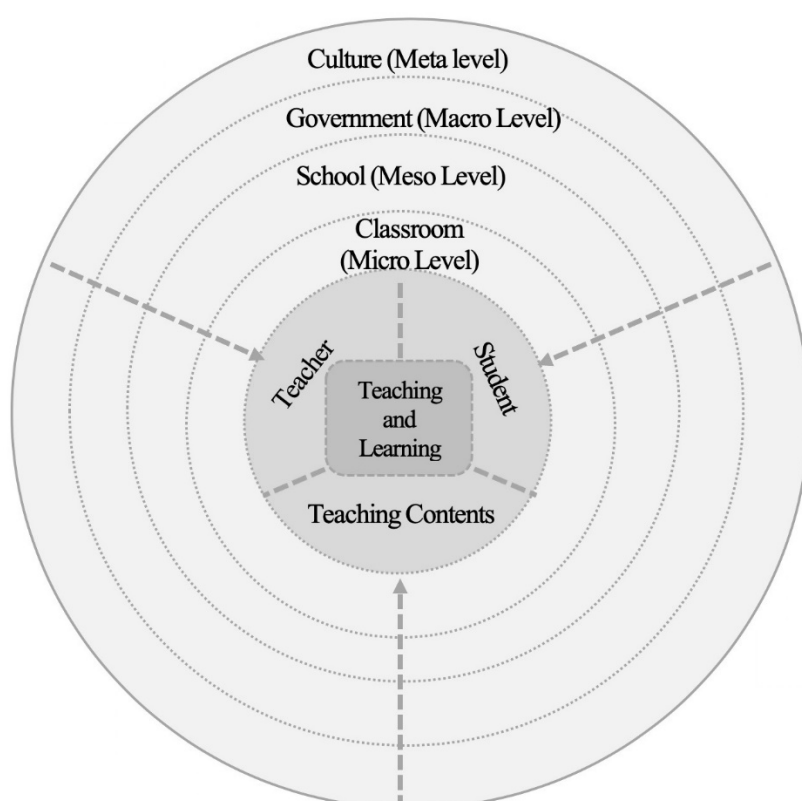
Figure 3.5. Conceptual model for interpretation.
Note. Adapted from Wang's (2009) onion model.

3.4.1 External contextual factors on the macro level – government.

As mentioned previously, factors on the macro level are related to educational governance. Fend (2008) described it as *school on paper*. Among the various factors on this level, teacher education and curriculum are selected due to their influence has close relationship with the internal contextual factors of teachers' characteristics and teaching contents, which both have a direct influence on teaching and learning (Figure 3.5).

3.4.1.1 Teacher education.

The teacher, as one participant in the teaching and learning process, plays a decisive role in the improvement of teaching effectiveness (Hattie, 2009). In other words, they certainly affect the teaching and learning process. In this study, teacher influence is particularly obvious as it is the adoption of teaching methods and instructional media that were investigated, and to some extent, the teacher might be seen as the controller of applying various teaching methods and media in classroom.

When the teachers' characteristics are mentioned, the term *teachers' professional competence* is always used, which consists of professional knowledge, beliefs, motivation, and self-regulation (Baumert & Kunter, 2006; Kunter & Trautwein, 2013). Kunter and Trautwein (2013) stated that teachers' professional competence should be mainly developed in teacher education. Then, it was inferred that teacher education first affects teachers' professional competence and then influences the teaching and learning in classroom. In this respect, teacher education should be selected as the proper dimension for interpretation.

In this study, however, it is not the overall teacher education system in Germany and China that was compared. Instead, only the components that are really connected to the compared subject – the adoption of the teaching methods and instructional media – was involved. Ultimately, pedagogical-related knowledge, including both pedagogical knowledge (PK) and pedagogical content knowledge (PCK) as two sub-fields of teachers' professional knowledge (Shulman, 1986, 1987), were chosen as the specific domain of focus.

3.4.1.2 Curriculum.

The relationship between curriculum and teaching and learning was pointed out in many studies. In a cross-cultural comparison study, it was indicated that the "nature of the curriculum was largely responsible for the type of teaching (and learning) approaches used in each country" (Aldridge et al., 1999, p. 57). The relationship between the adoption of media and media presence in the curriculum was also pointed out by Akbulut (2009). As such, curriculum was selected as another possible interpretation dimension.

Curriculum could be analyzed from different levels. For example, based on the process-oriented concept highlighted by Vollstädt et al. (1999), curriculum was differentiated between the official curriculum, institutional curriculum, individual curriculum, and other curriculum types (Berger, 2015). Van den Akker (1998) outlined a differentiation between the formal curriculum (i.e., the vision elaborated in a curriculum document) and curriculum in action (i.e., the actual instructional process in the classroom). Such a classification was used in some curriculum studies in order to see whether what teachers do in reality (i.e., the "enacted curriculum") is in accordance with the "prescribed curriculum" (Pilz & Li, 2012; Pilz et al., 2016).

In this study, the second classification from van den Akker (1998) was adopted. Here, the aim to describe curriculum is to interpret the comparison outcomes (i.e., the focus of analyzing curriculum is to see how the contents affect the teaching and learning process). Therefore, the enacted curriculum does not need to be analyzed separately. Moreover, the curriculum in this study was not differentiated between official curriculum, institutional curriculum, etc., in that they acted together as one factor that might affect teaching and learning.

The next issue was concerning how to analyze a curriculum and how to relate it to the compared subject of this study. It should be clearly pointed out that not the overall curriculum structure is of interest. Instead, the teaching methods and instructional media in

curriculum were the focus as the adoption of teaching methods and instructional media is the compared subject in this study.

3.4.2 External contextual factors on the meso level – school.

Due to different traditions and beliefs, individual school presents its own characteristics (Wang, 2009). These characteristics might be reflected by how they cooperate with external stakeholders, the school culture, the physical environment, and so on (Berger, 2015; Fend, 2008; Wang, 2009). However, not all of them are related to the compared subject or the information is not attainable. In this study, only the media availability as part of the physical environment on this level was picked out.

Regarding media availability's relationship with the compared subject, it was stated that media availability would affect the adoption of instructional media in the teaching and learning process (e.g., Akbulut, 2009; Gil-Flores, Rodríguez-Santero, & Torres-Gordillo, 2017). Therefore, it was reasonable to choose it as one possible interpretation dimension.

3.4.3 External contextual factors on the micro level – classroom.

As described earlier, the factor on a classroom (micro) level refers to the environment in which teaching and learning takes place. Differentiation was made between the physical (e.g., seat arrangement, class size) and psychological (e.g., teacher-student relationship) environments (Wang, 2009). On this level, class size which is one factor on physical environment was selected.

Class size here refers to the total number of students allocated to a teacher for some or all of his/her teaching schedule. With respect to the relationship of class size to teaching and learning, it was stated that "the large number of students constrains some teachers' abilities to use individual teaching techniques, cooperative learning, or inquiry," for that in a large class both the teacher's and students' movement is restricted (Mansour, 2013, p. 362). Therefore, in this situation, the teacher has to remain close to the blackboard (Mansour, 2013). A

similar statement was also found in Wang's (2009) study since it was assumed as one factor that might affects the adoption of teaching methods.

3.4.4 Summary: Four possible interpretation dimensions.

Though a large number of factors from different levels might affect teaching and learning, in this study only four of them were selected as the possible interpretation dimensions. As shown in Figure 3.6, these four factors are from three levels. Teacher education and curriculum on the macro level; media availability on the school level and class size on the micro level. In Section 8.1, the information from these four dimensions in Germany and China is described and then compared. If the difference exists on the individual dimension, then it is used as the determinant for explaining the comparison outcomes derived from the observation.

Teacher Education
How pedagogical related knowledge is taught?

Curriculum
the educational objective;
Teaching method and instructional media in curriculum.

Culture (Meta level)

Government (Macro Level)

School (Meso Level)

Classroom (Micro Level)

Teacher

Student

Teaching and Learning

Teaching Contents

Media Availability

Class Size
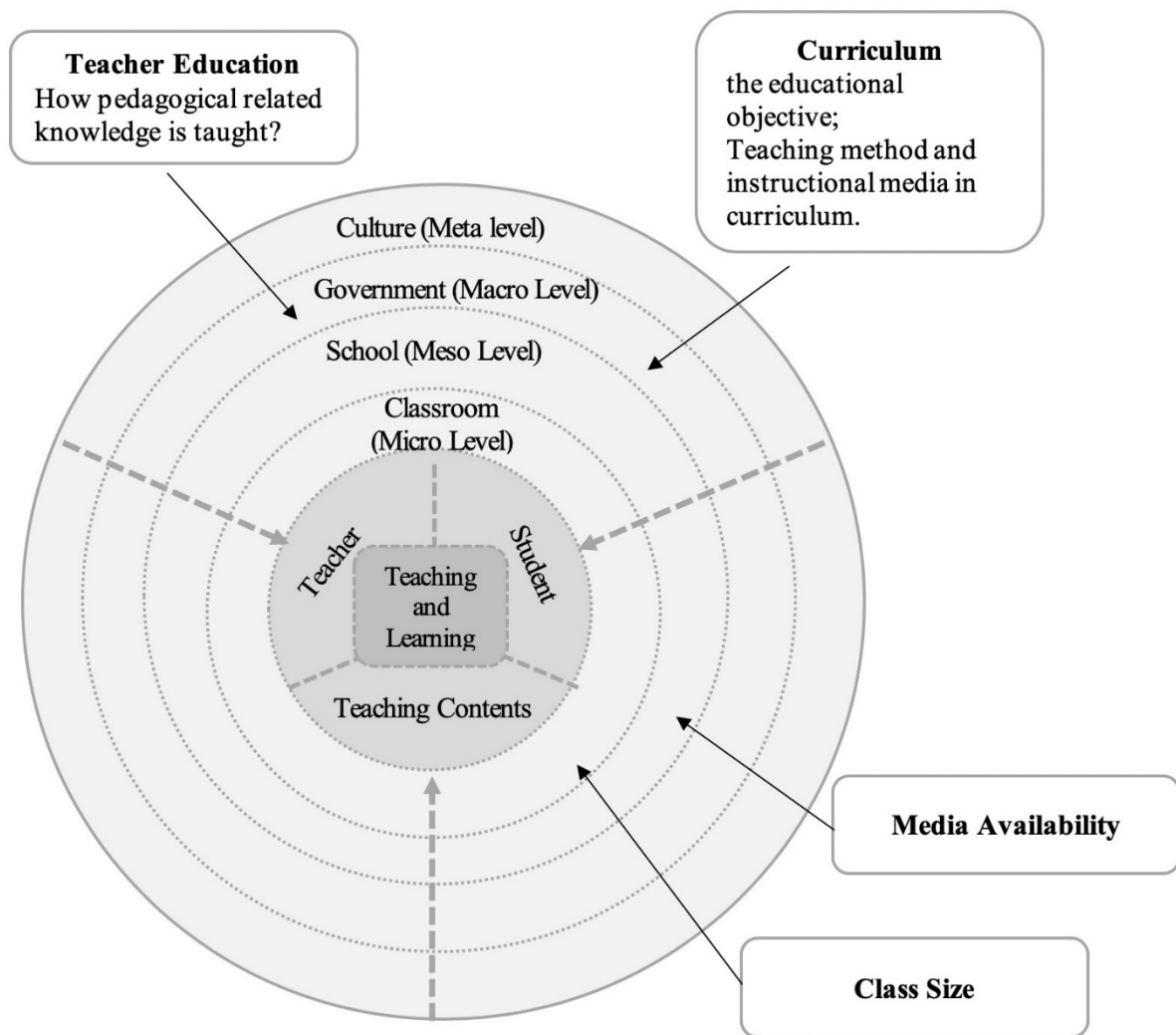
Figure 3.6. Four possible interpretation dimensions.

Chapter Four: Research Methodology and Research Design

The aim of this study is to compare the micro level of a VET system with the empirical approach. Two research fields involved in this study are comparative educational research and empirical lesson research[3]. In this chapter, questions that are relevant to this study but that fall into these two fields are answered in Section 4.1 and Section 4.2, respectively. Afterwards, based on the discussion in these two sections, a research design is presented in Section 4.3.

4.1 Empirical Lesson Research

In Section 3.1, it was pointed out that this study follows the descriptive paradigm of lesson research. In Section 3.2, the adoption of teaching methods and instructional media were determined as the reflection of teaching and learning in the classroom. In this section, question concerning how to collect such information is to be answered.

4.1.1 Reasons for selecting observation as the data collection method.

For collecting the process data in the classroom, three techniques are usually adopted: questionnaire, interview, and observation (Pfau, 1980; Stigler et al., 1999). For gathering information about classroom activities, questionnaires and interviews are considered indirect techniques (Pfau, 1980). With them, "teachers or students report what takes place in the classes" and then the results derived are used for describing classroom occurrences and for comparing occurrences (Pfau, 1980, p. 401). Though it is a simple approach and the researchers are able to administer a large number of respondents as well as easily transform the collected information into data files, it is still criticized for its validity issues (Pfau, 1980; Stigler et al., 1999). This might be caused by the premise that the words researchers use to

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[3] In German-speaking countries, there is a long history of studying lessons with either a theoretical or empirical approach. In German literature, the term *empirische Unterrichtsforschung* is used to describe those studies that aim to study lessons with an empirical approach (Helm, 2016; Semper et al., 2017). By contrast, in English-speaking countries, empirical lesson research is seldom discussed separately and there is no such a fix term to describe those studies that aim to describe the classroom life. In this study, the term empirical lesson research is used as the translation of "empirische Unterrichtsforschung".

describe one behavior or activity may not be understood in the same way by different teachers and students (Stigler et al., 1999). As a result, inaccurate information might be provided. Moreover, teachers are good reporters of what they have planned, but not good reporters of what they have done in the classroom for the reason that part of their behaviors are out of their own perception (Stigler et al., 1999).

Comparing observation, interview, and questionnaire, observation has obvious advantages (Pfau, 1980). With this approach, "behavior categories are defined objectively by the researcher, not independently by each respondent" and those behaviors that are unknown to teachers, could be easily observed by an outsider (Stigler et al., 1999, p. 3). This statement was further proven by other empirical studies. Wang and Sogin (1997) compared the data from teachers' reports and observations, and their results indicated that the teachers' own estimate of time use was greater than the actual time recorded for each music activity. Similarly, a difference was also found between the data from the observations and students' reports (Nelson, Reddy, Dudek, & Lekwa, 2017).

Keeping these discussions in mind, the observation technique was selected for data collection in this study because that the high-inference effect of questionnaire and interview may be even greater when they were applied in this study. Apart from the possibility that teachers might report required information inaccurately, in such a cross-cultural comparison study it cannot be guaranteed that teachers or students from two different backgrounds have the same understanding of the terms outlined in the questionnaire as the author herself, or even with each other (Pfau, 1980). When observations are adopted, it was the same person who is not only the researcher but also the observer that was embedded into the observable environments. In this way, the comparability of the data collected from two cultures was ensured.

4.1.2 The observation type in this study.

Scientific observation, unlike daily observation, is a type of goal-oriented, systematic-organized recording, documentation, and interpretation of some incidents and behaviors with strict rules (Laatz, 1993). There are many observation types which can be categorized into five dimensions (Friedrichs, 1982), which are:

- Subjective/objective observation: Is a third person is inserted as the observer? (*yes* = subjective observation; *no* = objective observation);

- Controlled/naturalistic observation: Is the observation conducted in a controlled environment, such as a psychology laboratory? (*yes* = controlled observation; *no* = naturalistic observation);

- Participant/non-participant observation: Does the observer participate in the group to be observed? (*yes* = participant observation; *no* = non-participant observation);

- Direct/indirect observation: Do the group members to be observed know that they are observed? (*yes* = direct observation; *no* = indirect observation);

- Structured/unstructured observation: Are the units, which are either the activities or behaviors, predefined? (*yes* = structured observation; *no* = unstructured observation).

In accordance to the analysis from these five dimensions, the observation type that fits the aim of this study has yet to be determined. First and foremost, it can be easily pointed out that the observation in this study is **subjective**, **naturalistic,** and **non-participant** (i.e., the first three dimensions). As stated previously, a teacher may be a good reporter of what they have planned, but not what they have done (Stigler et al., 1999). Therefore, a third person, the observer, is inserted into the classroom. As the aim of this study is to present a real status of classroom life, this real status should take place in a naturalistic environment and be not influenced by an outside factor or observer. To put it another way, the observation in this study should have the characteristics of being naturalistic and non-participant.

Apart from these three characteristics, the observation in this study should be a **direct** one. An indirect observation is usually conducted with help of mechanical instruments, such as a video recording of the session(s). In the last few decades, video-based observation has been widely carried out, especially in large-scale and cross-cultural lesson studies (e.g., Aldridge et al., 1999; Liu & Neuhaus, 2017; Reusser & Pauli, 2010; Stigler et al., 1999). There are indeed many advantages for using video recordings to study lessons (Stigler et al., 1999). For example, more detail information is captured and it "enables researchers to investigate phenomena in more powerful ways" (Hackling, 2014, p. 1). In addition, the information captured can be replayed and reviewed for analysis. Nevertheless, indirect observation is not the proper method for this study.

Here, the "issues of time and costs of capturing quality video" is a big concern (Hackling, 2014, p. 1). In an explorative study, which has limited time and funding, it is not feasible to conduct this research as a video-based study. Additionally, according to some teachers' feedback, they do not want to be videotaped or recorded by other instruments while conducting their lessons. In order to get access to the research subject, a direct observation was more suitable for data collection for this study.

The last dimension is structured/unstructured. In an unstructured observation[4], the observer monitors all aspects of the phenomena that is relevant to the research problem. It is typically used as some type of a qualitative assessment of a teacher's competence that can be provided by an observer (Wragg, 1999). In a comparative study, this approach is criticized for not providing a very objective basis for comparing patterns of teaching from one country to another, due to that they furnish only very gross indications (Pfau, 1980, p. 402). Another criticism lies in that the descriptive words do not contain a common base for making comparison (Pfau, 1980).

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[4] This approach is also called *narrative description*.

By contrast, a standardized approach, or structured observation[5], is stated as more suitable for a description and comparison of classroom life (Pfau, 1980). Within this approach, two kinds of instruments are usually introduced: a rating scale and a category system (Pfau, 1980; Wragg, 1999). In a rating scale observation, the observer is required to make a considerable subjective judgement (Wragg, 1999). Then it is regarded as a measure with high-inference effect. However, in a structured observation with a category system, which is also named **systematic classroom observation**, low-inference data "whether or not something takes place," is collected (Wragg, 1999, p. 24). In other words, "the frequency with which specific behaviors occur in the classroom and the length of time they occur" is the result of a systematic classroom observation (Hilberg, Waxman, & Tharp, 2004, p. 2). Additionally, it was believed as "potentially more suitable for gathering data to be used for making cross-national comparisons" in that "precise and valid cross-national comparisons could be made" (Pfau, 1980, p. 404). Therefore, the observation in this study will be a structured observation with category system, or systematic classroom observation.

By making use of the four classification-dimensions that from Friedrichs (1982), a matrix of the observation types is presented in Table 4.1 (Kromrey, Roose, & Strübing, 2016). According to the discussion above, type one in this matrix should be the proper one for collecting data in this study.

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[5] In German literature, an observation with such an approach is also named *standardisierte Beobachtung* (Gniewwosz, 2011) and *kodierende Beobachtung* (Pauli, 2012). In this study, the term *structured observation* will be used.

Table 4.1

Observation Types

		Non-participant		Participant	
		Direct	Indirect	Direct	Indirect
Naturalistic	Structured	1	2	3	4
	Unstructured	5	6	7	8
Controlled	Structured	9	10	11	12
	Unstructured	13	14	15	16

Note. From Kromrey et al. (2016, p. 328).

4.2 Comparative Vocational Education and Training (VET) Study

In this section, two main questions are dealt with. First and foremost, the comparative approach underpinning this study is going to be pointed out (Section 4.2.1). Afterwards, a series of selections in this comparative study are determined (Section 4.2.2).

4.2.1 Descriptive and quantified approach behind this comparative study.

With respect to the type of comparative education studies, Theisen and Adams (1990) proposed a classification which includes analytical, descriptive, evaluative, and exploratory. Following are the purposes of each comparative type:

- Analytical comparative research: Description of roles; specification of cause-and-effect relations or an explanation of relations and consequences. The typical questions are: *What are the explanations for relationships between components?* and *Why do actors or systems behave in the way they do?*

- Descriptive comparative research: Description of phenomena or conditions. Description of relationship between variables. The typical questions are: *What is the current status of the phenomena?* and *What are the relationships between variables?*

- Evaluative comparative research: Judgement of the merit, value, or worth of any given program or techniques; interpretations useful for decision making. The typical

questions are: *Is Program A better or more cost-effective than Program B?* and *Is the program or policy appropriate for particular context?*

- Exploratory comparative research: Generating new hypotheses or questions; exploration of relationships and functions with potential for in-depth research. The typical questions are: *What issues pertaining to roles, relationships, and processes exist that are worthy of examination by other modes or research?*

In this study, the **descriptive approach** will be followed because the fundamental aim is to describe the teaching and learning in the classroom instead of explaining relationships and consequences, making judgements, or generating hypotheses.

For data collection, the systematic classroom observation was selected (Section 4.1). One characteristic of this method is that information being collected is the frequency of occurrence of the behaviors, and the time length for each behavior or activity is calculated in the end. In other words, it is the statistical result that is received. Therefore, this study was a descriptive comparative study with **quantitative approach**.

4.2.2 The three selections in this study.

As Pilz (2012) stated, selections in a comparative study should not only concern the countries to be compared, but also on more concrete, pragmatic dimensions. In this study, selections were mainly made on three dimensions. Firstly, questions about which countries were to be compared should be answered (Section 4.2.2.1). The second selection concerned the educational level on which this comparative study was conducted (Section 4.2.2.2). In this same section, the VET systems on this level in the compared countries are elaborated upon and then the school types to be investigated are selected. In Section 4.2.2.3, the subject field being focused on is selected. At the same time, how the sample subject was embedded in the German and Chinese VET schools is briefly introduced and the courses to be observed were selected.

4.2.2.1 Comparison between Germany and China.

Germany and China have cooperated for a long period of time in the field of VET. This cooperation can be dated back to the 1980s and will be further strengthened in the future (Liu, 2017). In most situations, this cooperation might be regarded as a kind of policy-borrowing. It is well known that German VET has a good reputation around the world; by contrast, VET is comparatively underdeveloped in China. With such a background, policymakers and scholars from China intend to borrow the experiences from Germany. And the policies typically being borrowed might be the dual system, teaching concepts, curriculum structure, and so on. One common characteristic of these policies is that they are components from either the macro or meso level of the VET system. With respect to the micro level referring in particular to the classroom teaching and learning (Pilz, 2016), it is still not uncovered on both sides. Therefore, a comparative study on a micro level is beneficial for improving mutual understanding between them and then for efficient policy-borrowing in the future.

Analyzing from the theoretical level, Germany and China can be seen as the cases in a most different case design study (e.g., Mill, 1970). Generally speaking, Germany and China have different political, economic, and cultural backgrounds. Usually, the VET systems in these two countries are also categorized to the different typologies (OECD, 2000; Pilz, 2016; Rauner & Wittig, 2009). From this respect, it is meaningful to know whether the same or similar results can be received in spite of the different backgrounds.

Lastly, the accessibility to the research subject and to the compared countries is another consideration. Specifically speaking, it concerns language knowledge. As Bereday (1961) explained, a period of living in the comparative countries and having good command of the languages of the comparative countries are significant for a comparative study. It was a prerequisite for carrying out this study.

As was elaborated upon in Section 4.1, the systematic classroom observation was used as the data collection method. With this technique, a third person is inserted into the environment to be observed. The author of this study was the only single observer in the entire process. Therefore, the observer should have proper knowledge of both German and Chinese in order for the observer to know what happens in the classroom.

In addition, in the interpretation step, language also plays an important role. The interpretation was given based upon the analysis of the contextual factors that were widely discussed in other relevant literature shown in the conceptual model in Chapter Three. The description of these factors is mostly in the native language of the compared countries. Therefore, both accessing the literature and understanding the language of the compared countries is also necessary. As a result, the author's research background and language skill played a decisive role in the process of selecting the compared countries.

In all, it was meaningful and reasonable to select Germany and China as the two compared counterparts in this study. However, both of them "have certain domestic diversities with reference to education in general" (Pilz & Li, 2012, p. 231). The legislation and rights in school education varies from state to state in Germany (Eckhardt, 2017). In China, the socioeconomic condition is also different between regions (Pilz & Li, 2012). In a preliminary study, it was not feasible to select samples from all of the regions. Taking the accessibility of schools into consideration, **Cologne,** the fourth largest city in Germany located in North Rhine-Westphalia (later referred to as NRW) and **Peking,** the capital city of China, were regarded as the representative cities from which the observation samples were selected.

4.2.2.2 Comparison on the level of upper-secondary VET.

In this study, a comparison is made on the upper secondary level. In the international standard classification of education (ISCED), it refers to the education level three (UNESCO, 2011). "VET programs on this level are typically designed to complete secondary education

in preparation for tertiary education or provide skills relevant to employment, or both"

(UNESCO, 2011, p. 38). It is also regarded as the initial VET (IVET), which aims to

"prepare people with skills and/or competences to gain entry a specific occupations/sector or

to get access to the tertiary education" (Gambin, 2009, p. 10). It "falls at the intersection

between education, both general secondary and tertiary, and the world of work" (Cedefop,

2014, p. 26). Therefore, its role is not only to "meet the educational needs," but also to "meet

the wider economic and social needs of a country or region" or meet the goal of social

inclusion (Cedefop, 2014, p. 26).

Due to its significance, teaching effectiveness on this level should be stressed. And

the prerequisite for its improvement is to know the status of how the performance is in

reality. Then it is worthwhile and necessary to conduct such an empirical study on this

educational level.

Germany and China have different VET systems. Here, the all-embracing and

comprehensive information of the whole VET system is not presented. Instead, only the

VET on the target educational level is emphasized and then the proper school type on this

level being compared was determined.

4.2.2.2.1 *Upper-secondary VET in Germany*.

In Germany's upper secondary level, various programs are provided (Figure 4.1).

Specifically, both school-based and company-based programs are provided to residents

(Hippach-Schneider, Krause, & Woll, 2007). The company-based program refers to the

famous dual system in particular. Additionally, there are other school-based programs that

are mainly housed in the Germany's vocational schools, including full-time vocational

schools (German*: Berufsfachschule),* specialized secondary schools (German*:*

Fachobserschule), vocational grammar schools (German*: Berufliches Gymnasium*), upper

vocational schools (German: *Befusobserschule)*, and other types of schools that exist only in

individual state or only on a very small scale (Eckhardt, 2017; Hippach-Schneider et al., 2007).
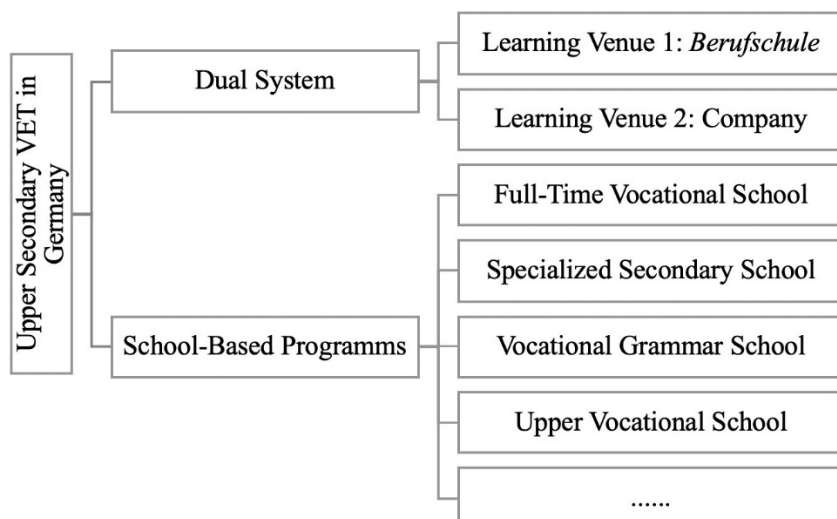
Figure 4.1. Upper-secondary VET in Germany.

The dual system (German: *duale Berufsausbildung*) is characterized by its two learning places: at the workplace and in a *Berufsschule* (Eckhardt, 2017; Fürstenau, Pilz, & Gonon, 2014; Greinert, 1995). In schools, it is theoretical knowledge as well as general subjects such as German, mathematics, or social studies that are taught (Deissinger, 2015). As a complement of the in-company training, both general knowledge and job-specific knowledge are taught (Fürstenau et al., 2014). In the workplace, practical training is conducted. The aim of a dual system is to "impart, within a structured course of training, the vocational skills, knowledge and qualifications necessary to practice a skilled occupation in a changing professional world" and "to provide the necessary professional experience" (Eckhardt, 2017, p. 142). With respect to any prerequisite for admission, the system is described as "open to everyone" (Eckhardt, 2017, p. 144).

The educational objective of full-time vocational school (German: *Berufsfachschule)* is to "introduce students to one or several occupations, offer them part of vocational education and training in one or several recognized occupations or lead to a vocational qualification in a specific occupation" (Eckhardt, 2017, p. 140; KMK, 2013). The

prerequisite for admission is that students should have a *Hauptschulabschluss* or a *Mittlerer Schulabshluss,* depending on the educational objective (Eckhardt, 2017).

In specialized secondary schools (German: *Fachobserschule)*, students are "equipped with general and specialized theoretical and practical knowledge and skills that leads up to *Fachhochulreife* (i.e., higher education entrance qualification for the *Fachhochschule*)" (Eckhardt, 2017, p. 141). In the first school year, students take the practical training as a relevant controlled placement in companies or equivalent institutions. Afterwards, students are instructed in school.

Vocational grammar schools (German: *Berufliches Gymnasium*) has "career-oriented specialization and comprises a three-year course of education" and leads to the general qualification for entrancing the higher education (*German:* Allgemeine Hochschulreife) (Eckhardt, 2017, p. 141).

Upper vocational schools (German: *Berufsobserschule)* was "established in order to enable those who have completed vocational education and training in the dual system to obtain a higher education entrance qualification" (Eckhardt, 2017, p. 141). The prerequisite for admission is the *Mittlerer Schulabschluss* or "qualifications recognized as equivalent and at least two years' successful vocational education and training, or at least five years' relevant practical experience" (Eckhardt, 2017, p. 141).

4.2.2.2.2 *Upper-secondary VET in China*.

In China, only full-time or school-based VET programs are provided on the upper secondary vocational education (Li, 2017). The three school types on this level are specialized secondary school (Chinese: 中等专业学校), vocational high school (Chinese: 职业高中), and artisan school (Chinese: 技工学校) (Li et al., 2019). Among these institutions, the main difference lies in their responsible organizations and historical backgrounds (Shi, 2012; Zhao, 2003). With respect to the education objective, curriculum, and other aspects, a

vague difference exists among these three school types. All of them recruit mainly the junior

secondary school graduates who failed to be admitted by the senior high schools (Yan, 2019).
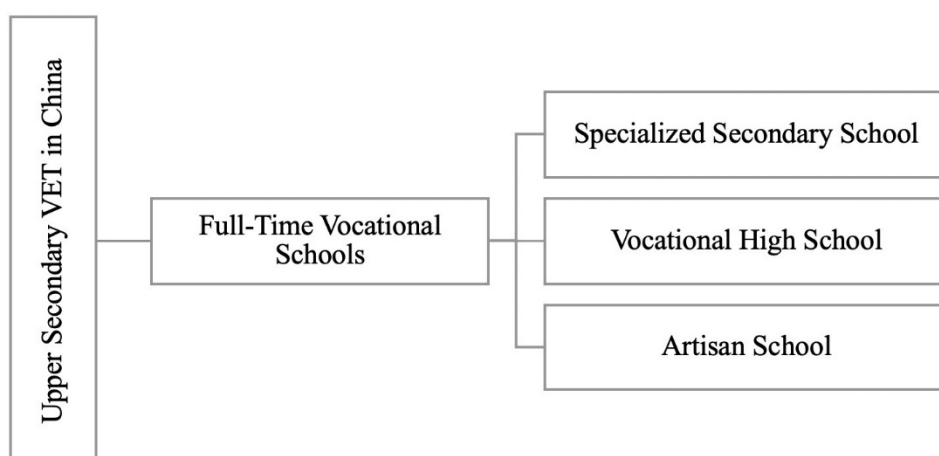
Figure 4.2. Upper-secondary VET in China.

Specialized secondary schools (Chinese: 中等专业学校) were established on the

basis of senior vocational schools in old China (Huang, 2009). The length of schooling is

three years. Prior to the 1990s, it was under the control of various administrative sections

and is now regulated by the Ministry of Education (Zhao, 2003). In the past few decades, the

educational goal of these school types has changed from "cultivating medium-level

technicians, administrative staff and primary school teachers" to "cultivating all kinds of

skillful laborers" ("Vocational Education in China," 2008, p. 51).

Most vocational high schools (Chinese: 职业高中) have developed from the general

high schools since 1985 (Huang, 2009). In the most situations, the study time in these

schools is three years. This school type is under control of the Ministry of Education (Aulig,

2006). In vocational high schools, "the similar personnel as the secondary specialized school

and artisan schools are cultivated" and "most of the graduates will become operators in

workplaces" ("Vocational Education in China," 2008, p. 51).

In artisan schools (Chinese: 技工学校), the length of schooling is three years, and it is

the ministry of labor or a large company that is responsible for this school type (Zhao, 2003).

In these schools, majors that are related to manufacturing and processing industry are housed. The educational target is to train intermediate skilled workers ("Vocational Education in China," 2008).

4.2.2.2.3 Selection of the investigated school types.

Comparing upper secondary VET in Germany and China, significant differences were found. **Firstly**, in China, only full-time VET programs at the upper-secondary level are provided. While in Germany, both full-time and part-time approaches exist. Considering that the compared subject should exist in both compared countries, then in this study the full-time VET approach was selected. **Additionally**, as described above, unlike the situation in Germany, the three Chinese school types do not have clear boundaries. Therefore, in this study, they were regarded as a whole from which the sample schools were selected. In Germany, full-time school types have different prerequisites for admission as well as educational objectives that lead to the various educational levels, and all of these are clearly defined in the official paper. For example, in the state NRW, the official information is found on the website of *Qulalitäts- und Unterstützungs Agentur – Landesinstut für Schule*. Therefore, it is not possible to take the same approach as in China, which makes no differentiation between the school types. Instead, the one that has the most similar characteristics should be selected.

In Section 4.2.2.1, various school types in Germany were introduced. Among the various school-based programs, full-time vocational schools (German*: Berufsfachschule)* are more similar to their compared counterparts. Here, the criterion for selection includes educational objectives, enrollment requirements, and the teaching model. The educational objective in vocational grammar schools (German: *Berufliches Gymnasium*), specialized secondary schools (German: *Fachobserschule),* and upper vocational schools (German: *Berufsoberschule)* is to lead students to obtain a higher entrance qualification either for the university or university of applied science (German: *Fachhochschule)*. In Chinese schools,

however, the educational objective is to lead students to receive the qualification to work in the labor market as skillful workers. Additionally, the enrollment requirement in the upper vocational schools (German: *Berufsoberschule)* is having finished a dual system or having related working experience. This is also different in Chinese schools, which mainly recruit junior secondary school graduates. In specialized secondary schools (German: *Fachoberschule)*, students should work in company during their first school year and afterwards study in the school. By contrast, Chinese schools are mainly institution-based with simulated work-based learning and/or with work experience placement in a company. Usually, the work experience placement is arranged in the last school year for a few months. Such a teaching model is similar with that in full-time vocational schools (German: *Berufsfachschule*).

Furthermore, the significance of full-time vocational school (German: *Berufsfachschule*) in German society also plays a role by selection. As shown in Figure 4.3, the four full-time VET schools have the largest student number just behind that in the *Berufsschule* or dual system.

Within the full-time vocational schools (German: *Berufsfachschule)*, various programs are provided. Each program has its own teaching plan in which the educational objective, curriculum, and other relevant information are different. In the state of NRW, all of these programs are categorized in two groups: *Berufsfachschule* (*Anlage* B) and *Berufsfachschule* (*Anlage* C). Students in *Berufsfachschule* (*Anlage* B) are equipped with the vocational knowledge, competence, and skills and leads to the qualification of lower secondary education (Stigulinszky, 2015). The educational objective in *Berufsfachschule* (*Anlage* C) is to qualify the students for the possibility of entering into the tertiary education, apart from imparting the vocational knowledge, competence, and skill (Stigulinszky, 2015).
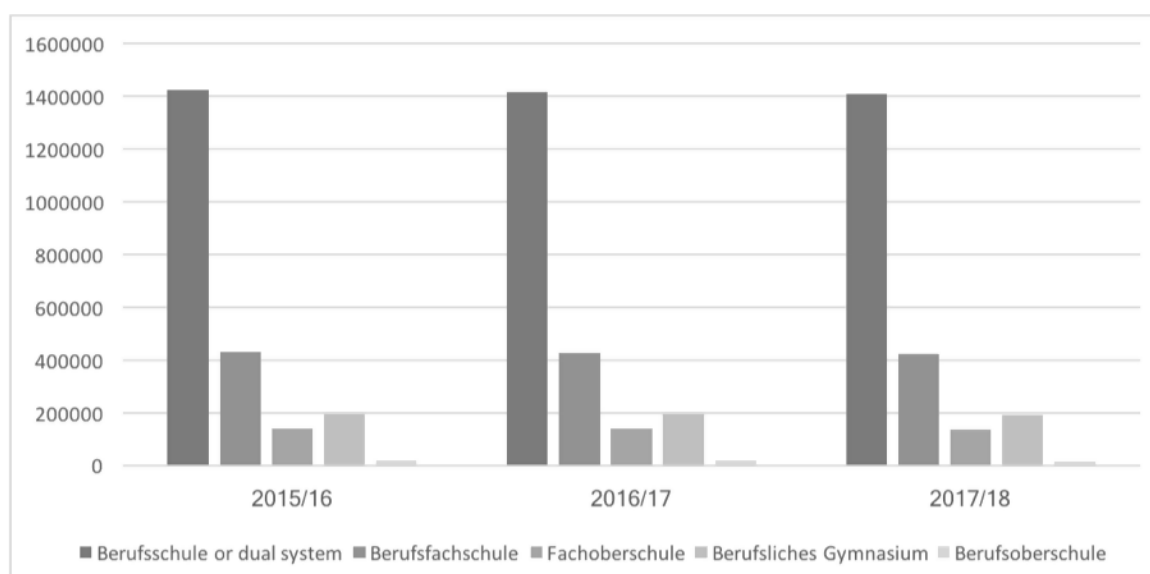
Figure 4.3. Student numbers in different German IVET programs**.**
Source: Author's own compilation based on the information from Statistisches Bundesamt (2018).

In China, the educational objective of the schools in upper-secondary level is to cultivate the personals in the labor market ("Vocational Education in China," 2008). However, graduates from these schools still have the opportunity to obtain entrance to the tertiary education, or higher VET schools. In one study from Xia and Cheng (2015), the graduation situations of students in IVET schools in one Chinese province, Hubei, were investigated. The results showed that between 2010 and 2012, nearly 34% of graduates entered into tertiary education, either into the university or higher VET schools, and the remaining 66% entered into the labor market. Afterwards, it was concluded that students graduating from upper secondary schools either entered the labor market or tertiary education, but with a special examination (Xia & Chen, 2015). From this respect, *Berufsfachschule* (*Anlage* C) has more common characteristics with those Chinse schools. As such, it was decided to select the observation samples from *Berufsfachschule* (*Anlage* C).

4.2.2.3 Comparison in the field of accounting.

Over the past few decades, cross-cultural comparison of teaching and learning in the discipline of mathematics and science has been widely carried out (Section 2.1). By contrast, such comparison in the field of VET, or in one vocational discipline or subject, is still at the

initial stage (Helm, 2016). Among the various disciplines in VET, accounting was selected as the field for comparison in this study. The main reason for this decision lies in that it was the only one common field that could be found in commercial education in the German and Chinese schools. But they have different meanings in these two systems.

4.2.2.3.1 Accounting as part of the course "Business Administration with Accounting" in German schools.

In Germany, "there are *Berufsschule* for business occupations, occupations involving foreign languages, trade and technical occupations, crafts industry occupations, home-economics-related and social-work-related occupations and so on" (Eckhardt, 2017, p. 140). In other words, every full-time vocational school has its own teaching focus. Accounting is taught in the schools for business occupations or commercial vocational schools (German: *kaufmännsiche Berufsfachschule*)[6].

In commercial vocational schools, the single major offered (German: *Fachbereich*) is business administration (German: *Wirtschaft und Verwaltung*). As for the curriculum is various from states and all the samples being observed are all from NRW. Then following, only the curriculum of the investigated major from NRW is presented (Table 4.2; QUA-LiS NRW, 2018). As shown, all the courses were categorized to general/cross-occupational and subject/occupation-specific areas. One learning arena that is related to accounting is Business Administration with Accounting (German*: Betriebswirtschaftslehre mit Rechnungswesen)*.

The teaching content of this course was organized based on the concept of learning arena (German: *Lernfeld*). It is a recent curriculum framework for VET schools that was enacted at the end of 20[th] century (KMK, 2018). With this concept, curriculum should be work-process related and competence-based instead of discipline-organized (Fischer &

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[6] It could also be named Commercial Vocational Schools.

Bauer, 2004). As presented in Table 4.3, there are seven learning arenas of the sample course (Ministeriums für Schule und Bildung des Landes Nordrhein-Westfalen, 2018). Apparently, accounting is not in the list and is instead integrated into each learning arena. This way, students acquire the ability and readiness to understand the economic reality from different perspectives (KMK, 2018). For example, in the learning area of purchase, students are required to determine the optimal order quantity in order to minimize the total delivery cost (KMK, 2018). In this process, accounting is necessary. Then, it could be said that accounting is one part of the course business administration with accounting.

Table 4.2

Curriculum Structure of the Sample Major in German VET Schools

	Business Administration with Accounting
	Economics (*German: Volkswirtschaftslehre*)
	Information Technology (*German: Informationswirtschaft*)
Subject- or occupation-specific area	Physic, Chemistry or Biology
	Mathematics
	English
	Second Foreign Language (French or Spanish)
	German/ Communication
General/cross-occupational area	Religion (Catholic or Protestant)
	Sport
	Politic

Note. Adapted from QUA-LiS NRW (2018).

Table 4.3

Learning Arenas in The Target Course

	Learning Arena
1	Strategies and Management of Company
2	Purchase
3	Goods and Services
4	Marketing
5	Employee
6	Investment and Financing
7	Value Stream

Note. Adapted from the teaching plan of the target course (Ministeriums für Schule und Bildung des Landes Nordrhein-Westfalen, 2018).

4.2.2.3.2 Accounting as a major in Chinese IVET schools.

In China, all IVET schools are comprehensive in which various majors are offered. All of these majors can be found in the major catalogue put forward in 2010 (MoE, 2010). They were categorized into nineteen major groups; accounting is one major of the major group of financial and commercial.

The curriculum of this major is not highly standardized like that in Germany. As summarized by Shi (2013), "there has been constant curriculum reform and the models have also constantly changed" (p. 19). Generally speaking, there are two approaches for curriculum reform (Zhang, 2008):

- Approach 1 (Top-Down-Reform-Initiatives): the government initiates the reform movement, by issuing a document as the guideline. The advantage of this approach lies in that the government provides a unified guideline. The shortcoming is that the different development stages between regions and schools are overlooked.

- Approach 2 (Down-Top-Reform-Initiatives): on the school level, curriculum is reformed. The disadvantage of this approach is obvious. Specifically, most of them

are formalistic, inefficient, and the teaching quality might be declined due to the reform.

In fact, these two approaches affect the school curriculum together. Since 2000 in the major of accounting, two curriculum reform movements at the government level have been initiated. One was in 2000 (MoE, 2000) and the other was in 2012 (MoE, 2012). The results of these movements were the newly-developed curriculum (Figure 4.4 and Figure 4.5). However, none of them has been applied in the three sample schools that were evolved into this study. Specifically speaking, the general curriculum structure in these schools is in accord with the official one, which includes public courses and professional courses. The difference, however, can be witnessed with the various professional courses provided. This might be due to that school-level reform is also very popular.

Then, for the purpose of selecting the proper sample course, focus was given to the curriculum on the school level instead of the government level. In Table 4.4, the professional courses in the three sample schools are listed. Taking the accessibility and importance of the courses into consideration, three courses – Basic Knowledge of Accounting, Calculation of Tax and Other Fees, Accounting of Financial Results - were selected as the sample courses.

Basic Knowledge of Accounting is a course that is provided in all these three schools, and the teaching contents in this course are almost the same which is concerned with the bookkeeping and compilation of accounting records. By contrast with the other courses, though the same course name is given, the teaching contents and the teaching mode are completely different. For example, in school CA, the course Calculation of Tax and Other Fees was carried out in the training room where every student was equipped with one computer. The teacher of this course indicated that the teaching objective was to help students become familiar with the whole process of tax declaration in a company. In School CB, however, the teaching contents was more about the theoretical knowledge of tax accounting.
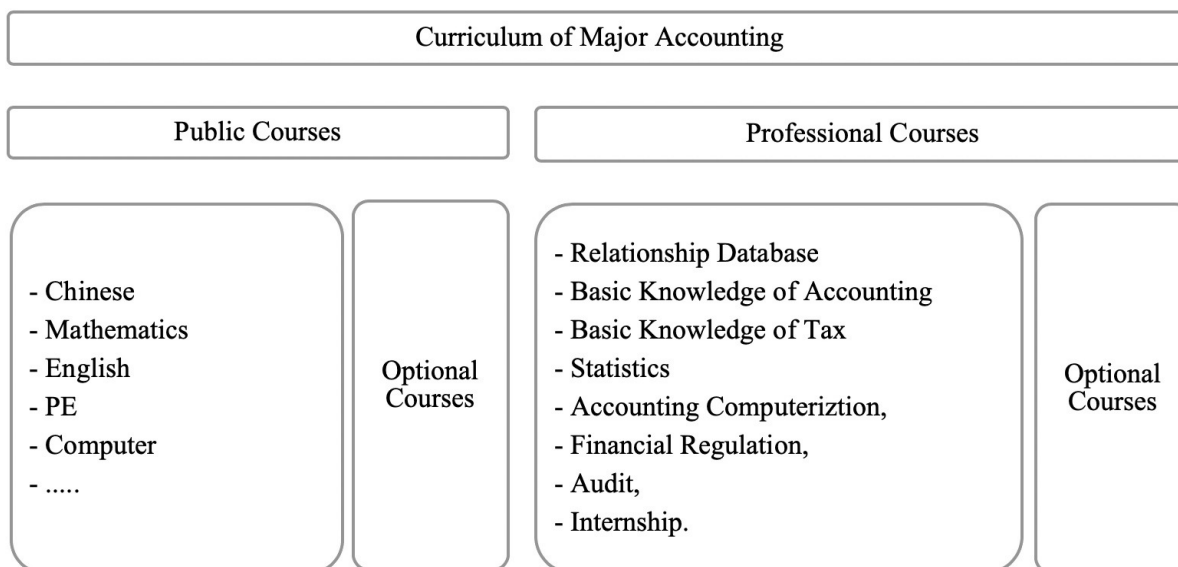
Figure 4.4. Curriculum of the major accounting in 2000.
Note. Adapted from the internal material provided by a Chinese teacher.
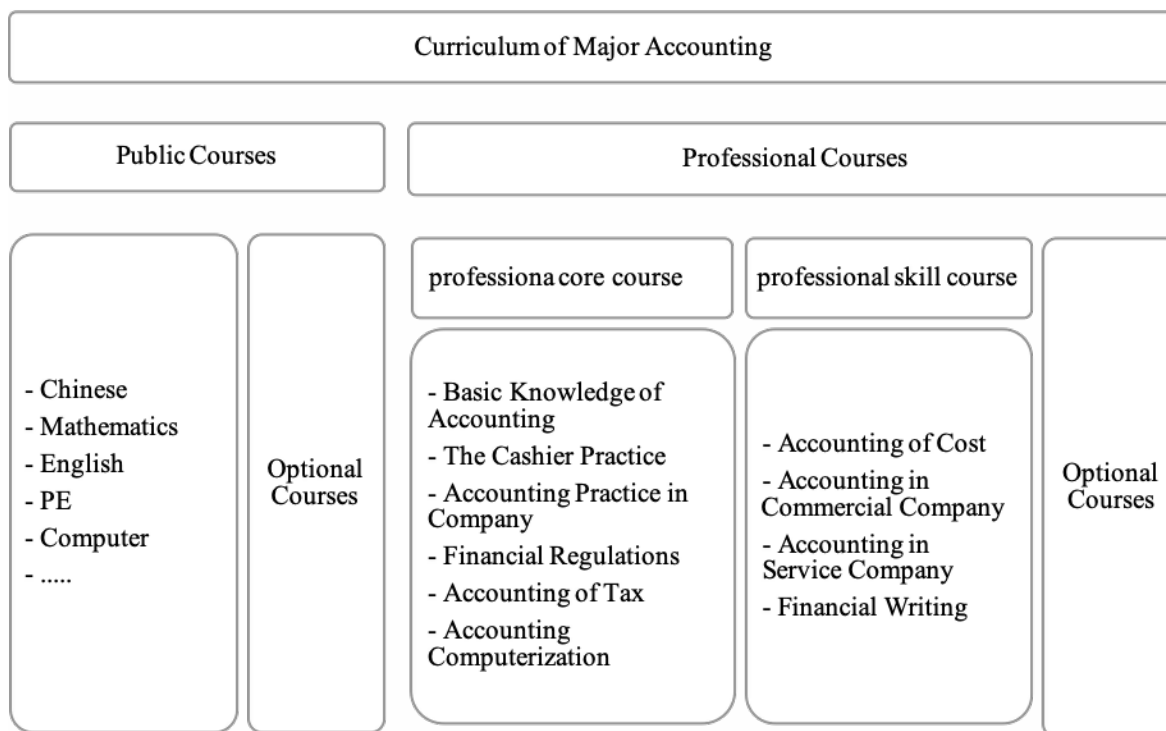
Figure 4.5. Curriculum of the major accounting in 2013.
Note. Adapted from the internal materials provided by a Chinese teacher.

Table 4.4

Professional Courses in the Chinese Schools

Sample Schools	Professional Courses
Sample School CA	**Basic Knowledge of Accounting** Financial Laws **Calculation of Tax and Other Fees** ***Accounting of the Financial Results*** Accounting of the Sales Computerization Comprehensive Skills Start-Up Business
Sample School CB	**Basic Knowledge of Accounting** **Accounting of Tax and Other Fees** Financial Laws Computerization Cost Accounting Accounting in Commercial Enterprises Manual Accounting Practice Enterprise Accounting
Sample School CC	**Basic Knowledge of Accounting** Computerization Financial Laws Strat-Up Business Professional Skills in Accounting

Note. Compiled by the author of this study based on the materials collected from the sample schools.

4.2.2.4 Overview of the selections.

In Table 4.5, all of the selections involved in this comparative study are presented. The first level shows selection of compared subject which is the teaching and learning in the classroom. Following, a comparison is made between Germany and China on the upper secondary VET level.

With respect to the selections on other aspects, it was not easy due to institutional differences. For example, in Germany, different German school types have different objectives and curriculums. Even within the same school type, curriculum vary between programs and are officially established. By contrast in China, the boundary between the

three school types has gradually vanished. An attempt to formulate a national curriculum is in its initial stages. On the school level, different curriculum are utilized. Having taken many factors into consideration, the German samples were selected in the course business administration with accounting (German: *Betriebswirtschaftslehre mit Rechnungswesen*) of the major business administration in the full-time vocational schools (German: *Berufsfachschule*). The Chinese samples were from three courses of the major accounting in two vocational high schools and one specialized secondary school: basic knowledge of accounting, accounting of tax and other fees, and accounting of financial results.

Table 4.5

A Series of Selections in this Comparative Study

Compared Subject	Classroom Teaching and Learning	
Compared Countries	Germany	China
Representative City	Cologne	Peking
Educational Level	Upper Secondary VET or Initial VET	
School Type	Full-Time Vocational Schools (German: *Berufsfachschule*)	Vocational High School Specialized Secondary School
Major	Business Administration (German: *Wirtschaft und Verwaltung*)	Accounting
Course	Business Administration with Accounting (German: *Betriebswirtschaftslehre mit Rechnungswesen*)	Basic Knowledge of Accounting Accounting of Tax and Other Fees Accounting of Financial Results

4.3 Research Design

In the two previous sections, the research type of this study was determined which is descriptive comparative study utilizing a quantified approach. For collecting quantified data, a systematic classroom observation was adopted (Section 4.1). In other words, systematic classroom observation was embedded into this comparative procedure.

In this section, a research design for this study is developed. For this purpose, the research steps of systematic classroom observation and comparative education that were put forward by others are presented and adjusted respectively. Then based on it, a research design that fits into the research purpose of this study was constructed.

4.3.1 Steps of systematic classroom observation.

For conducting a structured observation, a five-step model has been widely introduced (Hugener, Rakoczy, & Pauli, 2006; Seidel, 2010; Figure 4.6). It was believed to be constructed on the basis of the step-model for content analysis from Bos and Tarnai's (1999) study (Pauli, 2012). In this study, this model was adjusted. Specifically speaking, some steps were integrated into the research design. While some were not, based on the analysis of the characteristics of this study.

Generally speaking, a structured observation should begin with the focus on the research field. At the same time, a research question and a hypothesis are also formulated (Seidel, 2010). More specifically, for a structured classroom observation, it is necessary to determine the aspects to be observed on the basis of theoretical consideration. In other words, the observer should focus on certain aspects of a lesson instead of capturing the complex lesson in its entirety (Pauli, 2012). In the next step, a suitable observation instrument should be developed. It includes the consideration of selecting recording method, observation system, as well as training the observer (Seidel, 2010). Then, in order to guarantee the research quality (i.e., objectivity, reliability and validity) in an observation study, a pilot study should be conducted. The main task of this step is to ensure that all the observers use the instrument with the intended and same manner to insure the inter-observer reliability (Pauli, 2012). In the same step, the applicability of the observation instrument being developed should be checked. In the fourth step, structured observation is carried out in the real situation then the data being collected should be analyzed. Lastly, the result

should be further interpreted upon the basis of the theoretical consideration determined in the first step.

In this study, the former four steps in this model are the first four steps in the research design, as shown in Figure 4.8. Regarding the step of interpretation, it is not the subsequent step of observation and analysis. Instead, it is after the step of comparison. Since this is also a comparative study and in order to answer why with this arrangement, it is necessary to know how comparative approach is imbedded into this study (Section 4.3.2).
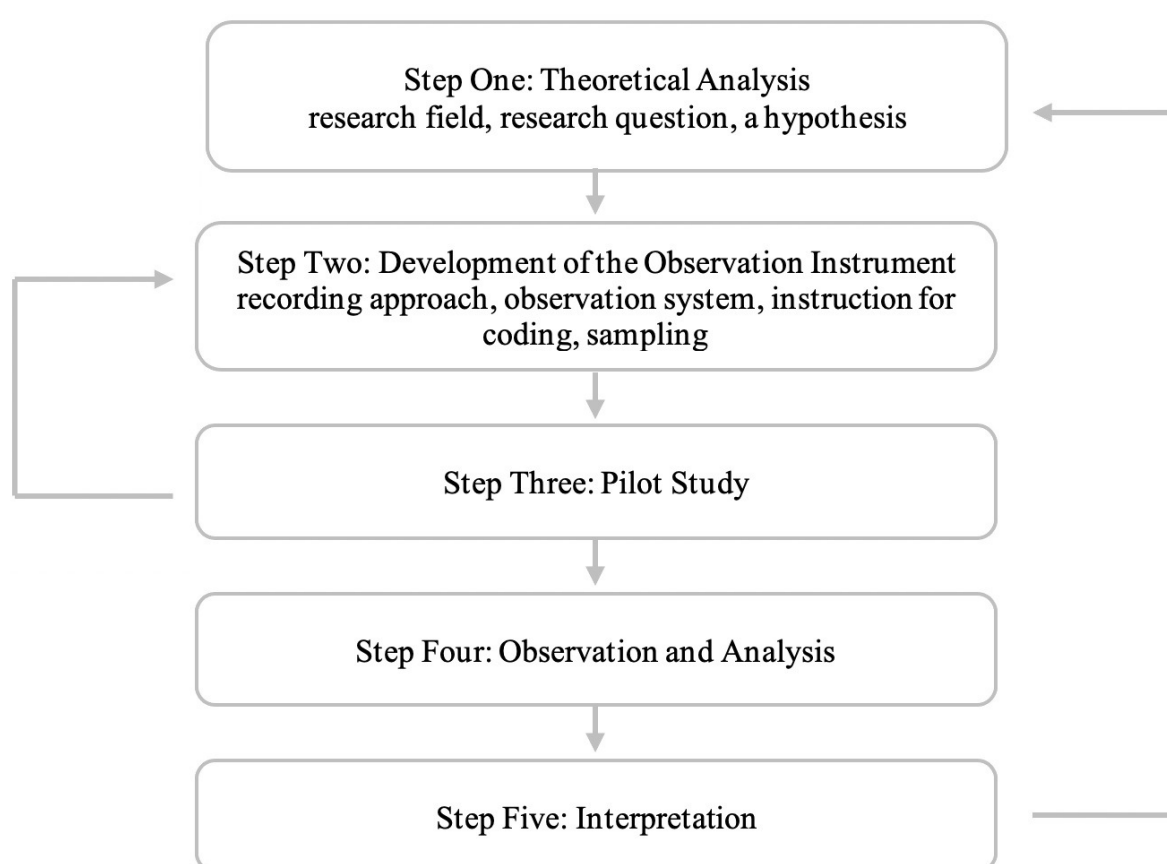
Figure 4.6. Steps of conducting a structured observation.
Note. Adapted and translated from Seidel (2010, p. 145).

4.3.2 Steps of comparative educational research.

In fact, some measures for comparative study have already been enacted (Bereday, 1964; Hilker, 1962; Phillips, 2006). Among them, the four-step model from Bereday (1964) and Hilker (1962) have been widely introduced and successfully adopted (e.g., Berger, 2015; Li, 2013).

The initial stage of this model is **description**. In this stage, the investigated object should be described carefully and completely (Hilker, 1962). In the second stage, the results from the former stage should be **interpreted** with the aim to explain and understand (Pilz, 2012). Afterwards, the real comparison begins at the **juxtaposition** step (Bereday, 1964). In this step, based on the defined criteria or *tertium comparationis*, the findings from the previous stage should be placed side to side. The final step of this model is **comparison**. It is the second level of comparison. In this step, the purpose is to search for general evaluation criteria and derive theory-oriented hypotheses from the previous findings (Hilker, 1962).

As Adick (2014) stated, this is an inductive model which starts from the collection and interpretation of phenomenon without theoretical consideration. Then a comparison is made on all the intuitive results and the theoretical consideration which may be reviewed in further studies is formulated.

However, this model is not completely suitable for this study, as it starts from the analysis of theory. Specifically speaking, the classroom teaching and learning is the compared subject. Its reflection dimensions (Section 3.3.2) and the categories to be observed as shown in Chapter Five are predefined based on existing theories. Then, from the observation, the statistical results from the compared countries are derived on which comparison is made. Lastly, interpretation is given after the step of comparison, by relating contextual differences to the comparison outcomes in order to get some clues for policy-borrowing. Based on the discussion above, the comparison steps in this study are drawn in Figure 4.7 below.
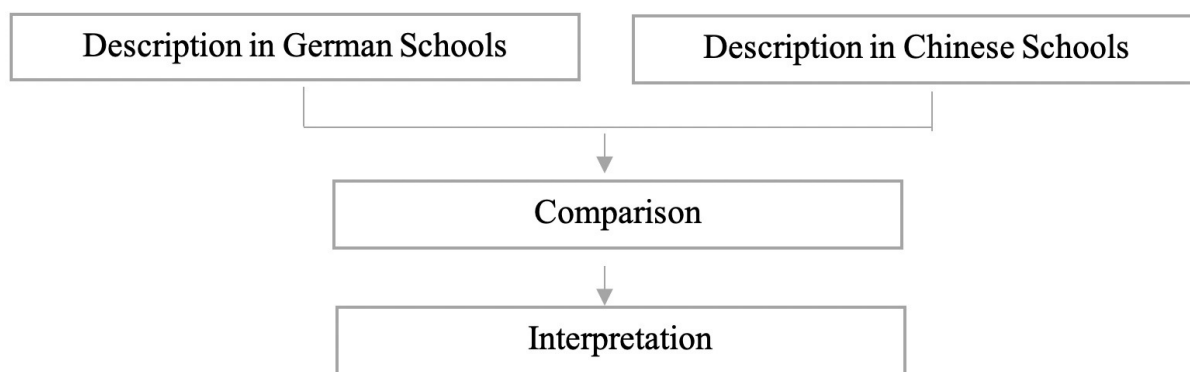
Figure 4.7. Comparison steps in this study.

4.3.3 Research design of this study.

Combining the discussion in the former two sections, the research design of this study is presented in Figure 4.8 below. Afterward, it is elaborated upon in detail.

The teaching and learning in the classroom was the focus of the investigation. It refers particularly to the activities that take place in the engaged time or time on task as explained in Chapter Three. Also, in Chapter Three, it was pointed out that the visible structure of a lesson – the utilization of teaching methods and instructional media - is the proper dimensions for reflecting teaching and learning. Then the two observational focuses were the adoption of teaching methods and instructional media.

Based on this analysis, an observational instrument was developed. This is further elaborated upon on in Chapter Five. Summarily speaking, the observation system of the instrument developed was the category system. Time sampling was selected as the recording method. In this study, the instrument developer and conductor were the same person, the author. Therefore, the problem of training the observer was not an issue.

In Seidel's (2010) model, a pilot study was carried out in the third step. The pilot study of this research was conducted in one German school together with other two observers. The prominent purpose was to insure the applicability of the instrument. Concerning the other purpose, which is to guarantee the inter-observer reliability, it was not a relevant concern in this pilot study because there was only one observer and coder.

In the fourth step, the instrument developed was applied in German and Chinese IVET schools. In both countries, 96 teaching hours were observed and recorded. Afterward, data collected were processed and analyzed with help of the instrument, which was Microsoft Excel. In a structured classroom observation, the statistical result is the time allocation to each indicator (Hilberg et al., 2004). In the end, descriptive statistics instead of inferential statistics should be presented. The functions of Microsoft Excel are data entering, data manipulation, and statistical analysis. By using Excel, the purpose for deriving descriptive statistics was easily achieved. Additionally, Microsoft Excel has the function of finding significant difference in tests, which is necessary for comparing statistical data in step five. Then, it was concluded that Microsoft Excel fulfilled all requirements.

In the last stage, the statistical data was compared and interpreted. As explained previously, the dimensions for explanation were abstracted from the relevant theories and then status of each factor were inferred from other relevant studies.

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┌─────────────────────────────────────────────────────────────────┐
│              Step One: Theoretical Analysis                     │
│         Observed Subject: Classroom Teaching and Learning       │
│   Observed Focuses: Adoption of Teaching Methods and Instructional Media │
└─────────────────────────────────────────────────────────────────┘
                              │
                              ▼
┌─────────────────────────────────────────────────────────────────┐
│      Step Two: Development of the Observation Instrument        │
│              Observation System: Category System               │
│               Recording Approach: Time Sampling                │
└─────────────────────────────────────────────────────────────────┘
                              │
                              ▼
┌─────────────────────────────────────────────────────────────────┐
│                    Step Three: Pilot Study                      │
│  Pilot study in German schools, together with other two observers, aiming to guarantee the │
│                  applicability of the instrument.              │
└─────────────────────────────────────────────────────────────────┘
              │                                    │
              ▼                                    ▼
┌──────────────────────────┐         ┌──────────────────────────┐
│ Step Four: Observation and│         │ Step Four: Observation and│
│        Description        │         │        Description        │
│ 96 teaching hours in German IVET │  │ 96 teaching hours in Chinese IVET │
│ schools                   │         │ schools                   │
└──────────────────────────┘         └──────────────────────────┘
              │                                    │
              ▼                                    ▼
              ┌──────────────────────────────────┐
              │       Step Five: Comparison       │
              └──────────────────────────────────┘
                              │
                              ▼
              ┌──────────────────────────────────┐
              │     Step Six: Interpretation      │
              └──────────────────────────────────┘
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Figure 4.8. Research design of this study.

Chapter Five: Construction of the Observational Instrument

In this study, systematic classroom observation, or structured observation with a category system, was chosen as the data collection method (Chapter Four). For conducting this observation study, a proper observation instrument is required. In this chapter, the prominent purpose is to develop such an instrument.

Category observation instrument is defined as "an organized, objective system for observing, coding, arranging, and analyzing the behaviors emitted by teachers and students engaged in instructional exchange" (Martin, 1977, p. 5). The two necessary components are: (1) a set of operationally defined categories of behaviors, and (2) a set of rules and priorities for observation and coding (Martin, 1977). In Section 5.1 and Section 5.2, these two aspects are addressed respectively. Afterwards, a standardized recording form, which is also a component of the observational instrument (Martin, 1977), was constructed for recording during the observation.

5.1 Development of the Category System

In Section 3.3.1, it was explained that a lesson in this study was regarded as being composed of a series of segments which might be categorized to three groups: teaching-and-learning segments, teaching-and-learning supportive segments, and teaching-and-learning non-related segments. Though the fundamental focus to be compared is what happens in the teaching-and-learning segments, it is still necessary to describe what happens within the other two segment groups. Presenting the overall picture of classroom life in German and Chinese schools is the second aim of this study, as elaborated upon in Section 1.1. Then, sub-category systems of these two groups were also developed. The other two sub-category systems were regarding teaching methods and instructional media. In Section 3.3.2, it was pointed out that their utilization is seen as the reflection of teaching and learning. In a word, the category system to be developed should be composed of four sub-systems (Figure 5.1).

Normally, a category system is composed of a series of behavioral categories, and all of the behaviors of interest could be grouped into one of these existing categories (Seidel, 2010). In other words, the categories should be disjunctive (Pauli, 2012). In this study, the lesson was seen as the interaction between the teacher and students. With this understanding, the activity, rather than the behavior, should be stressed. This was applied to the sub-category systems 1 and 2. Regarding sub-category system 3 and 4, it was the concrete tools utilized in the activities that were categorized.
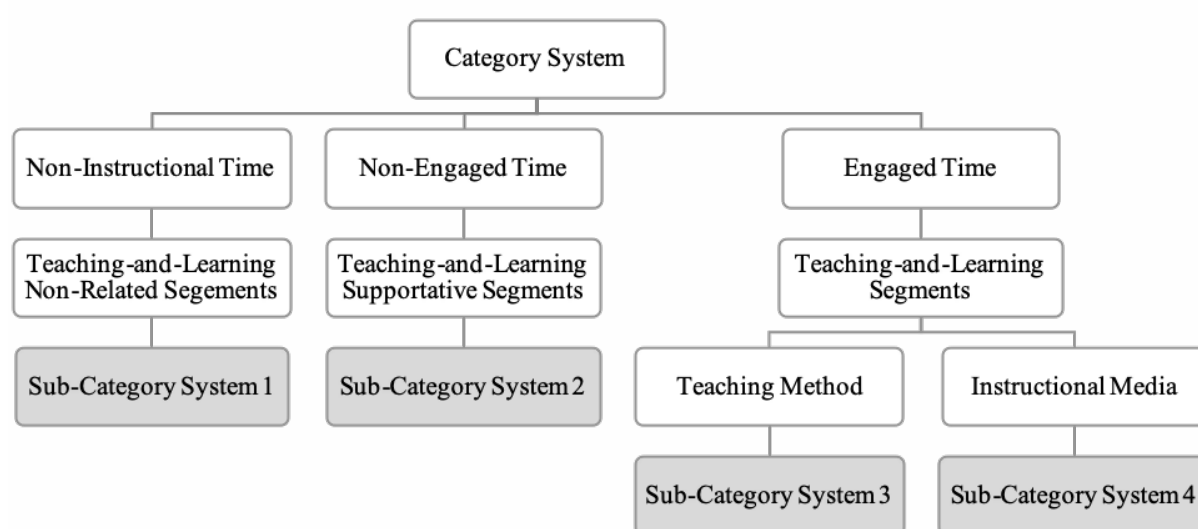
Figure 5.1. Structure of the category system to be developed.

With respect to the development of category system, two approaches are usually mentioned (Kromrey et al., 2016; Pauli, 2012):

- The first approach: A category system is developed by conducting unstructured observations. In an unstructured observation, researchers record the behaviors or events that are of interest and then categorize them into groups.

- The second approach: A category system is developed by analyzing relevant theories.

In this study, these two approaches, as shown in Figure 5.2 below, were used simultaneously. Categories of the four sub-systems were initially abstracted from the relevant theories and results from other studies. Afterwards, they were adjusted in accordance to the results from the pilot observation as well as the formal observation.
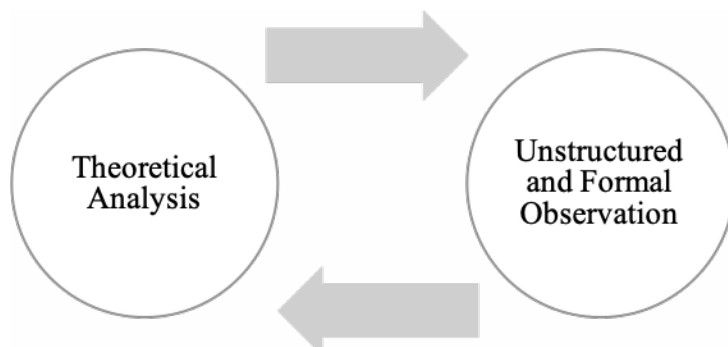
Figure 5.2. Procedure of developing the category system in this study.

5.1.1 Sub-Category System 1: Activities in non-instructional time.

Non-instructional time is equal to the allocated time minus instructional time (Kauchak & Eggen, 1998). In this study, this was understood as the time loss in a lesson (Section 3.3.1). The activities that probably take place are late-beginning of the lesson, early-end of the lesson, and outside interruption (Götzl et al., 2013). Apart from these three categories, two additional categories – discipline management and equipment problem – were recorded during the observation.

Late beginning of the lesson is usually caused by the teachers' late arrival to the classroom. In another situation in which all students were late coming to class was recorded in one Chinese school. Additionally, it is normal for a teacher to end the lesson earlier. It might be due to that the teaching task is finished earlier or one topic is finished, and the rest time was not sufficient for the next topic.

For the next category, outside interruption, the activity included is that person from the outside interrupts the teaching and learning process. For example, an individual enters the classroom to convey information or observers introduce themselves in a lesson. Another outside interruption would be the teacher answering a phone call.

An additional substantial consumer of time in a lesson is the teacher addressing discipline problem. Two activity groups within this category are the teacher stressing the importance of discipline or intervening in student misbehaviors.

The last category in this sub-system is equipment problems. During the observation, it was recorded that the teacher might spend time to adjust the teaching equipment, such as the classroom computer, when that equipment misfunctions. There are two concrete situations in this sub-category: (1) something is wrong with the equipment installed in the classroom; and/or (2) something is wrong with the equipment that is brought by the teacher (e.g., a dead computer battery or the software is not updated).

Category	Description and Examples	Code
Late Beginning of the Lesson	The lesson begins late due to the teacher's or students' late arrival.	A1
Early End of the Lesson	The lesson is ended early.	A2
Outside Interruption	A "third" person interrupts the teaching and learning process; teacher answers a phone call	A3
Discipline Management	Teacher stresses the importance of discipline; teacher collects students' mobile phone; teacher deals with the problem of studnet's leave.	A4
Equipment Problem	Something is wrong with the teaching equipment, such as computer is not charged and teacher spends time adjusting it.	A5

Figure 5.3. Sub-Category System 1: Activities in non-instructional time.

5.1.2 Sub-Category System 2: Activities in non-engaged time.

Non-engaged time is instructional time minus engaged time. As defined in Section 3.3.1, this part of time is used for teaching-and-learning supportive activities. Burns and Anderson (1987) classified these activities into four groups: procedural, direction, transition, and closing. In this study, this classification is adopted as the categories of the sub-system to be developed.

Procedural activities refer to those activities in which a teacher is tasked with administrative duties. During the time block for direction, a teacher may assign tasks and/or explain how to present the assignment. Between two segments of a lesson, a transition might take place. In the closing segments, various activities might take place which could be also categorized to other groups, such as the activity of assigning classwork could be categorized to the direction group. In order to avoid such a situation, the identification for closing activities is the time. In other words, when the activities took place at the end of a lesson then it was coded as the "closing" activity.

Category	Description and Examples	Code
Procedural	Talking something about examination; assigning homework during the teaching and learning process; checking homework; taking class attendance; explaining that day's teaching plan or of the following lessons.	A6
Direction	Assigning and explaining tasks in the teaching and learning process.	A7
Transition	Adjusting the equipment; distributing materials; preparing for group study.	A8
Closing	Reviewing the teaching contents in the very lesson; saying something of the teaching plan in the following lessons.	A9

(Left side label spanning all rows: Activities in Non-Instructional Time)

Figure 5.4. Sub-Category System 2: Activities in non-engaged time.

5.1.3 Sub-Category System 3: Teaching Method.

In Section 5.1.1 and Section 5.1.2 above, the category systems of the activities which might take place in non-instructional time and non-engaged time were developed. In the following two sections, the category systems of teaching methods and instructional media are constructed.

5.1.3.1 Teaching and learning activities.

Before the category system is presented, it is necessary to point out the type of activities which are the focus of this study: teaching and learning. Burns and Anderson

(1987) listed four possible purpose of those teaching and learning activities: development, review, practice, and enrichment. With the purpose of development, new knowledge or skills are introduced, while in the segment for review topics previously presented are reviewed. When the time is used for a student to practice the newly acquired knowledge or skill, then it is the activity for practice. In the enrichment activity, knowledge or skills are expanded through the use of games, films, or projects. Though it is the adoption of teaching methods and instructional media in all of the segments with these four purposes, each of them is given a code instead of one code (Figure 5.5). By doing so, it is expected to know whether difference exists when comparison is made on the adoption of one teaching method for different purposes.
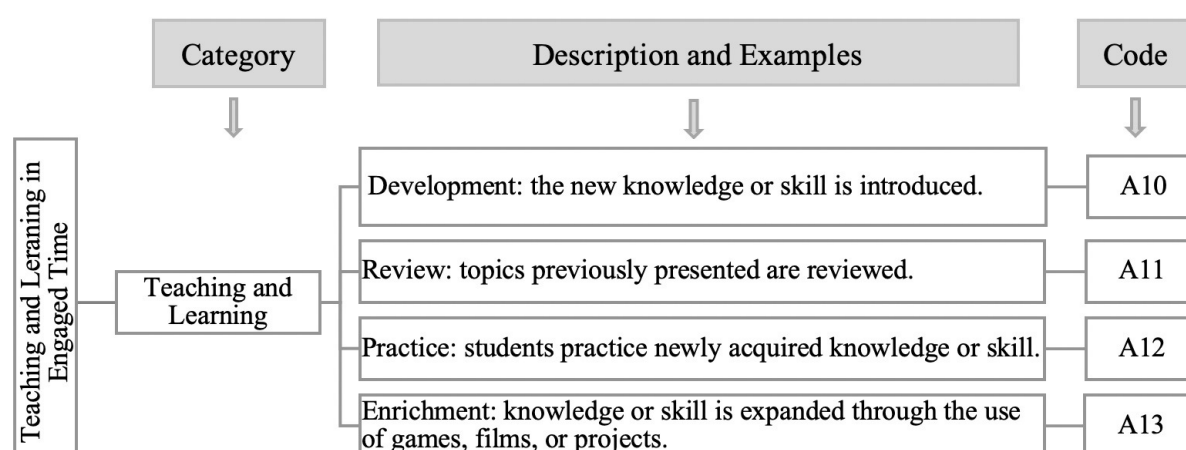
Figure 5.5. Teaching and learning in engaged time.

5.1.3.2 The definition of the teaching method in this study.

Another question that also needs to be answered before the category system of teaching method is developed is about how to define teaching method in this study. Essentially, the teaching method might be understood differently (e.g., Terhart, 2005). Here, the purpose is not to define it,; instead, it is more important to determine the reflection form of teaching method in the classroom. From this respect, Meyer (1987)'s classification of teaching method is more helpful.

Meyer (1987) analyzed teaching method on three levels – macro, meso and micro - in accordance to the decision fields that should be taken into consideration for teaching. On the macro level, items such as the method system, school organization, and others should be regarded. The concept of teaching and learning, such as project, and also self-regulated teaching belongs to this level. On the meso level, the concrete aspects of teaching method – social from, action from and so on - are included. Lastly, teachers' verbal and non-verbal behaviors are the micro aspect of teaching method.

Among these three levels, it is more practical and worthwhile to focus on the meso level. As stated previously, the teaching method on the meso level is related to the structure, form, and the environment in the classroom (Meyer, 1987). Unlike the macro level, all of the meso-level components are easily observed. This is particularly important in an observational study because comparative low-inference data might be received when the category to be recorded is easily identified. Regarding to the methods on the micro level, many valuable studies are available (e.g., Flanders, 1970). However, it is pointless to make a comparison at this level in a cross-cultural study as drawing the conclusion that the teacher praises students more often in one country than another. So, in this study, teaching method is understood as the aspects on the meso level, which are the concrete strategies for organizing teaching and learning.

5.1.3.3 The three organization structures as the sub-categories of teaching methods.

As described in Section 2.2.1, in many empirical studies from German-speaking countries, social form (German: *Sozialform*), which is one aspect of teaching method on the meso level, was adopted as the reflection of teaching methods (e.g., Götz et al., 2005; Hage, 1985; Jahn & Götzl, 2014; Seifried et al., 2006). Social form is a special German concept which was originally put forward by Schulz (1975). Meyer (1987) defined it as the relationship structure in the teaching and learning process. It has both the explicit characteristics of a seating arrangement and the implicit characteristics of a communication

and interaction structure (Meyer, 1987). The four forms are frontal teaching, group study, partner study, and individual study (Meyer, 1987). With frontal teaching, the teacher normally stands in front of his or her students and interprets the curriculum contents while the students sit still and listen to what their teacher says. With both partner study and group study, students are assigned to work with others as partner or group. Lastly, with individual study, students are independent from others and works as individuals.

To some extent, social form could be understood as the organizational structure in the classroom, when its explicit characteristic, seating arrangement, is emphasized. For example, the organizational structure of frontal teaching is a kind of whole class arrangement in which teacher stands in front of others while students sit facing the teacher. The organizational structure of both partner study and group study is group arrangement by which students are arranged to sit with others. The organizational structure of individual study is that students sit and work alone, which is also called *individual arrangement*. Additionally, organizational structure or seat arrangement is easily identified, and therefore was used as the first level of the category system for classifying teaching methods.

Table 5.1

Description of Three Organizational Structures

Organizational Structure	Description
The whole Class Arrangement	Teacher or a few students are the center of the whole class. All students participate together into the teaching-and-learning activity and could interact with each other.
Group Arrangement	Two or more than two students are arranged together and compose a (small) group. The communication takes place just in the group.
Individual Arrangement	Every student is independent from others to work on something individually.

Note. Adapted from Granström (1998, 2006).

It should be pointed out that frontal teaching is only one possible sub-structure of the whole-class arrangement (Gudjons, 2011). During the frontal teaching, the teacher speaks solely in an uninterrupted monologue. Apart from this situation there are other two possible situations, which are students only speaking and also teacher-student-dialogue (Mathes, 2013). In this study, a differentiation is made between them. In Figure 5.6, the classification structure of the teaching method is presented. In the following sections, all of these sub-categories are elaborated upon in detail. The concrete teaching strategies, such as lecture, demonstration, and so on are categorized to this structure. The purpose of doing so is to establish clear boundary between each structure type. In the following sections, each organization structure is elaborated in detail and the concrete teaching methods are categorized to them and be coded.
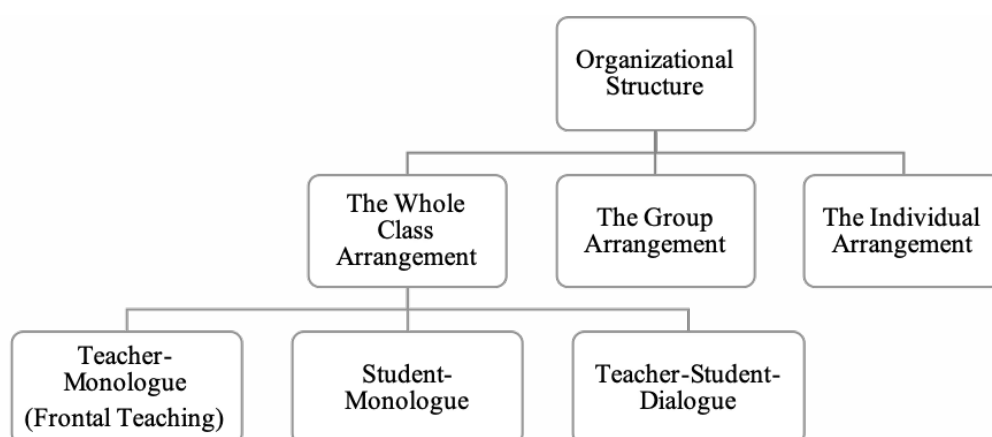
Figure 5.6. Organizational structure in the teaching and learning process.

5.1.3.4 The whole class arrangement.

As mentioned above, three sub-categories are added to the structure of the whole-class arrangement. They are teacher-monologue, student-monologue, and teacher-student-dialogue as shown above in Figure 5.6.

5.1.3.4.1 Teacher monologue.

Here, teacher monologue is adopted as a synonym of frontal teaching. The concert teaching strategies that are often mentioned are teacher-lecture and teacher-demonstration

(Dubs, 2009). Teacher-lecture is a strategy for delivering the information, with which teacher explains the teaching contents orally (Frölich, 2007). In the observation process, two different situations were recorded: teacher teaching by interpreting (**t**eacher-lecture) and teacher teaching by reading (teacher-recitation).

With teacher-demonstration, a teacher models procedures for students, such as showing them how to use a computer (Dubs, 2009). A complete process of teacher demonstration includes four steps: attracting students' attention, providing general information or an overview, teacher demonstrating, and students' practice. In this study, this process was not seen as an integral whole. Instead, teacher-demonstration only refers to the period in which the teacher makes a demonstration. The other steps were given other codes; for example, the last step where students practice individually was coded as individual study.

5.1.3.4.2 Student *m*onologue.

Student monologue describes the situation in which one or a few students are the information senders. The concrete strategies of a group being identified in the observation process is student-presentation. Though it is seldom discussed in the relevant literature, the meaning for using student presentation in the teaching and learning process should not be overlooked. It "furthers general education goals, promotes student engagement, and provides an opportunity for students to practice an art that will enhance their lives outside of the classroom" (Thurneck, 2011, p. 18).

When the following situations take place in the teaching and learning process, it is regarded as one kind of student presentation. All of these situations might be further grouped into informal presentation (student-recitation) and formal presentation (student-report).

- (informal student-presentation): Student reads part of the literature, including the text in a book or other materials;

- (formal student-presentation): Student reads the calculation result and explains how the result is received;

- (formal student-presentation): One or a few students stand in front of other students to present the discussion result. This situation typically takes place after group study or partner study.

5.1.3.4.3 Teacher-*student dialogue*.

In teaching and learning process, teacher-student dialogue can be used for four purposes: (1) Dialogue as instruction. Dialogue is adopted when the purpose is for scaffolding, or with the dialogue, the students are guided to construct new knowledge or skills along with their previous ones. (2) Dialogue as discovering. Dialogue is applied when the purpose is to answer a specific question or solve a particular problem. (3) Dialogue as conversation. Dialogue is adopted when the emphasis is to promote understanding among students, to identify a problem together, etc. (4) Dialogue as debate. Dialogue is used for clarifying different opinions (Dubs, 2009).

In the observation instrument to be developed, the term *question and answer* was adopted as the concrete strategy of teacher-student dialogue, because it was found that the fundamental interactive mode is that teacher or students insert a question and others answer the question.

In the process of informal and formal observation, it was perceived that questions are answered differently. The formal process of question and answer is that the teacher poses a question, and then students put their hands up and answer the question one by one (Question and Answer 1). There is a special situation that was widely found in Chinese schools where the process is that teacher poses a question and then students answer the question without raising their hands and answer the question together (Question and Answer 2). Then, in order to highlight this different aspect, two indicators were given to the category of teacher-and-student dialogue.

		Category	Description and Examples	Code
The Whole Class Arrangement	Monologue	Teacher Monologue		
		Lecture	Teacher teaches by intepretation. The students sit and listen to the teacher.	B1
		Recitation	Teacher teaches without intepretation, just by "copying" the contents in the books. Students sit and listen to the teacher.	B2
		Demonstration	Teacher shows how to do something.	B3
		Student Monologue		
		Student-Report	Students stand in front of others to report something, such as an presentation.	B4
		Student-Recitation	Students are asked to read something, such as the contents in book.	B5
	Dialogue	Teacher-Student Dialogue		
		Question and Answer 1	Teacher poses a question and students answer the question one by one.	B6
		Question and Answer 2	Teacher poses a question and students answer the question together.	B7

Figure 5.7. Category system of the whole class arrangement.

5.1.3.5 *The group arrangement*.

In a teaching and learning process when students are divided into groups or partners, the organizational structure in the classroom is the group arrangement. The concrete strategies used within this group arrangement are partner study and group study, which are usually regarded as the forms for cooperative learning (Dubs, 2009).

With respect to the concept of cooperative learning, it is "widely recognized as a pedagogical practice that promotes socialization and learning among students from kindergarten through to college level and across different subject areas" (Gillies, 2014, p. 125).

As defined by Gillies (2014), "cooperative learning involves student working together to achieve common goals or complete group tasks" (p. 125) Here, at least two aspects should be emphasized: working together and achieving common goals or completing group tasks. However, in reality, when students are grouped into partners or groups, cooperative learning does not always take place. For example, the situation of students divided into groups and asked to finish an application task in an accounting course. In this situation, what a student should do is to make calculations by themselves and then compare the results with others (Dubs, 2009). Obviously, a common goal for a group task does not exist and cooperation does not exist between the members. In the study, this situation was listed separately and was named Individual Learning 1 and is further discussed in Section 5.1.3.6 (Figure 5.8).

With respect to the discussion of partner study and group study, a large amount of literature can be found. When partner and group study are regarded as a type of teaching concept, then a few steps are involved for carrying it out. For example, the steps of discovering group study, which is one form of group study, are: (1) teacher explains the aim of group study; (2) teacher organizes the group study; (3) students are divided into groups; (4) the members of a group assign roles and make a plan for the task; (5) the members of the group work individually and during this period, they discuss tasks with others; (6) the

individual's results are presented along with other members of the same group; (7) the members of the group together prepare for the presentation; (8) each group as a unit makes a presentation (Dubs, 2009).

In this study, *group study* or *partner study* do not refer to this entire process; instead, in the examples above, only Steps 4 to 7 were coded as group study. Specifically speaking, group study and partner study that were recorded in this study are one component of the whole process when they are regarded as a singular concept.

5.1.3.6 The individual arrangement.

When students are seated alone and cooperative communication does not exist, then it is called individual arrangement. Normally within this organizational structure, individualistic learning takes place. It is characterized by when a student is independent of others and working toward a set criterion where their success depends on their own performance (Johnson & Johnson, 2002). It is usually regarded as one comparison counterpart of the cooperative learning, and the results showed that cooperative learning is beneficial for students' learning (e.g., Peklaj & Vodopivec, 1999). In this study, it was not the purpose to compare individualistic learning with others; instead, how often this method is used in reality was of interest. Then, it is necessary to define individualistic learning in this study.

The criterion for identifying the individualistic learning is that students are independent of others. The two situations being recorded are: (1) one is with the group arrangements that was mentioned in Section 5.1.3.2, and (2) the individual arrangement. Individual learning is usually used for students studying new knowledge by themselves, or to just practice on their own.

Category	Description and Examples	Code
Partner Study	Two students sit together and work on a specific task	B8
Group Study	Groups in a class work on the same topic.	B9
Individual Learning 1	Students sit together, but work as an individaul.	B10
Individual Learning 2	Students sit alone and work individually.	B11
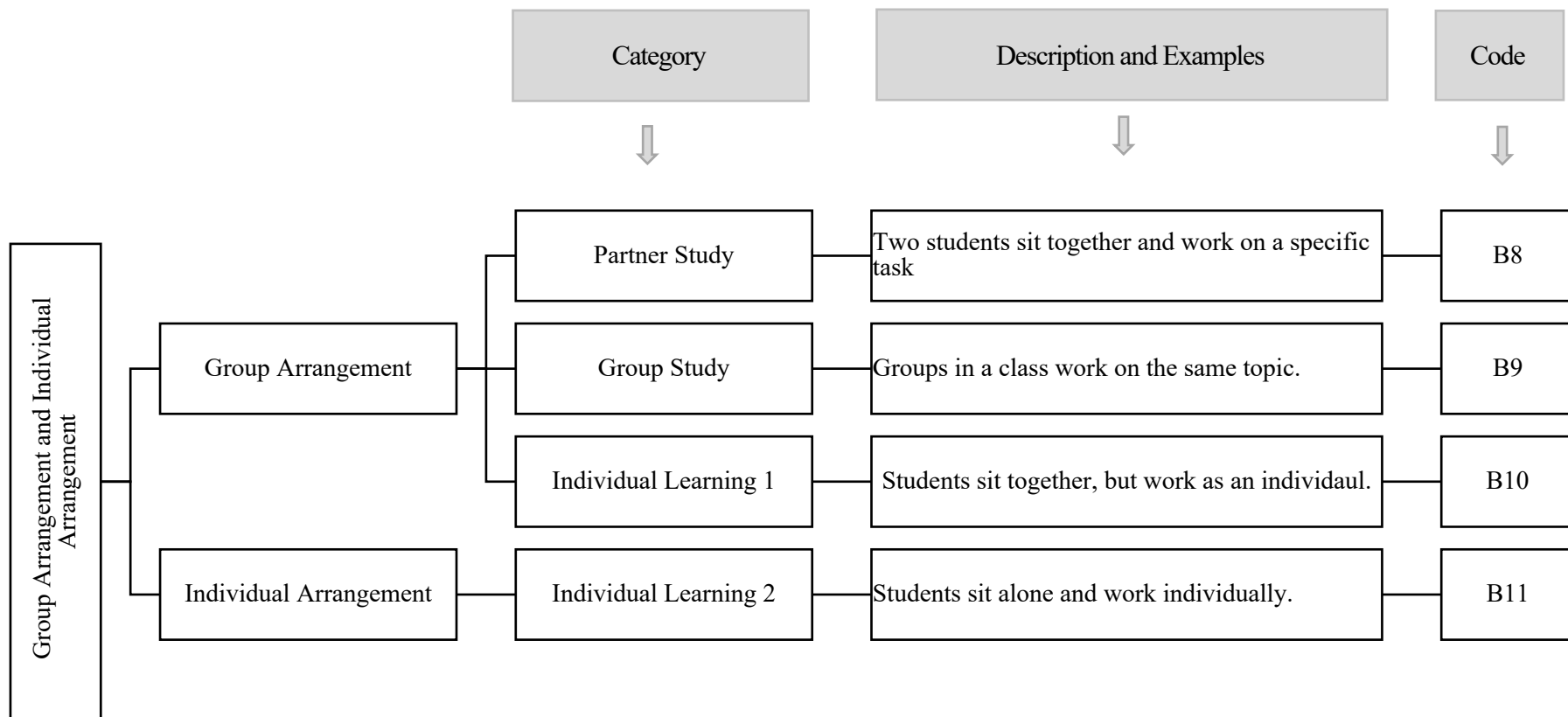
Figure 5.8. Categories of the group arrangement and the individual arrangement.

5.1.4 Sub-Category System 4: Instructional media.

The word *media*, which is the plural of *medium*, "comes from Latin, meaning in the middle and also that which intermediates or interprets" (Bates, 2015, p. 236). Reiser and Gagne (1983) defined the term *instructional media* as "the physical means via which instruction is presented to learners" (p. 5). With such an understanding, the physical means of instructional delivery, for example, teacher, textbook or computer, and so on, should be regarded as a kind of instructional medium (Reiser, 2001). Among them, teacher as a medium is intrinsic mediation and all others medium are extrinsic mediation (Molwantwa, 1997). In reality, intrinsic and extrinsic mediation are always applied together. For example, teacher explains teaching contents by using a computer.

In this study, the extrinsic mediation was given more emphasis. More specifically, instructional media refers particularly to **extrinsic media**. When the situation that teacher speaks only and no other medium was adopted, it was regarded as no medium being used and this situation was coded as C0 (Figure 5.9).

5.1.4.1 Traditional media and modern (digital) media as the sub-categories of instructional media.

With respect to the classification of instructional media, there are different criterion to group them. They might be differentiated between visual, audio, and audio-visual media and also into the print media, non-print media, and electronic media. Another classification is projected and non-projected media. Here, the main task of this study is not to discuss which classification is better than others. Instead, a structure should be determined in which all instructional media being used are easily categorized to one area of this structure and make sure that the indicators to be recorded are non-adjacent. Another consideration for constructing such a configuration concerns the question of how to make the statistical result more meaningful. Then the discussion regarding the adoption of media in relevant literature was taken into consideration.

When reviewing the relevant studies, it was found that digital media was more often mentioned as elaborated on in Section 2.2.1.2. This phenomenon might be attributed to the reality that now we are living in a digital age and media competence is required (Bates, 2015). In the field of vocational education, it was believed that equipping students with media competence by using the digital media in schools is particularly important. Influenced by the concept of Industry 4.0 and Economy 4.0, digitization has taken place in many industrial and economic sectors, and these new digital business and sales models challenge the craft and service industries (Schmid, Goertz, & Behrens, 2016). In order to keep up with this trend, digital media should be imbedded in the teaching and learning process (Padur & Zinke, 2015).

Keeping this in mind, traditional media and modern (digital) media were selected as the sub-categories of instructional media. Apart from the intention to present the overall situation regarding how instructional media are used in classroom, it is also meaningful to know how modern media are used and then make comparison on this aspect.

5.1.4.2 Modern (digital) media.

Eder (2009) defined digital media as the generic term for computer (e.g., laptop, desktop), internet, peripheral devices (e.g., scanner, digital camera), software, DVD, CD-ROM, and so on. With digital media, it is the digital data that are transmitted and presented. Normally in this process, both hardware and software are needed for a successful transmission. *Hardware* refers to the computer or other mobile terminals on which the software is processed. There are many combinations of hardware and software and it is not possible to list them fully; instead, the hardware and software that were observed are listed respectively in Figure 5.9. During the observation process, the code being noted was composed of two parts: hardware and software.

Computer, beamer, tablet, mobile phone, and calculator are five digital devices that were recorded in the observation. Here, it should be pointed out that in the step of data

analysis, a calculator is regarded as a type of traditional media as the target course was accounting in which calculator is basic equipment. Therefore, the use of a calculator should not be seen as being influenced by the digital age. The software used was Microsoft (Office; PowerPoint), simulation software, apps, and the Internet.

5.1.4.3 Traditional media.

As shown in Figure 5.9, printed and non-printed media are two traditional media categories. Printed media are "textual and other materials that can be run off in large numbers on a duplicator or printing machine for use by students" (Ellington, 1987, p. 7). In German and Chinese schools, textbooks, workbooks, and worksheets are in this category.

- Textbooks: The teaching content is structurally printed out as a book.

- Workbooks: It has the same function as the worksheet in which all exercises are listed.

- Worksheets: It includes assignment sheets, handouts, as well as some other information-providing materials (Ellington, 1987).

The non-printed media category has been divided into non-projected display materials and still projected display materials (Ellington, 1987). Those visual display materials "that can be shown to a class, small group or individual student without using an optical or electronic projector of any sort" are non-projector media (Ellington, 1987, p. 4). During the observation process, the three non-project media used were a chalkboard, a whiteboard, and a model, as described by Ellington (1987):

- A chalkboard is a dark-colored surface on which something is written with chalk (p. 5).

- A whiteboard is a light-colored surface on which something is displayed with felt pens, crayons, or other non-permanent markers (p. 5).

- A model is "useful in cases where three-dimensional representation is necessary" (p. 6).

When an optical projector is required in order to "show the contents to a class or group or enable them to be studied by an individual learner", then it is the still-projected display (Ellington, 1987, p. 6). During the observation, only one of this group was recorded, which was overhead projector with transparencies and similar materials. With it, the textual or graphical images were put on large acetate sheets and then presented to the class with the help of an overhead projector.

Category				Code
			No Media	C0
		Printed Media	Textbook	C1
			Workbook	C2
			Worksheet	C3
	Traditional Media	Non-Printed Media	Chalkboard	C4
			Whiteboard	C5
			Model	C6
Instructional Media			Overhead Projector with Transparencies	C7
		Hardware	Computer	C8
			Tablet	C9
			Mobile Phone	C10
			Calculator	C11
			Computer and Projector	C12
	Digital Media	Software	Microsoft	D1
			Learning Software	D2
			Internet	D3
			App	D4
			Simulation Software	D5

Figure 5.9. Sub-Category 4: Instructional media.

5.2 Time Sampling as the Recording Method

In Section 5.1, four sub-category systems were developed. In this section, the question concerning how to record during the observation process is answered.

In a structured observation, two recording approaches are usually adopted, which are time sampling and event sampling (Seidel, 2010). With time sampling, a certain time interval is pre-determined, and the observer writes down the code of a behavior or event as it takes place in every interval. In event sampling, when one behavior or event takes place, the time of beginning and ending is recorded.

In this study, the adoption of teaching methods and media in the teaching and learning process was recorded and the purpose of each segment was written down. Generally speaking, information from three dimensions – segment purpose, teaching method and instructional media - was collected. In each dimension, indicators were discrete and continuous, and it was expected that the time percentage for each indicator was to be calculated as the foundation for comparison. For such a purpose, event sampling, or continuous duration recording (CDE), is the appropriate sampling method.

However, it is impractical to use event sampling in this study. When event sampling is used to record discrete and continuous activities, it should be guaranteed that the observer is not distracted by other activities (Wood, Hojnoski, Laracy, & Olson, 2015). As described, the observer of this study needed to pay attention to the information from three aspects at the same time: the segment purpose, the teaching methods, and the instructional media adopted in the teaching and learning process. In recording process, the observer would definitely be distracted not only by the environment factors but also by the information of the other two dimensions to be recorded. Hence, event sampling was not suitable for this study.

With the same research purpose in mind, the time sampling approach can be used to make an estimation of the occurrence and nonoccurrence of the behavior or event instead of

the actual measure (Wood et al., 2015). For minimizing the deviation, the proper recording method was determined.

The three concrete recording methods of time sampling are momentary time sampling (MTS), whole-interval recording (WI), and partial interval recording (PIR; Wood et al., 2015):

- Momentary time sampling (MTS): Observer only notes events "at a designated moment in time, typically the first of last second of an interval, and records the behavior or event at that moment" (Wood et al., 2015, p. 212).

- Whole-interval recording (WI): Observer records "whether the target event or behavior occurs or do not occur for the entire interval" (Wood et al., 2015, p. 212).

- Partial interval recording (PIR): The target event behavior or event occurs at any time during the interval, and then observer makes a record of it (Wood et al., 2015).

Comparing the results derived from the different recording methods, it was proven that the error margin of MTS was comparatively small, especially when the aim is to calculate the time percentage of behavior or event (Gardenier, MacDonald, & Green, 2004; Radley, O'Handley, & Labrot, 2015; Saudargas & Zanolli, 1990). In this study, MTS was selected as the recording method.

Another issue that should be also addressed is to determine the time interval. Scholars have compared results from different time intervals, and the results show that when the interval length is 30 seconds or less, the result is more accurate (Brulle & Repp, 1984; Kearns, Edwards, & Tingstrom, 1990). However, it is impractical to adopt 30 seconds or less as the interval length in this observation study due to the fact that it requires a large amount of work to analyze nearly 200 teaching hours in total. In addition, the discussion in the studies cited above is based on the assumption that MTS is used for studying behaviors that might last for a shorter time than those events observed in this study. Therefore, in this respect, it is reasonable to increase the interval; but, when the interval length increases, the

measurement error increases at the same time (Powell, Martindale, & Kulp, 1975). Taking these two aspects into consideration, in the end, 60 seconds was determined as the proper interval length for recording.

5.3 Construction of a Standardized Observation Table

In the section, a standardized observation table is presented that was to be used for recording in the classroom based on the discussion in the previous two sections.

As presented in Table 5.2, the observational table is composed of four parts. In the **first part**, basic information related to the research subject should be recorded, such as the school name, date of observation etc. The **second part** is recording field. In Section 5.2, time sampling was determined as the correct recording approach and the momentary time sampling as the recording method. Sixty seconds was selected as the proper time interval for recording. Normally, every teaching hour is 45 minutes; therefore, the observer made a record at least 45 times in a teaching hour. In the case that the teacher ended the teaching hour late, some blank boxes were added. In the **third section**, the category of teaching methods and instructional media as well as its corresponding code are listed. In the **fourth section**, each segment purpose was given a short explanation or given examples by listing the possible activities in the classroom.

Table 5.2

Standardized Observation Table

Basic Information

School:	Teacher:	Student Nr.:	Teaching Topic:
Date:	Description of Teacher:	Description of Students:	Description of the Teaching Environment:

Recording

Indicators/ Time	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
Activity																																																
Teaching Method																																																
Instructional Media																																																

List of Indicators and Codes

Non-Instructional Time	Late Beginning	A1	Non-Engaged Time	Procedural	A6	Engaged Time	Development	A10
	Early End	A2		Direction	A7		Review	A11
	Outside Interruption	A3		Transition	A8		Practice	A12
	Discipline Management	A4		Closing	A9		Enrichment	A13
	Equipment Problem	A5						

Engaged Time		Teaching Methods			Instructional Media		
	Whole class structure	Teacher Monologue	Lecture	B1	No Media		C0
			Recitation (t)	B2	Traditional Media	Textbook	C1
			Demonstration	B3			
		Student Monologue	Recitation (s)	B4		Workbook	C2
			Report	B5		Worksheet	C3
		Teacher-Student Dialogue	Question and Answer 1	B6		Chalkboard	C4
			Question and Answer 2	B7		Whiteboard	C5
						Models	C6
	Group Arrangement	Individual Learning 1		B8		Overhead projector with transparencies	C7
		Partner Work		B9	Modern Media	Mobile phone	C8
						Computer	C9
		Group Work		B10		Computer Projector (beamer)	C10
						Tablet	C11
	Individual Arrangement	Individual Learning 2		B11		Calculator	C12
						Learning Program	D1
						Microsoft	D2
						App	D3
						Internet	D4
						Simulation Software	D5

Explanation and Examples of Each Segment Purpose

Late Beginning	Lesson begins late, due to teachers' late coming or all students' late coming.
Early End	Lesson is ended earlier.
Outside Interruption	A "third" person interrupt the teaching and learning process; Or teacher answers a phone call.
Discipline Management	Teacher stresses the importance of discipline; teacher collects students' mobile phone; teacher deals with the problem of student's leave.
Equipment Problem	Something is wrong with the equipment for teaching, such as computer is out of charge, and teacher spends time for adjusting it.
Procedural	Teacher is tasked with administrative duties, such as talking something about examination; assigning homework during the teaching and learning process; checking homework; checking class attendance; explaining the teaching plan of the very day or of the following lessons.
Direction	Assigning and explaining task in the teaching and learning process.
Transition	The time block between the other two segments. During the block for transition, teacher might adjust the equipment, distribute materials, or prepare for group study.
Closing	Reviewing the teaching contents in the very lesson; saying something of the teaching plan in the following lessons.
Development	New knowledge or skill is introduced.
Review	Topics previously presented are reviewed.
Practice	Students practice on the newly acquired knowledge of skill.
Enrichment	Knowledge or skill is expanded through the use of games, films or projects.

Chapter Six: Classroom Life in German Schools

This chapter is composed of three sections. In Section 6.1, the relevant information to the samples being observed is described, such as the classroom environment, teachers' characteristics, and so forth. In Section 6.2, the results derived from the observation are presented and classroom life in German schools is depicted. This is also the second aim that was elaborated in Chapter One as shown in Figure 1.1. Afterwards, in Section 6.3, as an interim conclusion, the teaching methods and instructional media that are more welcomed in German schools is clearly pointed out. At the same time, a comparison is made between the results from this study and others. One purpose for doing so is to guarantee the validity of this study's results. Fundamentally, the validity of the observation instrument being developed might be partly proved, which is the first aim of this study (Figure 1.1).

6.1 Description of the Observation Samples

In Germany, 96 teaching hours were observed with every teaching hour comprising 45 minutes. The nominal allocated lesson time was 4,320 minutes, which is equal to the real allocated lesson time. Among the observed samples, 45 lessons were double-teaching-hours, and the remaining six lessons were single-teaching hours.

All of these samples are from the course Business Administration with Accounting (German: *Betriebswirtschaftslehre mit Rechnungswesen*) in the business administration major (German: *Wirtschaft und Verwaltung)* in full-time vocational schools (German: *Berufsfachschule*) as detailed in Section 4.2.2.

The 96 lessons were observed in seven classes from three schools which are located in the different districts of Cologne – the representative city of Germany (Section 4.2.2). The information of the classes is presented in Table 6.1. Three classes were iPad classes in which every student was required to bring an iPad to the class. The average student number of these classes was 22. Regarding the classroom infrastructure, not much difference was identified between the classes. The basic infrastructure in every classroom was a computer for teacher,

a beamer, and a blackboard or whiteboard. A transparency projector was in two classrooms.
Computers for students' use were only in one classroom in which the iPad class (Class GA-3)
had lessons.

In the observation process, six teachers – four females and two males – were
involved. As shown in Table 6.2, they had the same educational level which is a master's
degree. Some were experienced teachers who had been teaching for more than ten years,
while some had been teachers for less than ten years.

Table 6.1

Description of Students and Classrooms in German Sample Schools

Sample School	Sample Class	Teaching Hours to be Observed	Number of Students	Average Students Number	Classroom Infrastructure
School GA	Class GA-1	16	20		Computer for teacher; beamer; transparencies projector; whiteboard.
	Class GA-2	6	26		Computer for teacher; beamer; transparencies projector; whiteboard.
	Class GA-3 *iPad Class*	11	21		Computer for teacher and four computers for students; beamer; whiteboard.
School GB	Class GB-1	17	19	22	Computer for teacher, beamer, whiteboard
	Class GB-2	16	21		Computer for teacher, beamer, chalkboard
School GC	Class GC-1 *iPad Class*	14	26		Computer for teacher, beamer, chalkboard
	Class GC-2 *iPad Class*	16	24		Computer for teacher, beamer, chalkboard

Table 6.2

Description of German Sample Teachers

Sample School	Sample Teacher	Gender	Educational Level	Teaching Experience (in Years)
School GA	Teacher GA-1	Female	Master	5
School GA	Teacher GA-2	Female	Master	21
School GB	Teacher GB-1	Male	Master	12
School GB	Teacher GB-2	Female	Master	21
School GC	Teacher GC-1	Male	Master	8
School GC	Teacher GC-2	Female	Master	15

6.2 A Description of the Observational Results from German Schools

Figure 6.1 below presents an overview of how the allocated lesson time was divided among the three time-types in German schools. As shown, three-fourths is labeled as engaged time, while the remaining one-fourth was used for the other time (i.e., 13% for non-instructional time; 12% for non-engaged time). On average in one teaching hour, the engaged time length was 34 minutes, non-engaged time was five minutes, and non-instructional time was six minutes (Table 6.3).

Table 6.3

Time Allocation in German Schools (Minutes [min.]/Teaching Hour)

	Allocated Time	Non-Instructional Time	Non-Engaged Time	Engaged Time
Average (min.)	45	6	5.2	33.8
Standard Deviation (min.)	0	4.2	4.8	6.1
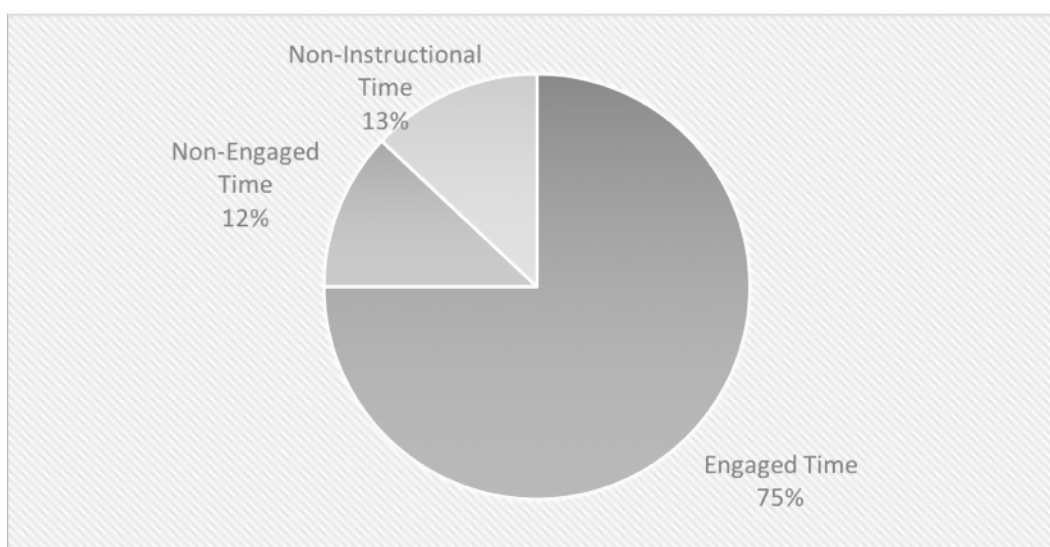
Figure 6.1. Time allocation in German schools (Percentage [%] of the allocated lesson time).

6.2.1 Activities in non-instructional time.

As presented in Figure 6.2, one obvious characteristic of time allocation to the five indicators of the group non-instructional time lie in that no time was given for equipment problems. In other words, the total non-instructional time was mainly divided between the other four indicators.

The largest amount of non-instructional time was allocated to the indicator of late beginning of the lesson that was caused by the teacher's late arrival. In 40 of the 45 double-teaching-hour lessons and all the other six single-teaching-hour lessons, a late start was recorded; the rate of late starts in German schools was more than 90%[7]. The indicator of early end of the lesson accounted for a similar amount of non-instructional time. This phenomenon was recorded in 19 double-teaching-hour lessons and two single-teaching hour lessons.

Apart from the two indicators mentioned above, outside interruption was another significant consumer of non-instructional time. It occupies 28% of the pie chart as shown in Figure 6.2 and, on average, it took up 1.7 minutes of every teaching hour (Table 6.4). During

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[7] Late rate= (46/51)*100%

the observation, four outside interruption activities were identified (Table 6.5). Comparing their appearance frequency, the activity GO2 took place more often than the other activities.

Figure 6.2. Teaching and learning non-related activities in German schools (Percentage [%] of non-instructional time).

Table 6.4

Teaching and Learning Non-Related Activities in German Schools (Minutes [min.]/Teaching Hour)

	Non-Instructional Time	Late Beginning of the Lesson	Outside Interruption	Discipline Management	Equipment Problem	Early End of the Lesson
Average (min.)	6	2	1.7	0.5	0	1.8
Standard Deviation (min.)	4.2	2.4	3.8	3.4	0	3

Table 6.5

Outside Interruption in German Schools

No.	Description of the Activities	Frequency
GO1	Somebody comes into classroom and interrupts the teaching process.	●
GO2	Teacher and students talk about something that was not related to the teaching contents (e.g., joking).	●●●●
GO3	A third person, such as observer or others who is sit in on lesson, introduces himself or herself.	●●
GO4	Students have five minutes break during teaching process.	●

In German schools, time for discipline management accounted for 8% of the total non-instructional time, and four misbehavior types were recorded in German schools (Table 6.6). Among them, students whispering with others, talking out of turn, playing on their mobile phones or iPads and then teacher interfering these activities (GD2) took place comparatively more often.

Table 6.6

Discipline Management in German Schools

No.	Description of the Activities	Frequency
GD1	Teacher asks students to be quiet before the lesson starts.	●
GD2	Teacher asks students to be quiet or to behave themselves during the teaching process when students whisper with others, talk out of turn, or play on their mobile phones and iPads.	●●●
GD3	Teacher writes down information and student gets of his/her seat and wants to go to the toilet.	●
GD4	Teacher stresses that students should be not late for the lesson when someone is late for the lesson.	●

6.2.2 Activities in non-engaged time.

As shown in Figure 6.1, in German schools, total non-engaged time accounted for 12% of the allocated time, and it occurred five minutes on average (Table 6.3). Figure 6.3 and Table 6.7 present how this time block was used for those teaching and learning supportive activities.
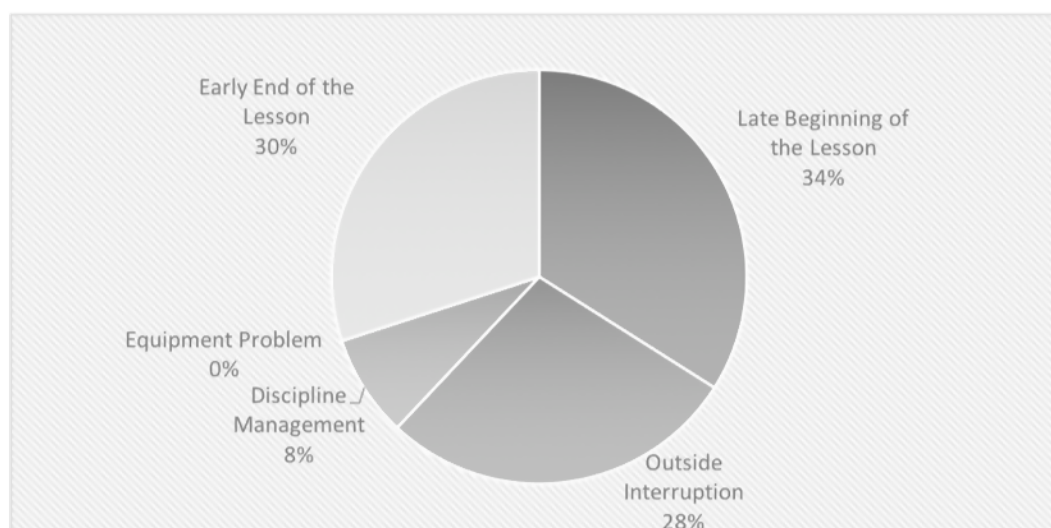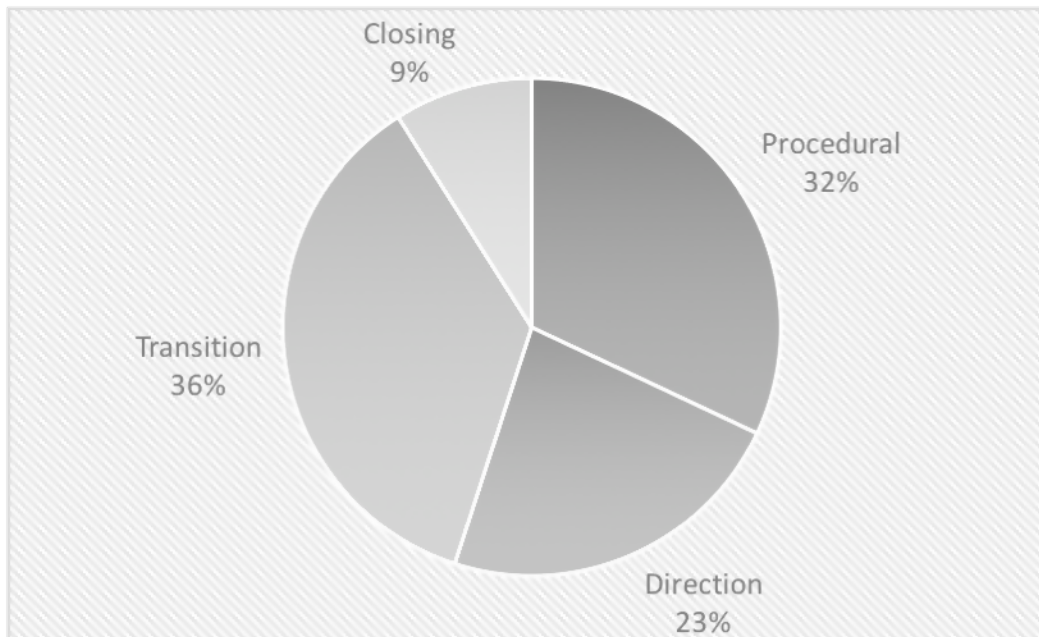
Figure 6.3. Teaching and learning supportive activities in German schools (Percentage [%] of non-engaged time).

Table 6.7

Teaching and Learning Supportive Activities in German Schools (Minutes [min.]/Teaching Hour)

	Non-Engaged Time	Procedural	Direction	Transition	Closing
Average (min.)	5.2	1.6	1.2	1.9	0.5
Standard Deviation (min.)	4.8	3.2	1.7	2.2	3.7

Thirty-two percent of non-engaged time was allocated to the indicator procedural (Figure 6.3), and, on average, it was 1.6 minutes (Table 6.7). Five kinds of activities are categorized to this group (Table 6.8), among which GP1 – teacher checked attendance – and GP3 – teacher emphasized something that is related to test – took place more often.

Table 6.8

Procedural Activities in German Schools

No.	Description of the Procedural Activities	Frequency
GP1	Teacher checks attendance.	●●●
GP2	Teacher assigns, checks, or collects homework.	●●
GP3	Teacher emphasizes something that is related to the test.	●●●
GP4	Teacher explains teaching plan for the next teaching hour(s).	●
GP5	Teacher collects phones at beginning of the lesson.	●

On average, the time for teacher's direction was 1.2 minutes (Table 6.7). As explained previously, a direction activity refers to when a teacher explains the parameters of an assignment. It was observed that teacher usually explained when the material was distributed or when students were prepared for cooperative learning via partner study or group study. In the coding process, time blocks for material distribution and preparation for cooperative were coded as "transition." Therefore, it should be pointed out that this calculation result of time of direction was much less than that in reality.

In German schools, the largest portion of non-engaged time was used for transition activities (36%; Figure 6.3). Among the five transition activities, distributing material (GT2) was recorded more often (Table 6.9).

Closing was another indicator of this time group. In German schools, only a small amount of time was allocated to closing and on average, it only occurred for 0.5 minute in every teaching hour (Table 6.7). Additionally, not every lesson observed ended with a closing; it was recorded only in 11 lessons of the 51 lessons in total. Regarding the activities taking place in the closing segment, three types were identified and recorded with a similar low frequency rate (Table 6.10).

Table 6.9

Transition Activities in German Schools

No.	Description of the Transition Activities	Frequency
GT1	Teacher adjusts equipment, including cleaning the blackboard.	●●●
GT2	Teacher distributes materials.	●●●●●●
GT3	Teacher and student prepare for group work or partner work.	●●●
GT4	Teacher waits for student's readiness to do something, such as taking books or other materials.	●●
GT5	Silence in the classroom.	●

Table 6.10

Closing Activities in German Schools

No.	Description of the Closing Activities	Frequency
GO1	Teacher assigns or collects homework.	●●
GO2	Teacher summarizes the learning effect.	●
GO3	Teacher says something about the examination or about other items.	●

6.2.3 Use of teaching methods in German schools.

As presented in Figure 6.4, the whole class arrangement was the most welcomed organizational structure in German schools. It occupies 50% of the engaged time and it is 17 minutes on average. Another 35% of engaged time is allocated to individual arrangement and the rest (i.e., 15%) is for group arrangement.

Here it could be also supposed that German teachers used the organizational structure differently in their lessons because the standard deviations were all more than ten minutes (Table 6.11).
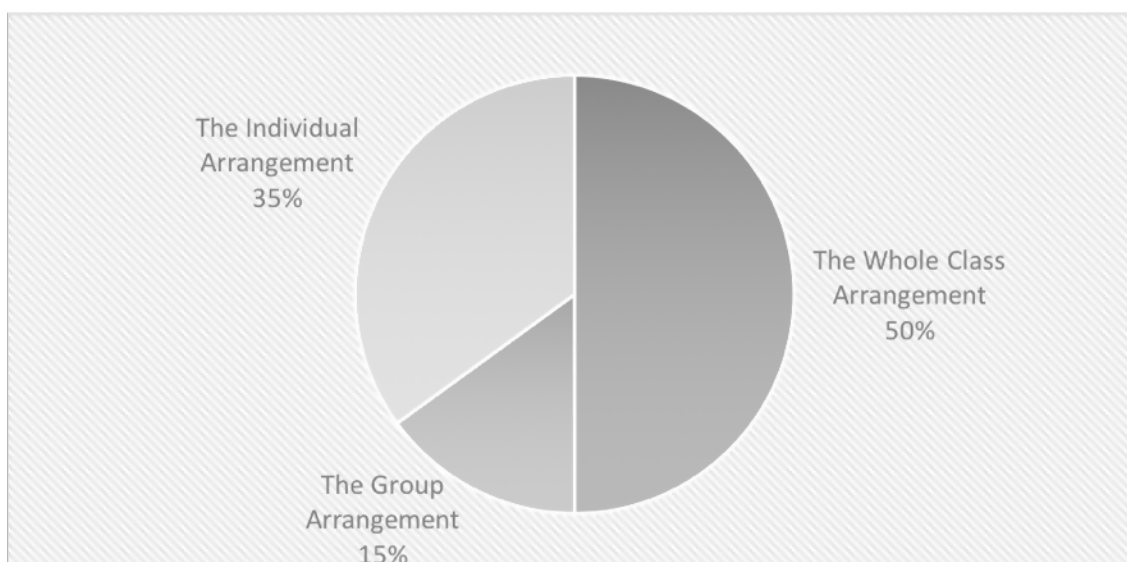
Figure 6.4. Organizational structures in German schools (Percentage [%] of engaged time).

Table 6.11

Organizational Structures in German Schools (Minutes [min.]/Teaching Hour)

	Engaged Time	The Whole Class Arrangement	The Group Arrangement	The Individual Arrangement
Average (min.)	33.9	16.8	5.2	11.9
Standard Deviation (min.)	6.1	10.1	10.3	10.9

6.2.3.1 The whole-class arrangement.

Within the whole class arrangement, teacher-student-dialogue was used more often. On average, it was made use of more than ten minutes in every teaching hour. By comparison, the other two groups were adopted much less (Figure 6.5).
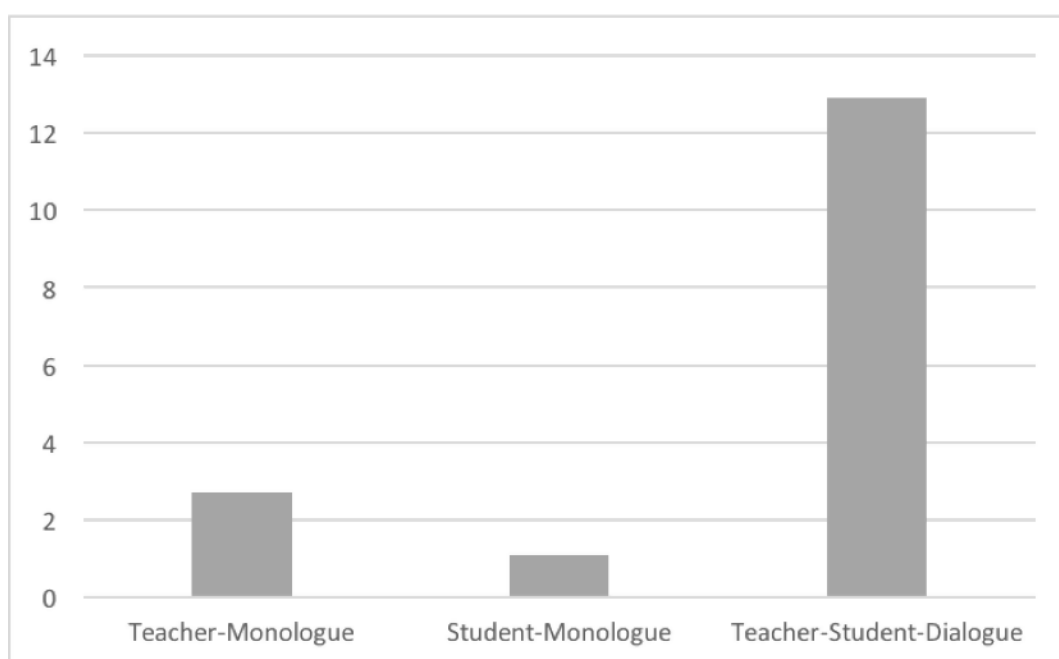
Figure 6.5. The whole classroom arrangement in German schools (Minutes [min.]/teaching hour).

On average, teacher-monologue was used for around three minutes. During the majority of this time block, the teacher gave a lecture by interpreting the teaching contents (Lecture; Table 6.12). By contrast, for a small amount of time, the teacher merely recited the contents that were presented in the media (Recitation). By doing so, the teacher read the exercise questions instead of simply reading the contents to be imparted. A demonstration by the teacher was recorded in only one teaching hour when the teacher intended to show how to draw graphics.

Table 6.12

Teacher-Monologue in German Schools (Minutes [min.]/Teaching Hour)

	Teacher Monologue	Lecture	Recitation	Demonstration
Average (min.)	2.7	2.5	0.2	<0.1
Standard Deviation (min.)	4.2	4.5	0.9	<0.1

Student-monologue method was adopted even less in German schools: 1.1 minutes on average (Table 6.13). More specifically, students' recitation and reporting were 0.6 and 0.5

minutes, respectively. Normally, instead of reading by the teacher, in German schools, students are more often required to do so and therefore the time for recitation by student was larger than recitations by the teacher (0.2 minutes).

Table 6.13

Student-Monologue in German Schools (Minutes [Min.]/Teaching Hour)

	Student Monologue	Recitation	Report
Average (min.)	1.1	0.6	0.5
Standard Deviation (min.)	2.3	2.1	3.1

With respect to report, two situations were recoded. One was for students to make a formal presentation, and the other one was for students to write down answers and then to explain it in front of others. As presented in Table 6.14, these two forms of using reporting took place with similar frequency.

Table 6.14

Report by Student in German Schools

No.	Description of the Transition Activities	Frequency
1	Students were required to stand in front of classroom to present the cooperative learning results (Figure 6.6).	●
2	Student wrote down the answer on the chalkboard, which was usually the calculation result, and then explained the calculation process.	●

Figure 6.6. Student's report in German schools.

As stated previously, German teachers used the teacher-student dialogue more often in their lessons. question and answer was regarded as the concrete method of this group (Section 5.1.3.1.3). Two indicators were added to this group. One described the situation where student raises hand and answers each question one by one (Indicator: Question and Answer 1). The other represented that students answer question together without raising their hands and standing up (Indicator: Question and Answer 2), and this phenomenon was seldom recorded in German schools (Table 6.15).

Table 6.15

Teacher-Student Dialogue in German Schools (Minutes [min.]/Teaching Hour)

	Question and Answer	Question and Answer 1	Question and Answer 2
Average (min.)	13	13	<0.1
Standard Deviation (min.)	9.3	8.4	<0.1

6.2.3.2 The group arrangement.

As shown in Table 6.16 below, the standard deviation of this indicator is around 10. It might be concluded that the group arrangement, as well as each concrete teaching method of this category, were used differently by teachers.

In the observation process, the teacher sometimes clearly pointed out that students should work in groups or with partners, and the assignment was usually to finish exercises or to do a calculation. During this period, some students worked together while others did not (Indicator: Individual Learning 1). This situation was recorded in seven teaching hours taught by four teachers. On average, it was 1.6 minutes in every teaching hour (Table 6.16). The other two indicators are of great interest to this study. Time for partner study in German schools was one minute, and group study was around three minutes (Table 6.16).

Table 6.16

Group Arrangement in German Schools (Minutes [min.]/Teaching Hour)

	The Group Arrangement	Individual Learning 1	Partner Study	Group Study
Average (min.)	5.2	1.6	1	2.6
Standard Deviation (min.)	10.3	12.8	10.3	9.7

Among the six sample teachers, some were particularly inclined to use partner work or group work in their lessons along with various concepts to make the process more interesting, such as station learning and group puzzles. Alternately, others used them in a more traditional way by which students were grouped arbitrarily and completing a common assignment.

Figure 6.7. Group work in German schools.

6.2.3.3 The individual arrangement.

On average, in every teaching hour, time for the individual arrangement was 12 minutes. Together with the time for Individual Learning 1, individual learning was 14 minutes (Table 6.17), which was more than 40% of the engaged time.

Table 6.17

Individual Learning in German Schools

	Individual Learning	Individual Learning 1 (The Group Arrangement)	Individual Learning 2 (The Individual Arrangement)
Average (min.)	13.5	1.6	11.7
Standard Deviation (min.)	11.1	12.8	10.9

6.2.4 Use of instructional media in German schools.

Figure 6.8 presents an overview of the time allocation to instructional media in German schools. As shown, time percentage for traditional media (77%) was much larger than others. Eleven percent of the pie chart is occupied by no media. The other 7% is for modern media, and the remaining 5% is for the combination of modern and traditional media. On average, in every teaching hour, traditional media was used for 26 minutes, and for another four minutes no media was used (Table 6.18). During the remaining four minutes,

either the modern media or a combination of both traditional and modern media were adopted.

It should be pointed out that the standard deviation of each indicator is not small, especially for the traditional media. In other words, the time block for traditional media in every teaching hour differed from the mean values to a comparatively large extent. This is in accordance with what was observed in the school. Three of the six sample classes were iPad classes, in which all of the printed materials were replaced by using iPad. Therefore, in these classes, traditional media were used less than the non-iPad classes.
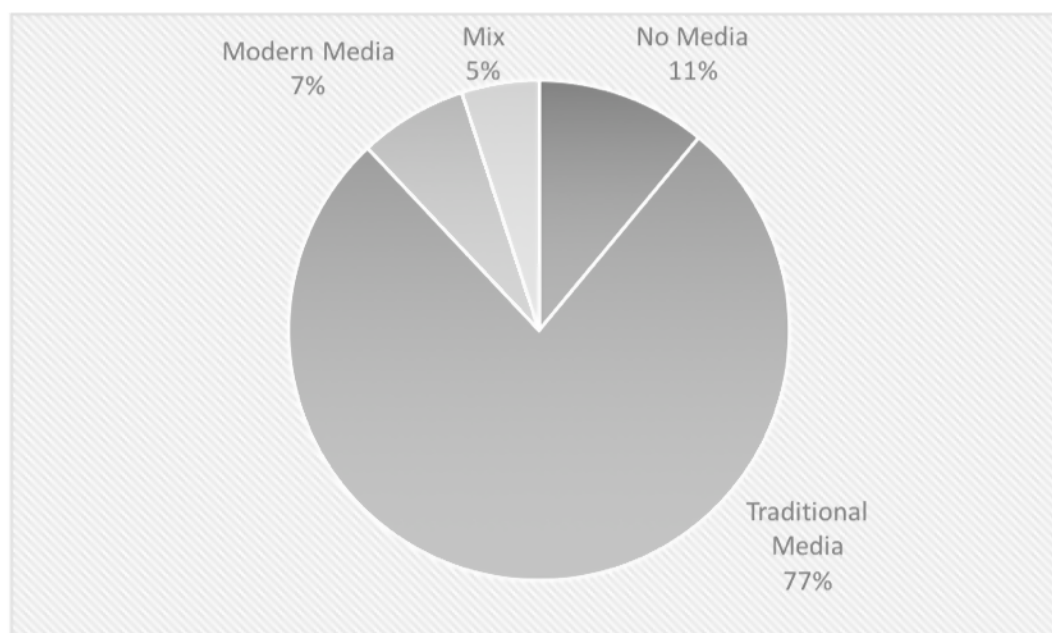

Figure 6.8. Instructional media in German schools (Percentage [%] of the engaged time).

Table 6.18

Instructional Media in German Schools (Minutes [min.]/Teaching Hour)

	Engaged Time	No Media	Traditional Media	Modern Media	Mix
Average (min.)	33.9	3.7	26	2.4	1.8
Standard Deviation (min.)	6.1	4.9	11.8	6.78	5.56

6.2.4.1 Traditional media in German schools.

In German schools, the chalkboard, whiteboard, textbooks, worksheets, models, project media with transparencies, and calculators were the traditional media used in the teaching and learning process. Among them, worksheets and calculators were adopted more often (Figure 6.9).

Worksheets were a significant instructional media type in the German schools. Normally, the teacher brought the printed materials into the classroom and distributed them when necessary. In most cases, information about the learning situation to be analyzed, regulations that should be noted, or exercises were printed out. Calculators were another important media type in the teaching and learning process. In an accounting-related course, a calculator is one of students' must-haves and was always used together with other media that played the role of presenting information.

Another traditional media type worth mentioning is the model. It was seldom adopted and here it merely refers to the chocolate from different companies. The model was used together with worksheets for students to analyze a series of product policies, such as price policy, advertisement policy, and so on.
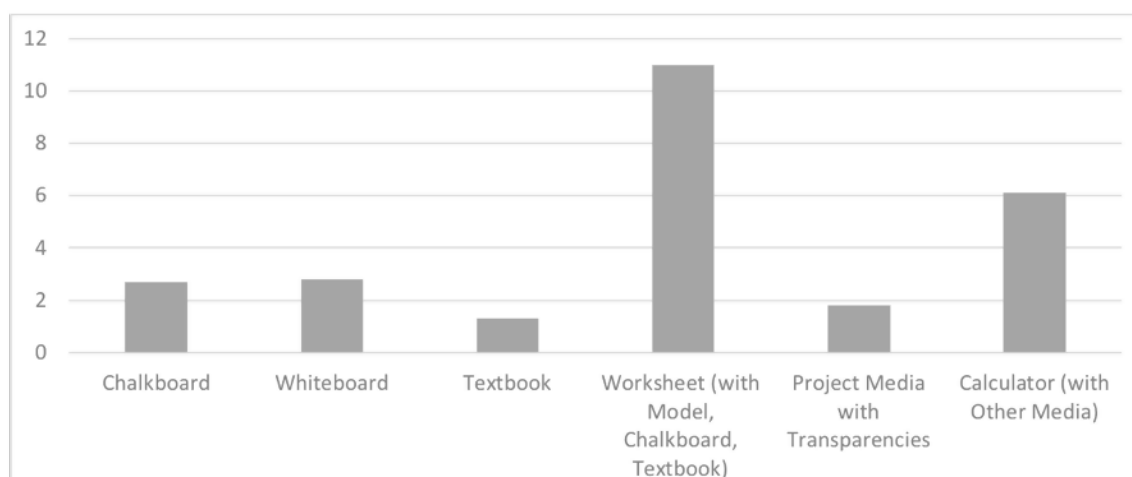

Figure 6.9. Traditional media in German schools (Minutes [min.]/teaching hour).

6.2.4.2 Modern media or digital media in German schools[8].

An iPad, computer, and beamer usually accompanied by software (e.g., Microsoft; learning software) were the modern media recorded in the observational process. A beamer, a tool for projection, was always used with other media and therefore will not be discussed separately.

In Figure 6.10, time allocation to different combinations of computers with other media is presented. As shown, there were two possible combinations, computers with Microsoft (Word or PowerPoint), and a computer with learning software. The average time for the former one was around 1.8 minutes. Usually, the teacher used it to present teaching content. Also, it was recorded once that students made use of a computer to make a presentation.

In contrast, the average time for computer with learning software was less, around 0.5 minutes. This combination was recorded in Class GA-3 (iPad Class). As presented in Table 6.1, in the classroom for this class, four computers for students' use were installed; however, they were not used in every teaching hour. During the observation, they were recorded in two teaching hours. Concretely, students were required to create multiple-choice questions based on the teaching contents by using a learning software running on a computer.

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[8] In this section, time for the mixed use of modern media and traditional media was calculated as part of the time for modern media in the combination. For example, time for the combination of computers with Microsoft, beamer, Microsoft and textbook was added to the time for computer with Microsoft, beamer. When in the combination two or more modern media were used at the same time, the prominent one was emphasized. For example, in the combination computer, beamer, iPad with learning software, iPad with learning software was regarded as the prominent one, and time for this combination was calculated as part of the time for the modern media iPad.
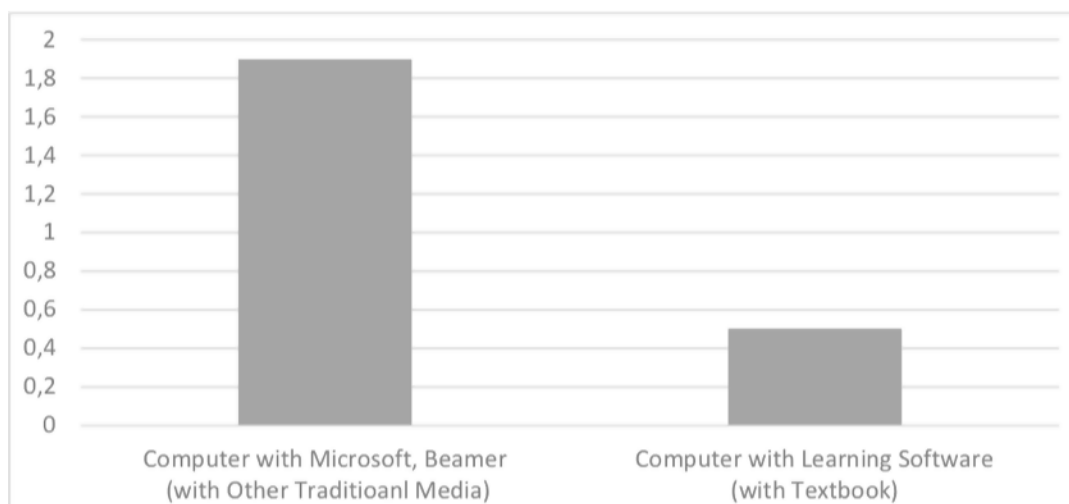
Figure 6.10. The use of computers in German schools (Minutes [min.]/teaching hour).

Similarly, in German schools, an iPad was mainly used with two kinds of software, which are Microsoft Word and learning software. In Figure 6.11, the average time for these items is presented. Obviously, time for the first combination was more than the latter one. Usually with the combination of iPad and Microsoft Word, the teacher intended to present information related to the teaching contents. For example, the teacher sent materials via email and required students to download them in advance. In this way, the iPad was used just like other printed materials.

The iPad with learning software was also recorded in Class GA-3 for the same teaching hours when a computer with learning software was adopted. As elaborated previously, a computer with learning software was used for compiling exercises questions. Afterwards, students were asked to answer questions using their own iPad.
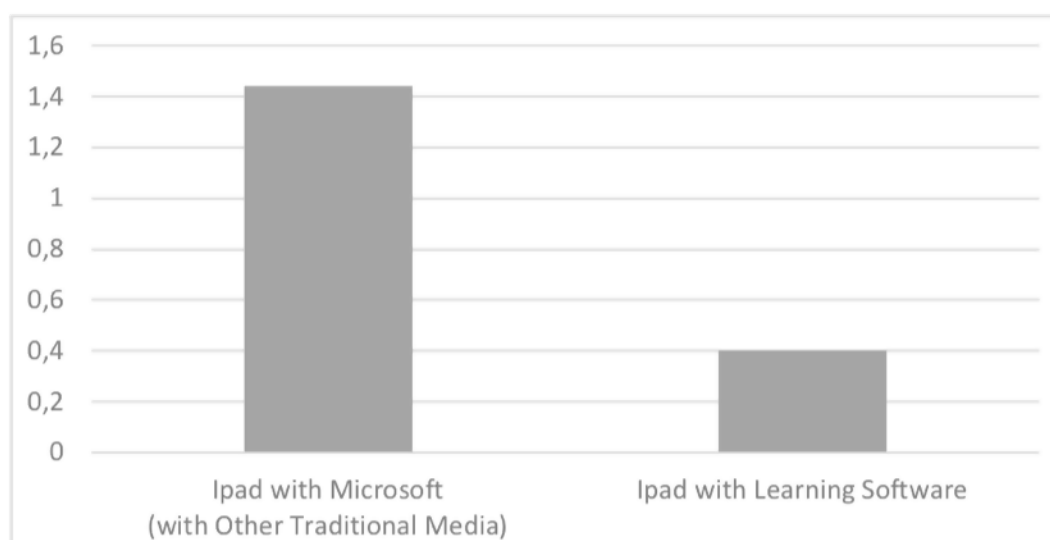
Figure 6.11. The use of an iPad in German schools (Minutes [min.]/teaching hour).

Summarily speaking, time for the combination of a computer or an iPad with Microsoft was comparatively more than the time for modern media with learning software. From this respect, another conclusion that in German schools, modern media was used mainly for presenting teaching content could also be drawn.

6.3 Interim Conclusion

In Section 6.2, the results are presented in accordance to the structure of the category system being developed. Here, attention is shifted to the concrete teaching methods and instructional media being adopted. It is intended to highlight those methods and instructional media that are particular welcomed in German schools (Section 6.3.1). Then in Section 6.3.2, results from this study are compared with those from other empirical study with the aim to guarantee the data validity.

6.3.1 Characteristics of the adoption of teaching methods and instructional media in German schools.

As shown in Figure 6.12, on average, the time for the question and answer method, as well as individual learning was much more than the others. It was then assumed that they are more often adopted in German schools. By contrast, the other methods played a minor role in the teaching and learning process.
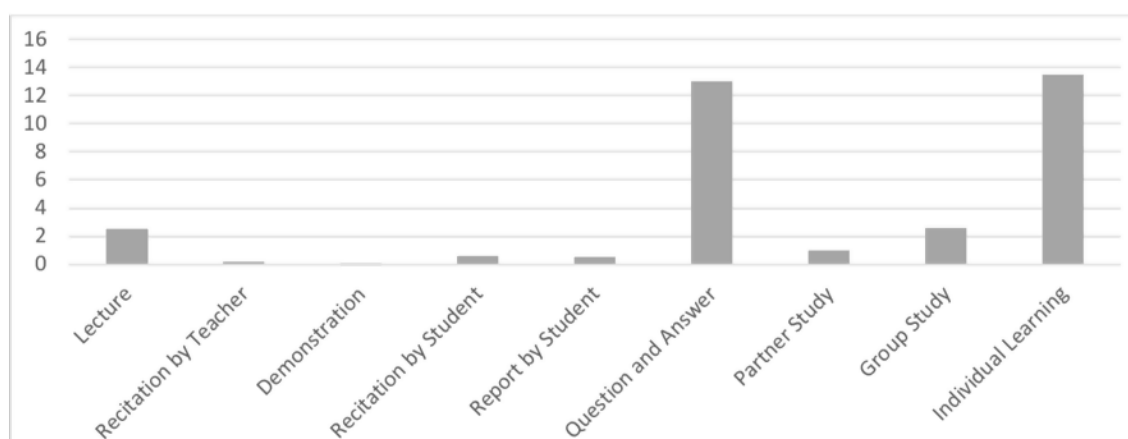
Figure 6.12. Teaching methods in German schools (Minutes [min.]/teaching hour).

Another conclusion drawn from the observation results (Section 6.2.4) is that traditional media, especially worksheets and calculators of this group, was the main instructional media in German schools. In terms of the adoption of modern media, it was found that in most cases, a computer and an iPad played the same role as other traditional media, which was presenting teaching contents.

6.3.2 The validity of the observation results.

In Section 2.2.3, it was pointed out that data group 1 – time allocation to the different teaching methods in German schools - exist among some other empirical studies. In Section 2.2.1.1, these relevant studies were listed. In these studies, four social forms – a special German concept - was adopted as the reflection of teaching methods in reality. As explained in Section 5.1.3 above, this concept was also imbedded into the category system being developed, but with some adjustment. Therefore, it is valuable to compare the results from this study with others, in order to guarantee their validity.

Generally speaking, the results from this study are in align with others. Specifically, the whole classroom arrangement (i.e., frontal teaching in other German studies) was the most populous organizational structure. Following was individual learning, and the least amount of time percentage was for partner study and group study together (Götzl et al., 2013; Seifried et al., 2006).

At the same time, discrepancy was perceived with the numerical results. For instance, 75% of the allocated time was labeled as engaged time from this observation study in contrast in Götzl et al.'s (2013) study, which was 85%. In addition, an apparent difference was found with the time for partner study and group study. Specifically speaking, time for them was much less than those from other studies (2% for partner study and 6% for group study from this study; 6.7% for partner study and 9.9% for group study [Seifried et al., 2006]; 15.6% for partner study and 13.4% for group study [Götz et al., 2005]; and 56.5% for partner study and 22.1% for group study [Pätzold, 2003]). Apart from the two different aspects mentioned above, it was noted that the time percentage for individual learning derived from this study was much higher (40% of the engaged time and 31% of the allocated lesson time from this study; 22.1% [Götzl et al., 2013]; 15% [Wild, 2000]; 18.2% [Götz et al., 2005]; 18.2% [Seifried 2008]).

Though a discrepancy exists, the validity of the observation results cannot be denied. The different definitions of some indicators in these studies might be the reason for the inconsistency. For instance, in this study, engaged time only refers to the time block for teaching and learning activities. Time for teaching- and learning-supportive activities was categorized as non-engaged time as described in Section 3.3.1 and was 75% for the former and 12% for the latter. When they were added, the result was 87%. In Götzl et al.'s (2013) study, time percentage of engaged time was 85%. It could be assumed that in their study, engaged time was defined as the time block for both the teaching and learning activities and those teaching- and learning-supportive activities.

In addition, comparative lower percentage of partner study and group study could also be attributed to this reason. Specifically speaking, the time percentage for partner study in this study was even lower, which is probably due to the situation as described by the indicator of individual learning 1 was analyzed independently. Such a coding regulation might be also be the reason for the higher percentage of the individual learning in this study. The time

block for preparation of partner study and group study, which was seen as the supportive activity or teaching, was calculated separately with the indicator of transition. In other studies, however, it was not clearly outlined whether this time block was calculated together or not.

In terms of the adoption of instructional media in German schools, no comparable data exist (Section 2.2.3). Nevertheless, it was still found that part of the results from this study was in accord with the statements in some other studies. For example, it was concluded in one empirical research that blackboards (whiteboards) and worksheets were more welcomed in German schools (Seifried et al., 2006). This was exactly the same result from this study (Figure 6.9).

The other characteristic, the adoption of instructional media, was not clearly pointed out and discussed in other studies. They are: (1) traditional media is more often adopted and in most cases; (2) modern media is used for presenting information, as the function of some traditional media, though in the iPad classes; and (3) calculators, as one type of traditional media, is populous in the classroom.

All in all, the validity of the observation results is confirmed. At the same time, based on the data received from this observation study, the knowledge of the adoption of teaching methods and instructional media in German schools might be, to some extent, expanded.

Chapter Seven: Classroom Life in Chinese Schools

In correspondence to the structure in Chapter Six, this chapter is composed of three sections. In Section 7.1, relevant information to the observation samples is presented. In Section 7.2, classroom life in Chinese schools is depicted based on the results derived from the observation, which is regarded as the second aim elaborated in Chapter One (Figure 1.1). Afterwards, in Section 7.3 as an interim conclusion, the characteristics of the teaching methods and instructional media in Chinese schools are clearly illustrated. At the same time, a comparison is made between the results from this study and others. The aim here is to guarantee the validity of the results. Fundamentally, the validity of the observation instrument being developed might be partly proven, which is the first aim of this study (Figure 1.1).

7.1 Description of the Observation Samples

In the three Chinese sample schools, 96 teaching hours were observed and recorded. Officially, every teaching hour is 45 minutes and the nominal allocated lesson time was 4,320 minutes. However, the real allocated lesson time was different from the real allocated lesson time. In the observational process, 14 teaching hours in School CC had only 40 minutes per teaching hour as the teaching schedule was changed. In some lessons, the phenomenon of class delay was recorded. Taking these exceptions into consideration in the analyzing process, it was the real allocated lesson time – 4,271 minutes in total and 44.5 minutes, on average - that was adopted. All of the observed samples were single-teaching hour lessons. Normally, two single-teaching-hour lessons would be arranged together with a ten-minute break in between.

In China, three schools, two of which are vocational high schools (School CA and School CC) and one specialized secondary school (School CB), were involved in this preliminary study (Section 4.2.2.4). The courses being investigated were Basic Knowledge of Accounting (Course C1), Accounting of Tax and Other Fees (Course C2), and Accounting of Financial Results (Course C3; Section 4.2.2.4).

Information regarding the sample classes is presented in Table 7.1. The 96 sample teaching hours were divided among six classes. In Chinese schools, every class has a fixed classroom in which a computer for teacher's use, a beamer, and a blackboard are installed. In this study, such a classroom was labeled as *traditional classroom*, but it does not mean that a class have lessons solely in this classroom. Sometimes, students would go to other classrooms or training rooms[9] in accordance with the requirements of a course. Class CA-2, for example, had a fixed classroom in which some courses were given. However, the observed courses (Course C1 and C2) for this class were conducted in different training rooms (Figure 7.1).

In Table 7.2, more detailed information of the sample teachers is presented. Among them, six were female and one was male with different educational backgrounds and/or educational levels. Three of them studied accounting in specialized secondary schools and then became vocational education and training (VET) teachers. They were comparatively older than the others. The other four studied accounting either on bachelor's or master's level. Similarly, they have different years of teaching experience. Some of them have been teaching for more than 20 years, while some could be seen as new teachers.
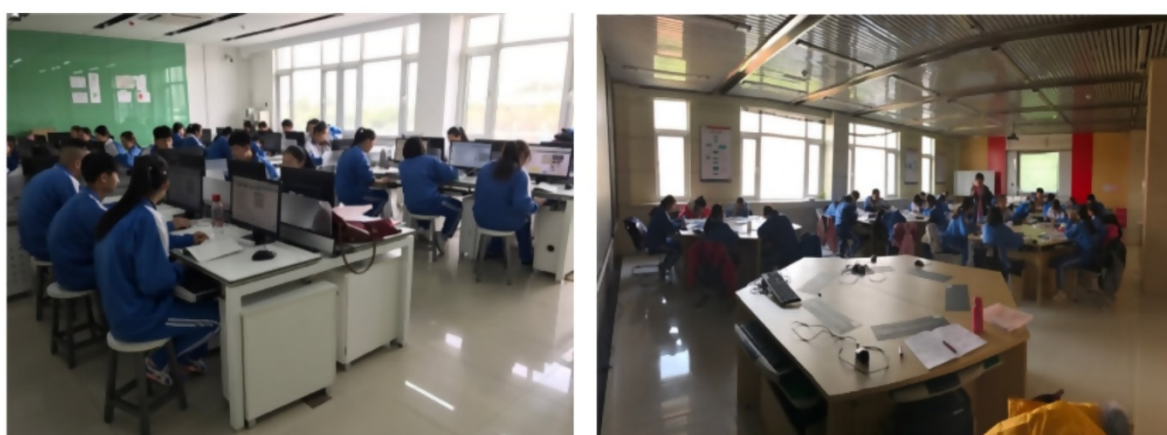
Figure 7.1. Training Room 1 and 2 in Chinese schools.

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[9] In the training room, a real working environment is simulated. The purpose of constructing such a room is to cultivate students' ability of doing. In China, a large amount of money has been invested into the construction of a training base, either on or off campus (a concrete number is unknown). It should be mentioned here that a training room for major accounting is available in all the three sample schools.

Table 7.1

Description of Students and Classes in Chinese Sample Schools

Sample School	Sample Class	Teaching Hours to be Observed	Class Size	Average Students Number	Classroom	Infrastructure
School CA	Class CA-1 (Course C1)	14	18	23	Classroom CA-1	Computer for teacher, beamer, chalkboards, overhead transparencies
	Class CA-2 (Course C2)	8	25		Classroom CA-2 Training Toom 1	Computer for teacher and every student, whiteboards
	Class CA-2 (Course C3)	9	24		Classroom CA-3 Training Room 2	Computer for teacher and every student, beamer, whiteboards
School CB	Class CB-1 (Course C2)	17	24		Classroom CB-1	Computer for teacher, beamer, chalkboards
	Class CB-2 (Course C1)	16	25		Classroom CB-2	Computer for teacher, beamer, chalkboards
School CC	Class CC-1 (Course C1)	18	22		Classroom CC-1	Computer for teacher, beamer, chalkboards
	Class CC-2 (Course C1)	14	23		Classroom CC-2	Computer for teacher, beamer and chalkboard

Table 7.2

Description of Teachers in Chinese Sample Schools

Sample School	Sample Teacher	Gender	Educational Level	Teaching Experience (in Year)
school CA	Teacher CA-1	Female	Specialized Secondary Education	28
	Teacher CA-2	Female	Specialized Secondary Education	22
	Teacher CA-3	Female	Master	6
School CB	Teacher CB-1	Female	Specialized Secondary Education	25
	Teacher CB-2	Female	Bachelor	20
School CC	Teacher CC-1	Male	Bachelor	3
	Teacher C-C-2	Female	Bachelor	10

7.2 Description of the Observational Results from Chinese Schools

As presented in Figure 7.2, the largest portion of this pie chart (87%) is occupied by the engaged time, which means that the majority of the allocated lesson time was used for teaching and learning activities. By contrast, the less than one-fourth was coded as non-instructional time and non-engaged time, 8% for the former and 5% for the latter. On average, non-instructional time was four minutes; non-engaged time was two minutes; and the remaining 38.5 minutes was engaged time (Table 7.3).
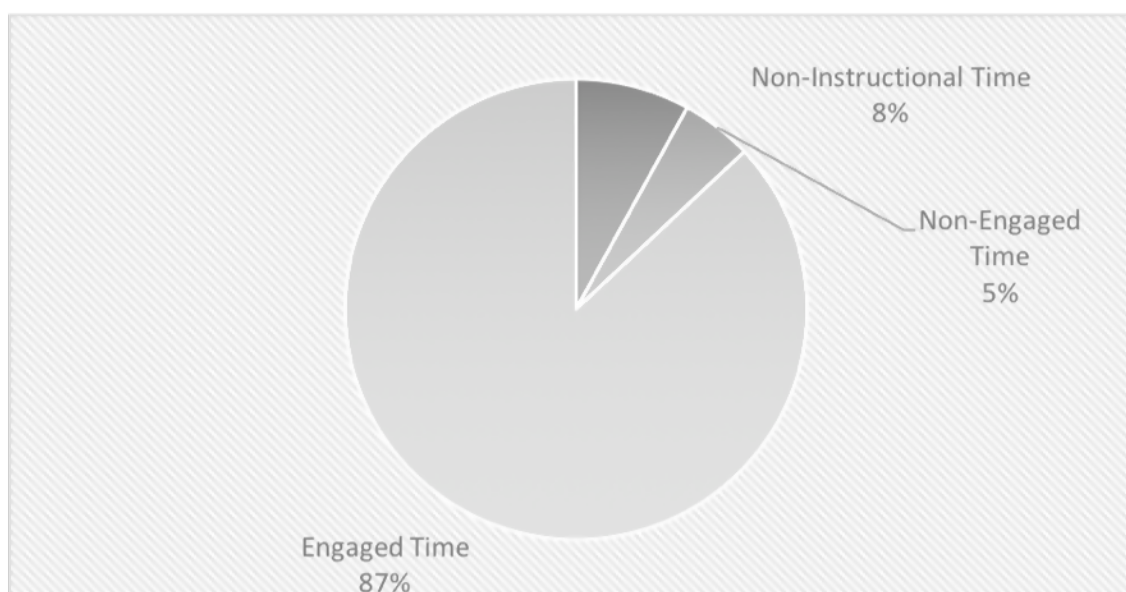
Figure 7.2. Time allocation in Chinese schools (Percentage [%] of the allocated lesson time).

Table 7.3

Time Allocation in Chinese Schools (Minutes [min.]/Teaching Hour)

	Allocated Time	Non-Instructional Time	Non-Engaged Time	Engaged Time
Average (min.)	44.5	3.8	2.2	38.5
Standard Deviation (min.)	1.95	4.1	2.5	5.6

7.2.1 Activities in non-instructional time.

In Chinese schools, a late beginning of the lesson was the most prominent consumer of non-instructional time. It accounted for more than one-third of total non-instructional time (Figure 7.3). On average, it took up 1.5 minutes of every teaching hour (Table 7.4).

One reason for this phenomenon was the teacher arriving late to classroom, which was recorded in 50 lessons for a total of 134 minutes and therefore the late rate was 52%[10].

Another reason for a late beginning being recorded was students being late to class. It was observed that students in one class came into the classroom late because they had participated

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[10] Late rate = (50/96) * 100%

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in a campus clean-up event earlier in the morning; this event was recorded only once. Then it might be concluded that in Chinese schools, a teacher's late arrival to the classroom is still the main reason for the late class start.
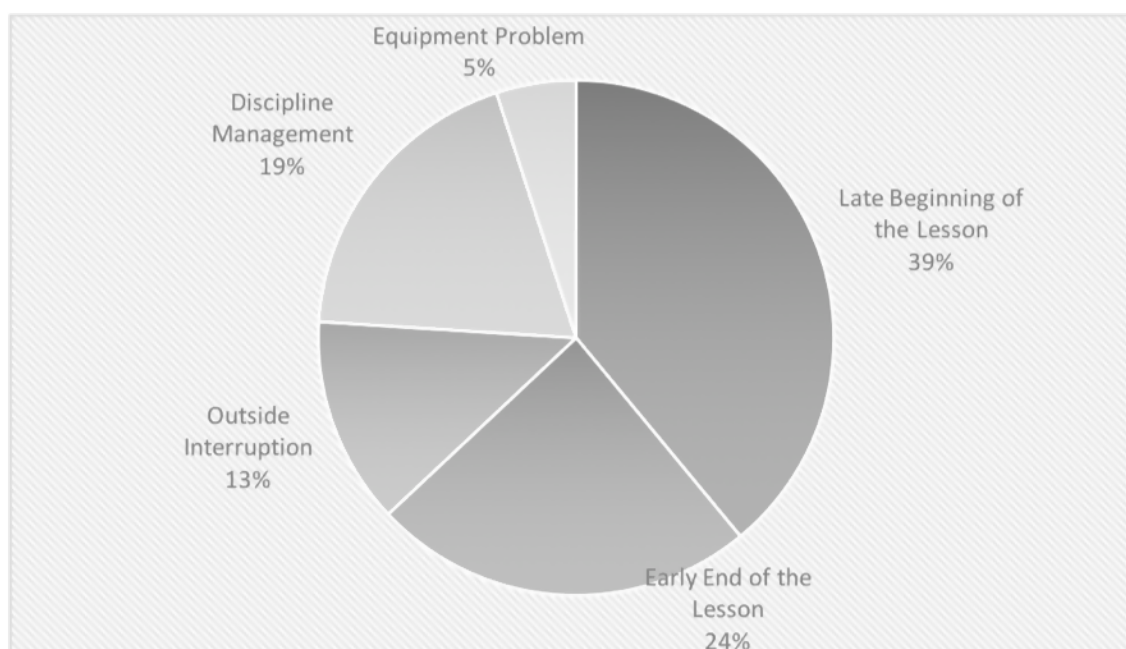
Figure 7.3. Teaching and learning non-related activities in Chinese schools (Percentage [%] of non-instructional time).

Table 7.4

Teaching and Learning Non-Related Activities in Chinese Schools (Minutes [min.]/Teaching Hour)

	Non-Instructional Time	Late Beginning of the Lesson	Outside Interruption	Discipline Management	Equipment Problem	Early End of the Lesson
Average (min.)	3.8	1.5	0.5	0.7	0.2	0.9
Standard Deviation (min.)	4.1	1.7	1.9	2.1	2.4	3.8

Another comparatively large part of non-instructional time (24%) was allocated to an early end of the lesson. In lessons from three sample teachers, this phenomenon was never recorded. In other words, every lesson taught ended as scheduled or even ran over time.

Usually, when they finished the teaching task and some time was still left, teachers preferred to ask students to complete exercises until the bell rang or ask students to stay in the classroom to do an activity not related to the teaching content. It should be clearly pointed out here that among the two situations described above, only the latter was coded as an early end of the lesson.

The time block for outside interruption accounted for 13% of the non-instructional time. On average, just 0.5 minutes of each teaching hour was used for outside interruption. Three kinds of outside interruption activities were recorded and described below in Table 7.5. As presented, Activity CO2 – the teacher and students talk something that is not related to the teaching contents - was recorded more often in Chinese schools.

Table 7.5

Outside Interruption in Chinese Schools

No.	Description of the Activities	Frequency
CO1	Somebody comes into classroom and interrupts the teaching process.	•
CO2	Teacher and students talk about something that was not related to the teaching contents, such as joking.	•••
CO3	Teacher answers a phone call.	•

Time for the indicator discipline management accounted for 19% of the pie chart (Figure 7.3) and on average, teachers spent 0.7 minutes on it per every teaching hour (Table 7.4). Discipline management was recorded in only 27 of the 96 teaching hours observed. In School CA, it was not even recorded, but it does not mean that no misbehavior took place. In fact, teachers usually ignored students' misbehaviors, such as sleeping or playing games on mobiles phones during the teaching and learning process. In most cases, teachers' reaction is to require students to be quiet and not disturb others.

Table 7.6

Discipline Management in Chinese Schools

No.	Description of the Activities	Frequency
CD1	Teacher asks students to be quiet before the lesson starts.	•
CD2	Teacher asks students to be quiet or to behave themselves during the teaching process when students whisper with others, talk out of turn, or play on mobile phones and iPads.	•••••
CD3	Student gets of his/her seat to go to the toilet and the teaching process is interrupted.	•

The remaining 5% of the non-instructional time was occupied by the indicator equipment problem (Figure 7.3). In most cases, teachers made use of the fixed equipment in the classroom. Sometimes, teachers had to spend some time adjusting this equipment when it did not work. Additionally, some teachers preferred to make use of their own computers. However, due to the insufficient preparation such as not charging their computers or forgetting to update the software, time was used for such adjustments. Comparing the frequency of these two kinds of activities, CE1 was recorded comparatively more often than CE2 (Table 7.7).

Table 7.7

Equipment Problems in Chinese Schools

No.	Description of the Activities	Frequency
CE1	Something is wrong with the equipment in the classroom and teacher spends time adjusting it.	••
CE2	Something is wrong with the equipment that teacher brings into the classroom.	•

7.2.2 Activities in non-engaged time.

As presented in Figure 7.2 above, non-engaged time accounts for only a small part of the allocated lesson time (5%). On average, teachers spent merely two minutes on teaching and learning supportive activities (Table 7.3). Figure 7.4 and Table 7.8 below show how this time block was divided between the four indicators of this group.
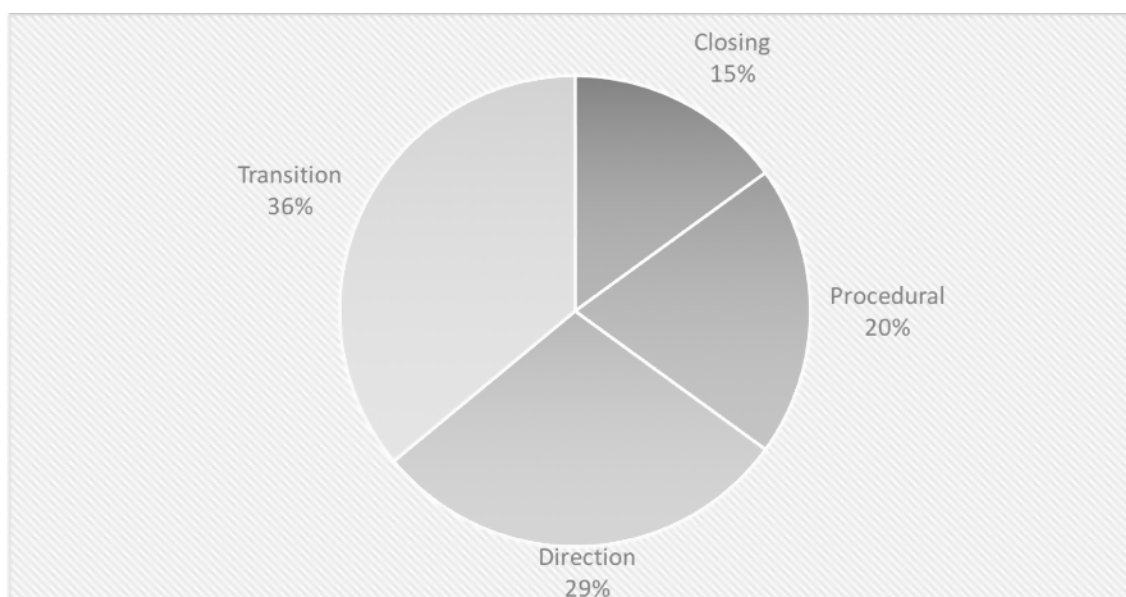
Figure 7.4. Teaching-and-learning supportive activities in Chinese schools (Percentage [%] of non-engaged time).

Table 7.8

Teaching and Learning Supportive Activities in Chinese Schools (Minutes [min.]/Teaching Hour)

	Non-Engaged Time	Procedural	Direction	Transition	Closing
Average (min.)	2.2	0.4	0.6	0.8	0.3
Standard Deviation (min.)	2.5	1.6	1.6	1.7	1

A time block for the procedural activity occupies 20% of the pie chart in Figure 7.4. On average, it was 0.4 minutes in every teaching hour (Table 7.8). During the observation process, four types of procedural activity were identified (Table 7.9) and took place with a similarly low frequency.

Table 7.9

Procedural Activities in Chinese Schools

No.	Description of the Procedural Activities	Frequency
CP1	Teacher assigns, checks, or collects homework.	●●
CP2	Teacher emphasizes something that is related to test.	●
CP3	Teacher explains the teaching plan for the next teaching hours.	●
CP4	Teacher collects phones at beginning of the lesson.	●

Twenty-nine percent of non-engaged time was used for teacher direction (Figure 7.4) and was recorded in 29 teaching hours. On average, it was 0.6 minute of each teaching hour (Table 7.8).

The largest amount of non-engaged time was labeled with the indicator transition, which was 36% (Figure 7.4). On average, it was observed 0.8 minutes of every teaching hour (Table 7.8). The activities identified in Chinese schools are listed in Table 7.10. Comparing the frequency of occurrence, CT3 took place comparatively more often than the others.

Last is the time block for the activities that appeared at the end of a lesson. It occupied the least amount of non-engaged time (i.e., 15% of the engaged time, Figure 7.4). Not every lesson would end with a formal closing segment. The four activities being recorded are presented in Table 7.11. As shown, they took place with a similar frequency in Chinese schools.

Table 7.10

Transition Activities in Chinese Schools

No.	Description of the Transition Activities	Frequency
CT1	Teacher adjusts equipment, including cleaning the blackboard.	●●
CT2	Teacher distributes materials.	●
CT3	Teacher waits for student's readiness to do something, such as taking books or other materials.	●●●
CT4	Silence in the classroom.	●

Table 7.11

Closing Activities in Chinese Schools

No.	Description of the Transition Activities	Frequency
CC1	Teacher assigns or collects homework.	●
CC2	Teacher summarizes the learning effect.	●●
CC3	Teacher says something about examination or about other items.	●
CC4	Time for students to ask questions.	●

7.2.3 Use of teaching methods in Chinese schools.

Figure 7.5 below presents an overview of how the engaged time is allocated to the three organizational structures in Chinese schools. As shown, in around two-thirds of the engaged time, the whole class arrangement was utilized in the teaching and learning process. Time for the other two organizational structures – the group arrangement and individual arrangement - together accounts for one third of the pie chart.

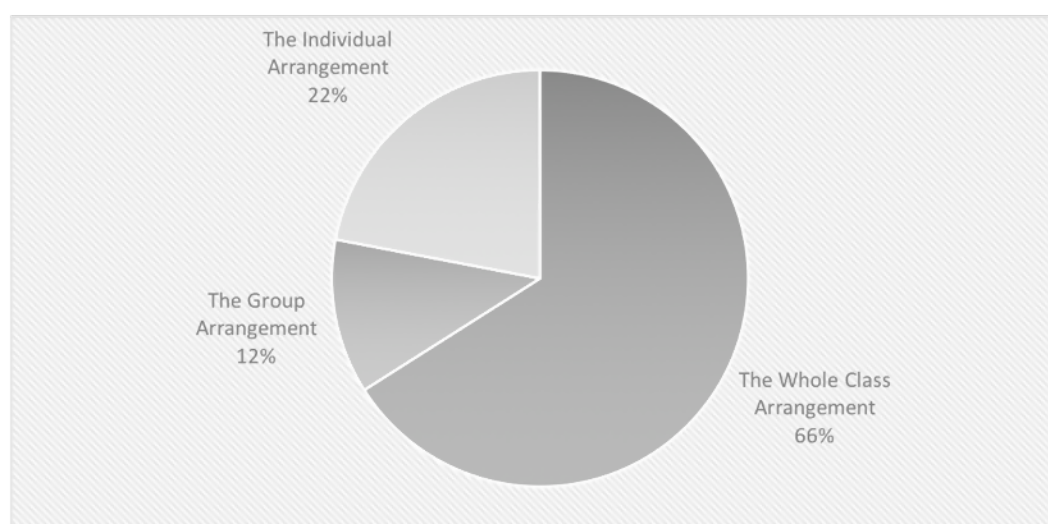*Figure 7.5.* Organizational structures in Chinese schools (Percentage [%] of the engaged time).

On average, the whole class arrangement was adopted for 25 minutes in every teaching hour. For another nine minutes, individual arrangement was used as well as five minutes for group arrangement (Table 7.12). It should be pointed out that the standard deviation is particularly large, reflecting a difference can be seen between teachers.

Table 7.12

Organizational Structures in Chinese Schools (Minutes [min.]/Teaching Hour)

	Engaged Time	The Whole Class Arrangement	The Group Arrangement	The Individual Arrangement
Average (min.)	38.5	25.4	4.6	8.5
Standard Deviation (min.)	5.6	10.5	11	8.2

7.2.3.1 The whole class arrangement.

Among the three sub-categories of the whole classroom arrangement, teacher-monologue was the most welcomed in Chinese schools (Figure 7.6). On average, it was observed more than sixteen minutes in every teaching hour, which is much longer than the other two groups.
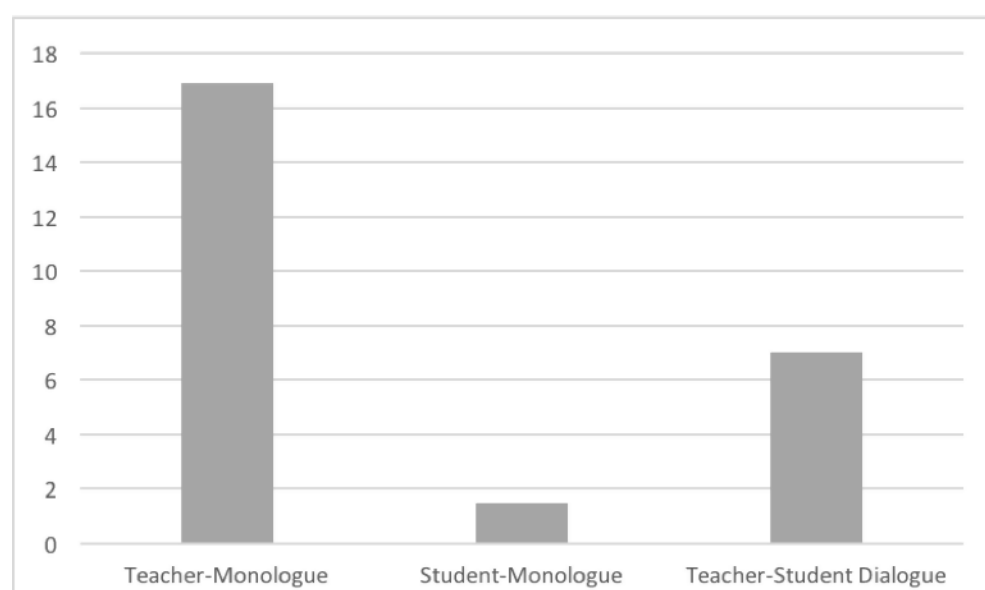
Figure 7.6. The whole class arrangement in Chinese schools (Minutes [min.]/teaching hour).

In the group of teacher-monologue, lecture was utilized much more often (Table 7.13). On average, it was used approximately sixteen minutes in every teaching hour. By contrast, recitation and demonstration were seldom recorded. Regarding the method of demonstration, only one sample teacher adopted it for a few minutes, and it was used in just two situations.

The first situation was to demonstrate how to use the Internet or other tools to obtain useful information, and the second was to demonstrate how to use the simulation software.

Table 7.13

Teacher-Monologue in Chinese Schools (Minutes [min.]/Teaching Hour)

	Teacher Monologue	Lecture	Recitation	Demonstration
Average (min.)	16.8	15.6	0.9	0.3
Standard Deviation (min.)	10.3	9.4	2.2	2

Comparing the average time for teacher-monologue and teacher-student-dialogue, it was found that student-monologue was not often recorded in Chinese schools (Figure 7.6). In other words, students did not have many opportunities to speak, neither to recite nor to report. As shown in Table 7.14, the average time for the formal presentation – Report - was 0.4 minute and for the informal presentation was 1.1 minutes. With respect to the method of report, it was only used for students to read the exercise results and then explain how the results were derived.

Table 7.14

Student-Monologue in Chinese Schools (Minutes [min.]/Teaching Hour)

	Student Monologue	Recitation	Report
Average (min.)	1.5	1.1	0.4
Standard Deviation (min.)	3.4	3.4	3.2

On average, the time for teacher-student dialogue was seven minutes per teaching hour (Figure 7.6). This amount of time was further divided between two indicators: Question and

Answer 1"[11] and Question and Answer 2"[12]. In Chinese schools, time for these were found to have little difference (Table 7.15).

Table 7.15

Teacher-Student Dialogue in Chinese Schools (Minutes [min.]/Teaching Hour)

	Teacher-Student Dialogue	Question and Answer 1	Question and Answer 2
Average (min.)	7	3.8	3.2
Standard Deviation (min.)	5.6	3.6	4.5

7.2.3.2 The group arrangement.

The group arrangement was only recorded in School CA. On average, it was utilized for five minutes in every teaching hour (Table 7.12). In Table 7.16, the average time for the three indicators of this group is presented. Most notably, the time for Individual Learning 1 was recorded much more often than the others. The concrete situations of the adoption of Individual Learning 1 are depicted below:

- Situation 1: In some lessons given by one teacher, students were asked to change the seat arrangement and teacher insisted that method of group study was used. However, students were merely to be arranged together to do exercises or calculation by themselves as shown in the first picture in Figure 7.7.

- Situation 2: Another similar situation was recorded in lessons from another teacher. The lessons were carried out in the training room equipped with a round desk. Students of a group sat at the same table. During the whole observation process, the students' task was to document materials as a bookkeeper in a company. Everyone had the same task and showed teacher the results after they finished the task. In the

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[11] Question and Answer 1: students raise hand and answers question one by one.
[12] Question and Answer 2: students answer question together.

meantime, students of a group could talk with each other, but act as competitively as shown the second picture in Figure 7.7.

Table 7.16

Group Arrangement in Chinese Schools (Minutes [min.]/Teaching Hour)

	The Group Arrangement	Individual Learning 1	Partner Study	Group Study
Average (min.)	4.6	4.2	0	0.4
Standard Deviation (min.)	11	12.8	0	2.1

Figure 7.7. Individual Learning 1 in Chinese schools.

It was perceived that partner study was not adopted by any teacher. There was a special situation in which some students worked as partners to finish exercises, but the teacher did not point out clearly that partner work was to be used. Instead, the teacher told the students that they were able to work with others if they preferred; some students utilized an exercise partner, while others did not. As described in Section 5.1.3.5, this was coded as Individual Learning 1.

With respect to the group study, it was not populous in Chinese schools and in the observation process, it was recorded in just two teaching hours. During group work, the students' task was to finish the declaration of tax as which would take place in a company, making use of simulation software (Figure 7.8).

Figure 7.8. Group work in Chinese schools.

7.2.3.3 The individual arrangement.

On average, time for the individual arrangement (or Individual Learning 2) in every teaching hour was nine minutes. Combined with the time for Individual Learning 1, it was the time for individual learning. As shown in Table 7.17, it was on average around thirteen minutes per every teaching hour.

During the process of observation, it was found that inductive teaching methodology was more welcomed in Chinese schools. The procedure was composed of four steps: 1) the teacher presenting definitions or parameters of an exercise; 2) the teacher explaining the definitions or the parameters of the exercise; 3) the students doing the exercises; and finally 4) the teacher and student together correcting the answers to the exercise (Reinhardt, 1994). Among them, individual learning was mainly used in the third step: students doing exercises.

Here, *exercise* has two meanings. One refers to the actual exercise, such as composing an accounting entry or doing a calculation. The other refers to the situation where students copied notes. It was noticed that students were often asked to transcribe definitions, accounting entries, and so on. As the teacher emphasized, the information being copied would appear in examinations and therefore students should copy and recite them after lessons.

Table 7.17

Individual Learning in Chinese Schools (Minutes [min.]/Teaching Hour)

	Individual Learning	Individual Learning 1 (The Group Arrangement)	Individual Learning 2 (The Individual Arrangement)
Average (min.)	12.8	4.2	8.6
Standard Deviation (min.)	10.9	12.8	8.2

7.2.4 Use of instructional media in Chinese schools.

In Figure 7.9, the time percentage of the four media sub-categories is presented. Summarily speaking, modern media and traditional media share a similar popularity in Chinese schools. The time percentage for these, combined, accounts for nearly 80% of the pie chart. During 18% of the engaged time, no media were recorded and the remaining 3% was for the mixed use of traditional and modern media. On average, in every teaching hour, traditional media was used for seventeen minutes and modern media for thirteen minutes. For seven minutes, no media were used and in another single minute, both modern and traditional media were used (Table 7.18).
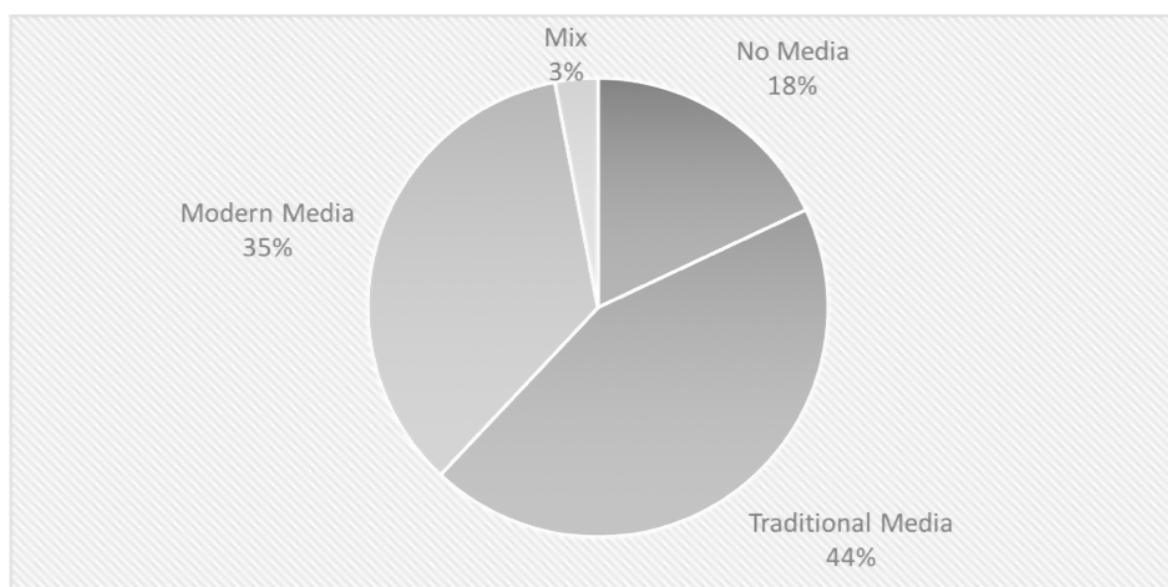

Figure 7.9. Instructional media in Chinese schools (Percentage [%] of the engaged time).

It was noticed that the standard deviations for traditional media and modern media were particularly large (Table 7.18). Put another way, time for these media types varied from teaching hours to a comparatively large extent.

Table 7.18

Instructional Media in Chinese Schools (Minutes [min.]/Teaching Hour)

	Engaged Time	No Media	Traditional Media	Modern Media	Mix
Average (min.)	38.5	6.9	16.9	13.5	1.2
Standard Deviation (min.)	5.6	5.1	12.4	11.5	3.7

7.2.4.1 Traditional media in Chinese schools.

In Chinese schools, the traditional media to be recorded were chalkboard, whiteboard, textbooks, overhead projectors with transparencies, worksheets, workbooks, models, and calculators. Generally speaking, neither of them was adopted much more often than others. As presented in Figure 7.10, on average, time for workbooks was the largest, but merely around five minutes in every teaching hour. With respect to other types, it was even less.

Workbooks (*Chinese:* 实训手册) are books in which various simulation-practice exercises are listed. Together with textbooks in which definitions and regulations are presented, they are students' must-have materials. It was noticed that though all the samples courses were related to the field of accounting, calculators were not often utilized in the teaching and learning process. On average, they were used around one minute per every teaching hour (Figure 7.10). Project media with transparencies were not available in every classroom. In the observational process, they were used merely in two teaching hours with one teacher. Lastly, models were another comparatively frequently utilized traditional media in Chinese schools. Here, *models* refer to account books and original documents, such as

receipts. Usually, students were required to fill in an account book based on some original documents. It should be also pointed out that models were recorded merely in the teaching hours with two teachers.

Figure 7.10. Traditional media in Chinese schools (Minutes [min.]/teaching hour).

7.2.4.2 Modern media in Chinese schools[13].

Computers, beamers, and mobile phones were three hardware items that were recorded in Chinese schools. They were usually adopted together with software such as Microsoft, the Internet, simulation software, and mobile apps. With a similar analyzing approach with the German data as outlined in Section 6.2.4.2, beamers are not discussed separately.

In Figure 7.16, time allocation to different combinations of computers with other media is presented. As shown, time for the combination of computer with Microsoft software, beamers, or other traditional media was twelve minutes. According to what was observed, teachers intended to make use of this combination to present theoretical knowledge, such as definitions of accounting terms.

Computers might be adopted with other software but were observed for less than one minute in every teaching hour. All of these combinations were recorded in lessons from one teacher in the Calculation of Tax and Fees course in School CA. In terms of a computer's

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[13] In this section, time for the mixed use of modern media and traditional media was calculated as part of the time for the modern media in the combination. For example, time for the combination of computers with Microsoft, beamers, Microsoft and textbooks was added to the time for computers with Microsoft, beamers.

function within these combinations, the presentation of information was still its main role. It was observed that when teacher intended to present information from the Internet, then computers with Internet was recorded. Similarly, when a teacher intended to present information from a Word document, computers with Microsoft was recorded. An exception was witnessed with computers with learning software. Students were the "controllers" of the computers in order to complete the process of tax-declaration with the simulation software (Figure 7.8).
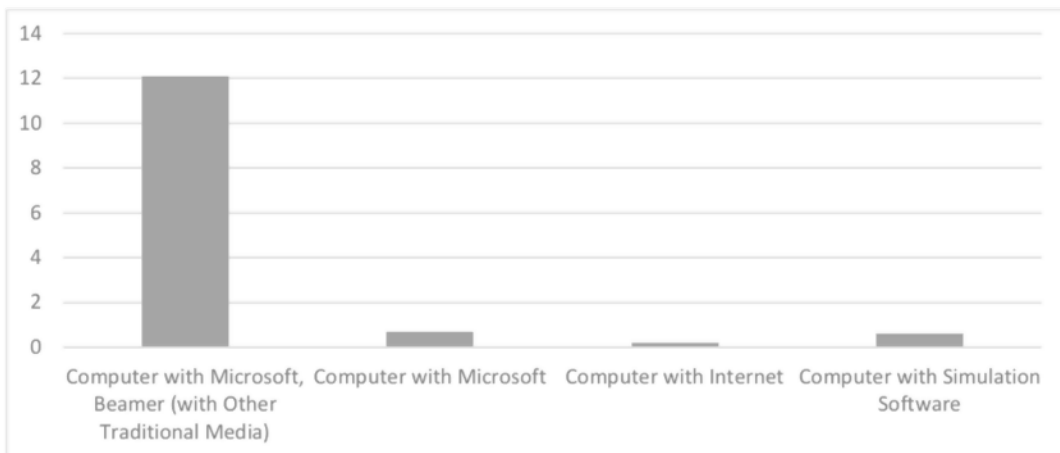

Figure 7.11. The use of computers in Chinese schools (Minutes [min.]/teaching hour).

Mobile phones were not a necessary instructional media in Chinese classroom, and whether they were used depended heavily on teachers' preference. In the observation process, two sample teachers (Teacher CA-2; Teacher CC-1) tried to implement them in a few teaching hours. Following are there situations that were recorded.
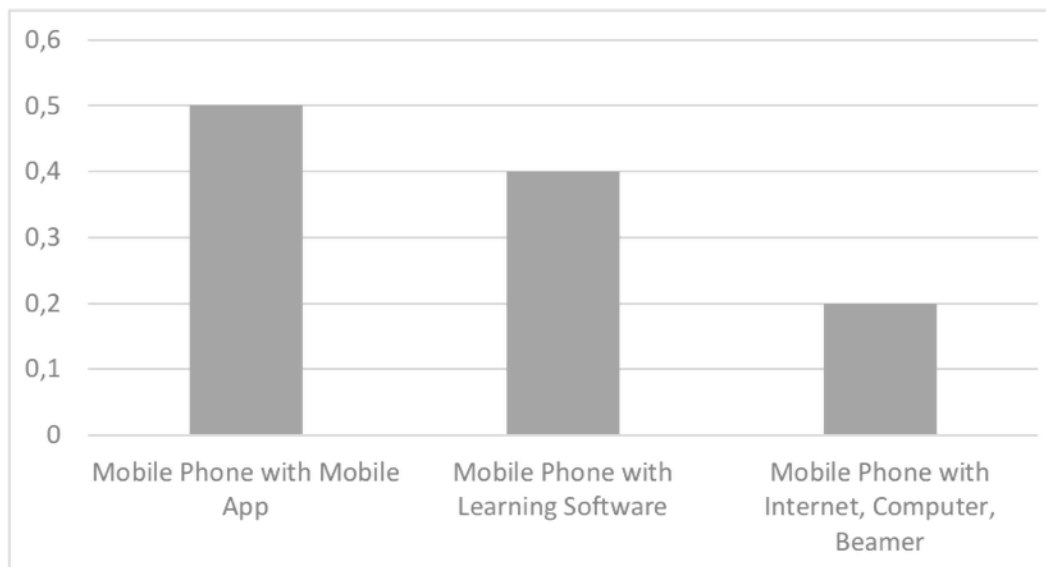
Figure 7.12. The use of mobile phones in Chinese schools (Minutes [min.]/teaching hour).

- Situation 1 – **Mobile phone with mobile app, computer, and beamer:** The teacher told students how to use a mobile app (WeChat, a social app similar to WhatsApp and Facebook) to get the latest news related to accounting. In order to show this process, mobile phones were connected with computer and then presented through the beamer.

- Situation 2 – **Mobile phone with mobile app, computer, and beamer:** The teacher intended to make use of a mobile app to present teaching contents, such as the theoretical knowledge of debit and credit accounting. By using this app, students received access to the coursework after class.

- Situation 3 – **Mobile phone with Internet, computer, and beamer**: The teacher played a video through mobile phone device. Then the phone was connected to a computer and the video was displayed though a beamer.

7.3 Interim Conclusion

In Section 7.2, the observation results were presented, in accordance to the structure of the category system being developed. Here, attention is shifted to the concrete teaching methods and instructional media being adopted. In other words, it is intended to point out

those methods and instructional media that are particular welcomed in Chinese schools (Section 7.3.1). Then in Section 7.3.2, results from this study is to be compared with those from other empirical study, with the aim to guarantee the data validity.

7.3.1 Characteristics of the adoption of teaching methods and instructional media in Chinese schools.

In Figure 7.13 below, time allocated to every concrete teaching strategy is presented. As shown below, the method of lecture and individual learning are the two that were most embraced in Chinese schools. By contrast, the other methods have the same low popularity. As mentioned in Section 7.2.3.2 above, the group arrangement was only recorded in one sample school. At the same time, it was found that in most cases, the teacher misused the method group study and partner. Specifically, students were required to sit together but without cooperative learning.

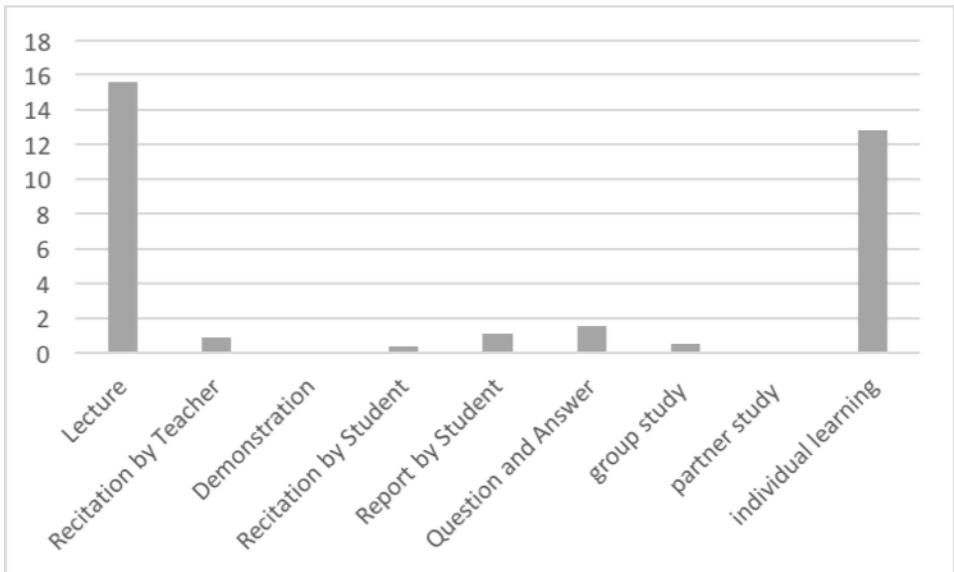*Figure 7.13.* Teaching methods in Chinese schools (Minutes [min.]/teaching hour).

With respect to the adoption of instructional media, statistical results indicated that computers, one type of modern media, was the most welcomed instructional media in Chinese schools. On average, it was around 14 minutes per teaching hour (Figure 7.11). According to the analysis in Section 7.2.4.2, however, it was perceived that computers were

mainly adopted for presenting teaching contents. Coming in second were workbooks. On average, it was around five minutes per teaching hour (Figure 7.10).

7.3.2 The validity of the observation results.

In Section 2.2.2, it was mentioned that time allocation to different teaching methods and instructional cannot be traced from existing studies. However, there were indeed some scholars who intended to describe the situation in Chinese classrooms. Comparing the observation results with these studies, the validity of the observation results might be partly proven.

In relevant studies, it was often criticized that cramming or lecture is the most often utilized teaching method in VET schools (e.g., Cheng, 2015; Gou, 2016; He & Liu, 2016). This is the same as what was received from this study (Section 7.3.1). Regarding the popularity of individual learning, it was not widely discussed by Chinese scholars.

In terms of the utilization of instructional media in Chinese schools, Chen (2011) presented some useful results. However, due to the different classification of instructional media, the results from this study and Chen's (2011) study are incomparable.

In all, the study of classroom teaching and learning is at its initial step in Chinese context. Due to rather limited data resources, the comparison between the results from this study and others is insufficient. From another aspect, the value of this study is further demonstrated by filling in this research gap.

Chapter Eight: Cross-Cultural Comparison and Interpretation of the Comparison

Result

In Chapter Six and Chapter Seven, classroom life in both German and Chinese schools was presented. In other words, the second goal in this study has been reached (Figure 1.1). At the same time, it was also proven that the observation instrument being developed might be used for future study and the validity was demonstrated by comparing the results from this study with others.

In this chapter, the additional two goals are approached, which are comparison and interpretation. As presented in Figure 8.1, this chapter is composed of three sections. First, for the aim of interpreting differences in the contextual differences, it was necessary to determine in which contextual dimensions the difference exists, and this is addressed in Section 8.1. In Section 8.2, a comparison is made regarding the adoption of teaching methods and instructional media between the compared countries. In Section 8.3, the results from the previous two sections are related with the purpose of gleaning a deeper understanding of these contextual differences and then provide advice from the aspect of policy borrowing.
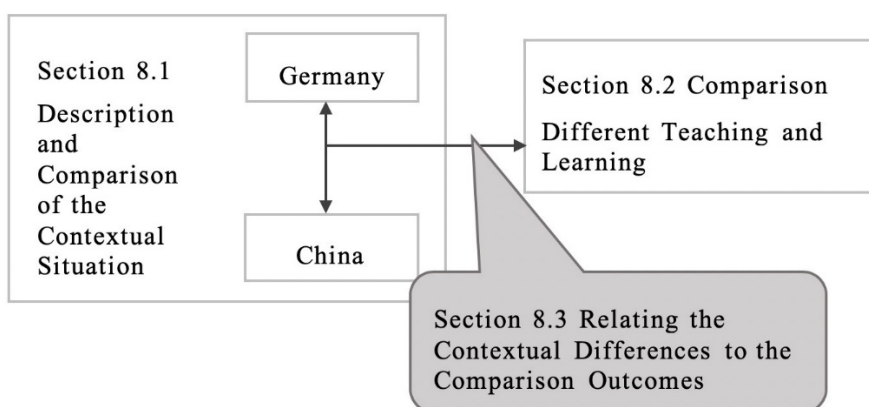

Figure 8.1. The structure of Chapter Eight.

8.1 Comparison of the Contextual Factors

In Section 3.4, a conceptual model for selecting the contextual dimensions was constructed by adapting the onion model from Wang (2009) (Figure 3.5). In this model, all

the contextual factors that might affect teaching and learning in the classroom are categorized to external and internal levels. The external level includes four sub-levels, which are culture (meta level), government (macro level), school (meso level) and classroom (micro level). The internal level refers to teachers' characteristics, students' characteristics, and teaching contents. In fact, a large number of factors from different levels might insert an influence on the adoption of teaching methods and instructional media. However, due to resource and time limitation as well as having the fundamental purpose of interpretation – policy borrowing - in this study, four contextual factors from three levels were selected (Figure 8.2).

In this section, the situation on each dimension in both Germany and China are briefly described and compared. Only those factors in which an obvious difference exists are identified as the determinants for explaining the different teaching and learning styles.

8.1.1 External – macro level – government – teacher education.

In Section 3.4.1.1, it was indicated that the overall system of teacher education was not compared in this study. Instead, it was the knowledge related to teaching methods and instructional media that should be emphasized. Specifically speaking, focus should be given to how pedagogical related knowledge is arranged in teacher education. At the same time, the effects of teacher education on teachers' competence in reality should be examined. In Section 8.1.1.1 and 8.1.1.2, the situation in Germany and China is described. Afterwards, in Section 8.1.1.3, a short comparison is made to see whether difference exists.
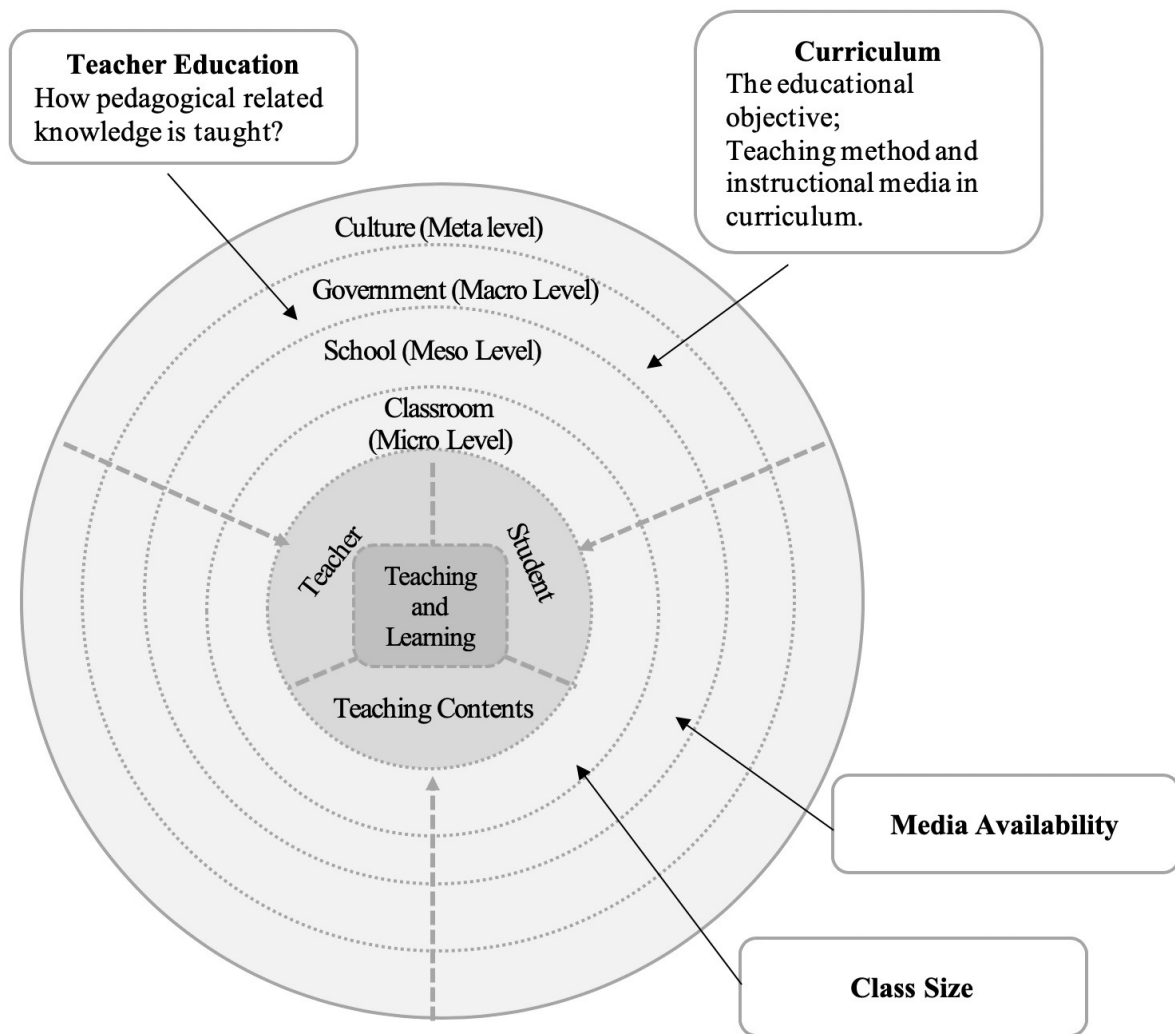
Teacher Education
How pedagogical related knowledge is taught?

Curriculum
The educational objective;
Teaching method and instructional media in curriculum.

Culture (Meta level)

Government (Macro Level)

School (Meso Level)

Classroom (Micro Level)

Teacher

Student

Teaching and Learning

Teaching Contents

Media Availability

Class Size

Figure 8.2. Representation of *Figure 3.6:* Four possible interpretation dimensions.

8.1.1.1 VET teacher education in Germany.

"In Germany, VET teachers are expected to be experts in their field of study (e.g., Engineering or Business Administration) and educational specialists" (Deissinger, Braun, & Melnyk). The whole process for cultivating VET teachers consists of three phases (Krüger, 2014). The former two phases are usually named as initial teacher training and the third phase is on-the-job training (Fritsch et al., 2015).

- The first phase (or the first state examination): refers to the university-level study, including bachelor's and master's-level study[14] (Eckhardt, 2017). The aim of this phase is to equip students with the scientific knowledge in specific discipline, as well as the knowledge of pedagogy (Krüger, 2014).

- The second phase (or the second state examination): also named as preparatory service (German: *Vorbereitungsdienst* or *Referendariat*). In this phase, students are required to practice in the real working environment (Krüger, 2014). The period of this phase is different between states and usually lasts 12 to 24 months (Krüger, 2014).

- The third phase (or teacher further training): refers particular to teachers' on-job-training. With respect to its importance, Krüger (2014) summarized that the experienced gained from this phase is crucial for teachers' further development, in terms of their professional biographs, as well as the extension and maintenance of their professional skills.

This is the general process of teacher education. However, with regard to the more detailed information, it varies from states as teacher education is under the control of state regulations (Eckhardt, 2017). Nevertheless, a statutory requirement (i.e., a standard for teacher education; German: *Standards für die Lehrerbildung Bildungswissenschaften*) issued by KMK should be adhered to by every state (KMK, n.d.). Here it is worthwhile to have a glimpse of the contents related to teaching methods and instructional media written in this standard.

In general, the competence that pre-service teachers should be equipped with is categorized into four domains: teaching, education, evaluation, and innovation (KMK, 2004).

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[14] Before 1999, diploma courses were provided. Since 1999, the Bologna Process was initiated for the Europeanisation of higher education. Afterwards, diploma courses were converted to the Bachelor's and Master's courses (Hippach-Schneider et al., 2007).

Among them, competence for teaching is particularly related to the focus of this study. In Table 8.1, the three competences in this domain are presented.

As shown, terms such as teaching method, forms of teaching, media education, modern technology, and communication technology, etc., were stressed in different ways (the contents in bold font in Table 8.1). From this respect, it might be concluded that on the macro level, knowledge of teaching methods and instructional media should be integrated into teacher education.

Apart from the standards for teacher education, a unified curriculum guidance for majors which aim to cultivate teachers working in commercial VET schools was put forward by DGfE in 2014 (*Die Deutsche Gesellschaft für Erziehungswissenschaft*)[15]. This curriculum is applied to the initial teacher training, including bachelor and master study. In the whole process, students should receive 75 ECTS points[16] in total. Among them, 25% of the ECTS points should be acquired by studying in the field of teaching, learning, and development[17] (6% for bachelor study and 19% for master study; DGfE, 2014). From this respect, the significance of pedagogical related knowledge in teacher education is proved again.

As mentioned previously, VET teacher education varies between states. Taking a look at the curriculum on the state level is also necessary. For such a purpose, the curriculum for the master's students in the major of business education (German: *Wirtschaftspädagogik*) at the University of Cologne is taken for example. Generally speaking, students who receive a bachelor's degree and desire to be a teacher in commercial vocational schools might apply this master-level study. The period of master's degree study entails four semesters during

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[15] DGfE is an association that focuses on research of teaching and learning in the field of education. It was founded in 1964 and currently has 3,600 members. The fundamental purpose of DGfE is to promote the development of research and practice in education (DGfE, n.d.).

[16] ECTS (European Credit Transfer System) is a grading scale defined by European Commission.

[17] Teaching contents were divided into five fields, which are theory, organization, structure of vocational education; teaching, learning and development; practice; professionalization; and research method (DGfE, 2014).

which students earn 120 credit points. Of these, 22.5% should be got from the economic pedagogy courses (Institut für Berufs, Wirtschafts- und Sozialpädagogik, 2018).

In all, when analyzing the standards and curriculum of VET teacher education, it could be concluded that pedagogically related knowledge is an essential part of the first phase of teacher education.

Additionally, efficiency was sometimes questioned. In some studies, it was found that preservice teachers have insufficient knowledge for teaching (e.g. Seifried & Wuttke, 2010; Seifried & Wuttke, 2015; Türling, 2014; Wuttke & Seifried, 2013). As Bouley et al. (2015) assumed, the main reason for this phenomenon was that at least in the first phase of teacher education, preservice teachers were not equipped with adequate knowledge. This statement is partly in accordance with the results from another empirical study carried out by Fritsch et al. (2015). In their study, the impact of university teacher training on preservice teachers' content knowledge (CK) and pedagogical content knowledge (PCK) was compared between Austria and Germany. It was concluded that crucial impact might be seen with the CK score. By contrast, only small effects on teachers' PCK were found, but at the same time it was found that teachers' knowledge will be evidently improved to a desirable extent after they enter into schools and teaching by themselves (Seifried & Wuttke, 2015). In other words, preservice teachers might improve their competence from the second phase of teacher education: preparatory service. Furthermore, the whole process of teacher education, including the first phase and second phase combined, enables pre-service teachers to be equipped with sufficient pedagogical related knowledge.

Table 8.1

Competence Domain 1 – Teaching in the Standard for Teacher Education

Competence 1:	
The teacher plans and teaches both professionally and appropriately.	
Standard for the section of theoretical education	Standard for the section of practice
The pre-service teacher should: - master relevant education theories, understand the educational goal; - know general and subject-related didactics and understand what must be taken into consideration when planning lessons; - know different **teaching methods** and task types, and know how to use them in accordance to the appropriate requirements and situations; - know the concepts of **media education** and psychology, and understand the possibilities and limitations of the use of media in the classroom in accordance to the requirements and situation; - know procedures for the assessment of teaching performance and teaching quality.	The pre-service teacher should: - combine the subject-specific and didactic arguments, and plan and design lessons; - select contents and **methods**, **forms of study** and **communication**; - **integrate modern information and communication technologies in a didactically sensible way and reflect their own media use**; - check the quality of their own teaching.
Competence 2:	
The teacher supports students' learning by designing suitable learning situations. The teacher motivates students and helps them to establish connections to use what they have learned.	
The pre-service teacher should - know learning theories and forms of learning; - know how to engage students in the teaching and learning process, support understanding and transfer; - know theories of learning, motivation and understand ways in which they could be embedded in the classroom.	The pre-service teacher should - **encourage and support different forms of learning**; - design the teaching-learning process; - awaken and strengthen the pupils' willingness to learn and to work; - **lead and guide learning groups**.
Competence 3	
The teacher promotes students' abilities to learn and work independently.	
The pre-service teacher should - know the strategies for learning and motivation; - know the methods that might promote student' self-determination and autonomy, and know the methods of cooperative learning; - know how to motivate students' learning interests and be able to construct a foundation for lifelong learning in the classroom.	The pre-service teacher should - communicate and promote learning strategies; - **teach students the methods of self-determination, autonomy and cooperative learning**.

Note. Adapted from KMK (2004).

8.1.1.2 *VET teacher education in China*.

In China, VET teacher education started rather late and developed slowly (Liu & Shen, 2013). At the moment, constructing a proper VET teacher education system is still in the exploratory stage (Tang, 2016). Therefore, it is not easy to give a full and general picture of VET teacher education in China. It is intended to abstract some characteristics of teacher education in China based on the analysis of the standards for teacher education and the current approaches for teacher education.

In 2013, the standard for teacher profession in secondary vocational schools was drafted by the ministry of education of the PRC. As described, this standard should be used as the baseline for teacher training, teacher recruitment and teacher evaluation (MoE, 2013). In this standard, fifteen fields are grouped into three dimensions, including beliefs and ethics of the teaching profession, professional knowledge, and professional competence (Table 8.2). Among these fifteen fields, two of them are of great interest as they are concerning the requirement on pedagogical knowledge (Field 5) and pedagogical content knowledge (Field 7). Looking at the items listed in these two fields, it could be found that nothing concrete concerning how to teach is put forward. Instead, some general terms such as "know the education strategies" and "master the pedagogical content knowledge" were used (Table 8.2).

With respect to the influence of this standards on VET teacher education and those in-service teachers, it is still uncertain as it is issued recently, and it is still in trial operation.

Shifting to the focus of teacher education in China, it is more or less complicated. Due to the special social background in China, in-service teachers have different educational backgrounds. Or to put it another way, there is no unified approach for cultivating teachers. As summarized by Shi and Fu (2018), three approaches are currently available. This classification might be also used to classify those in-service teachers in accordance to their educational backgrounds.

- Approach 1: studying at a university (or other levels) + on-the-job training. Within this approach, preservice teachers study the content knowledge at university and have a series of on-the-job training opportunities after recruited into VET schools.

- Approach 2: VET teacher education at a university on bachelor level. In some universities, there is a separate institute for VET teacher education, such as in Tianjin University of Technology and Education.

- Approach 3: VET teacher education at a university on master level. Institutes that provide VET teacher education on this level enroll students who have already finished their bachelor studies. The Institute of Vocational Education at Tongji University[18] sets forward a good example for this approach.

In some studies, it was indicated that the majority of the in-service VET teachers (80%) are from the first approach (Zhang, 2012). This is in accordance with the educational background of the target teachers involved into this study. As shown in Table 7.1, all of them studied accounting on different educational levels without being taught pedagogical-related knowledge.

This problem has already been recognized and in the last decade, the Chinese government has put great emphasis on those programs for on-the-job training. For instance, in 1998, the Action Plan for Education Revitalization for the 21st century was issued, and it was planned to construct 50 training bases for VET teachers (MoE, 2008). Since then, 56 training bases have been constructed (Ke & Shi, 2018). In 2006, the Ministry of Education and the Ministry of Finance issued the Opinions on the Quality Improvement Plan for Teachers in Upper Secondary VET Schools (MoE & MoF, 2006). In one of the three programs, training of the professional backbone teachers, it was planned that by 2020,

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[18] Originally, Approach 2 that was provided by the Institute of Vocational Education at Tongji University. Currently, Approach 3 is provided.

150,000 professional teachers should be trained, financed jointly by the central and provincial government.

Table 8.2

The Standard for Teacher Profession in Secondary Vocational Schools[19]

Dimensions	Fields	Requirements
Believe and Ethics of Teaching Profession	......	......
Professional Knowledge	Field Five: Pedagogical Knowledge	• Familiar with the development characteristics of skilled personnel and of students' physical and mention; • Understand the formative process of students' ideology and morality, and **know the corresponding educational strategies in different stages**; • Understand students' psychological and learning characteristic in the different education stage, in the transition process from school to work, and **know the relevant educational strategies**; • Understand the characteristics of students' collective activities and know the way to organize these activities.
	......	......
	Field Seven Pedagogical Content Knowledge	• Familiar with the teaching subject; • Master the theoretical knowledge, practical system and curriculum standards of the teaching subject; • Know students' cognitive learning characteristics and know the process and characteristics of skill formation. • **Master the pedagogical content knowledge**.
	......	......
Professional Competence	......	......

Note. Adapted from MoE (2013).

Nevertheless, evidence from some empirical studies indicated that VET teachers' pedagogical related knowledge is still at low level. For example, in He (2010)'s study, it was concluded that VET teachers have insufficient pedagogical related knowledge for teaching. Similarly, in the study from Zhao, Zhang, and Rauner (2017) in which VET teachers'

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[19] In this table, only the fields that are relevant to the topic of this study are presented.

competence was assessed, it was found that nearly half of the teachers from upper-secondary VET schools possessed only nominal competence – the lowest among the other four levels.

In a word, VET teacher education in China is, to some extent, disordered. Issues concerning how to alter the situation is always discussed from the macro level. The problem was also found with the newly drafted standards for VET teachers. Specifically, contents concerning pedagogical related knowledge are nebulous.

8.1.1.3 Different teacher education in the compared countries.

Comparing the importance of pedagogical related knowledge in VET teacher education in Germany and China, an obvious difference was witnessed. In Germany, pedagogical knowledge is the prerequisite to be a VET teacher and is systematically imbedded within the initial step of teacher education. By contrast, due to the special historical and societal situations, most Chinese VET teachers did not have sufficient pedagogical knowledge. This phenomenon can be attributed to a little-established teacher education system. Therefore, different VET teacher education should be one contextual factor which might be used to explain the different teaching and learning styles in German and Chinese schools.

8.1.2 External – macro level – government – curriculum.

In this section, the characteristics of the curriculum in the individual country are firstly presented (Section 8.1.3.1 and Section 8.1.3.2). Afterwards, comparison is made between them in Section 8.1.3.3, in order to decide whether to regard it as a determinant for interpretation.

8.1.2.1 Curriculum in German schools.

In Section 4.2.2.3.1, the curriculum of the target major – business administration (German: *Wirtschaft und Verwaltung*) - was briefly introduced, for the aim to select the target course. In this section, more attention is given to the contents written in the curriculum. As for curriculum in Germany is various from states and all the observation samples were from

NRW. Then, following it is the curriculum for the target major in NRW that is to be analyzed.

Generally speaking, competence-oriented is the main characteristic of the curriculum. As stated, the school year 2013-2014 was a strategic point in the calendar of the curriculum development in NRW, as a series of curriculum for different majors in vocational colleges entered into force (Buschfeld, Dilger, Göckede, & Hille, 2014). The concept behind the newly-developed curriculum is competence-oriented (Buschfeld et al., 2014). With respect to its implementation, it was reflected from four aspects (Buschfeld et al., 2011, 2014):

- Description of outcomes: in order to describe competences, it is necessary to describe their application in different fields. These fields refer beyond to the education system but describe the situations of application in which the competence required is to be transferred. Therefore, the situations in which students prepare for and in which the acquired competence is to be applied should be described.

- About actions (German: *Handlungen*) and their reflection: competence-oriented means that students are enabled to do and are willing to make improvement in the future. Therefore, action should not be understood only as doing. Instead, it should include both doing and thinking (i.e., reflective phases of action).

- Level-differentiation: in order to position the different VET programs in comparison to other educational programs, the proper and expected level of the outcomes should be highlighted. In the competence-oriented curriculum being developed, the expected outcomes should be described based on the level system of the entire education system. At the moment, it is the level system DQR[20] that is adopted.

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[20] DQR (der Deutsche Qualifikationsrahmen): an instrument used for classifying qualifications in German education system. The purpose for using this instrument is to increase transparency, comparability, and mobility both within Germany and in the EU. It includes eight levels and each level is described with a short text. For example, the competence for level four is for the independent planning and processing tasks in a comprehensive and continuous changing environment (KMK, 2014).

- Standardization of the structure among different educational programs: in order to pursue the objective of increasing transparency and permeability as well as improving the possibility of comparison among different educational programs, a standardized structure for education is required. As well, for a competence-oriented curriculum, such a structure that allows for comparison is essential.

For elaborating its concrete reflection in curriculum, the curriculum for the target course Business Administration with Accounting (German*: Betriebswirtschaftslehre mit Rechnungswesen*) is presented.

The overall structure of the curriculum is composed of three sections (Ministeriums für Schule und Bildung des Landes Nordrhein-Westfalen, 2018). In the first section, the general information of the target school type – the fulltime vocational schools (German: *Berufsfachschule mit Anlage C*) - is introduced, including the educational objective, the guideline for teaching methodology, etc. In the second section, the information of the target major – business administration (German: *Wirtschaft und Verwaltung*) - is elaborated. In this section, it is pointed out that of the target major, seven action fields (German: *Handlungsfeld*) are included and each action field is further divided in to three to seven business processes (German: *Arbeits- und Geschäftsprozess*). Based on the action fields and the business processes, more concrete learning situations (German: *Anforderungssituationen*) are then listed in the third section. In the same section, the specific requirement and objective of the target course is formulated.

In this curriculum, the educational objective is described as:

Students should acquire the competence to form well-founded opinion on business problems and find out possible solutions. In doing so, business decisions should be modeled in accordance to the corporate objective and the objective of different interest groups. At the same time, students should acquire the competence to

understand the economic reality from different perspectives. (Ministeriums für Schule und Bildung des Landes Nordrhein-Westfalen, 2018)

Analyzing this description, it could be found that students' competence is stressed. In other words, it is a reflection of the competence-oriented concept. Here, it should be pointed out that in this description, accounting is not mentioned. This might be due to the tradition in German-speaking countries. As Riebenbauer (2015) described, in German-speaking countries, accounting is believed to be the key to economic thinking, and the aim for accounting education is to develop students' economic action competencies (German: *Handlungskompetenz*). Students should be cultivated, thoughtful bookkeepers[21]. In the educational objective described above, it is students' competence which is required to make decision on the basis of accounting number and should be given more emphasis.

Shifting focus to the concrete contents in the curriculum, the competence-oriented characteristic of the curriculum might be further highlighted. In Table 8.2, learning situation 2.2 as part of the action field 2, procurement, which is one of other seven action fields in the curriculum, is translated and presented with the intention to explain how competence-oriented concept is imbedded.

As shown, the typical structure for describing a learning situation is composed of three parts. In the first part, the learning situation is described from graduates' perspective. For the sample learning situation, it is described as "graduates examine…", "they design…" and "they assess…" (Table 8.2). In the second part, concrete goals are formulated. For the sample learning situation, four goals are listed. In the third part, these goals are further categorized to the subject-related competence (knowledge and skills) and personal competencies (social competence and independence; Table 8.2).

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[21] The two approaches for organizing the curriculum are practical bookkeeping and thoughtful bookkeeping (Reinisch, 1996). With the first approach, students are required to master the knowledge of a bookkeeper and apply the knowledge in a real working environment. With the latter approach, the aim is to equip students with entrepreneurial thought.

Table 8.3

The Structure of a Learning Situation in the Curriculum

Action Field 2: Procurement			
Learning Situation 2.2 Time: 20-30 Teaching Hours			
With the aid of some business models, graduates examine the existing procurement process. They should also design the deployment processes against the back ground of sustainability. At the same time, they should assess the profitability of these processes.			
Objectives: Students determine the optimal order quantity for stored goods, in order to minimize the total provision costs (G1). In the field of logistics, students use the ABC analysis for reorganizing the warehouse (G2). Students check the availability of the warehouse, by using the key figures, such as maximum stock, minimum stock, reporting inventory and disposal inventory (G3). Students record and document values flows, also taking sales tax into account, as part of procurement (G4).			
Knowledge	Skills	Social Competence	Independence
G1-G4	G1-G4		G1, G4

Note. Adapted from Ministeriums für Schule und Bildung des Landes Nordrhein-Westfalen (2018).

Besides the competence-oriented characteristic, other aspects regarding the adoption of teaching methods and instructional media are also found.

In the official curriculum, a guideline for using teaching methods is included. Two items that are highly related to the compared subjects – teaching method - are the requirement of self-organized learning and working in a team (Ministeriums für Schule und Bildung des Landes Nordrhein-Westfalen, 2018).

Self-organized learning is a way of acquiring knowledge and competences in which learners set goals independently and self-motivated, autonomously choosing strategies to achieve goals, and making assessment (Götz & Nett, 2017). Concerning its concrete realization forms in the classroom, learning with others is one of them (Sembill & Seifried,

2007). Working in teams also requires students to work with others. All in all, these contents in the official curriculum indicated that method of cooperative learning is advocated.

The media adoption is not clearly pointed out in the official documents. But, in some schools, tablet (iPad) is required to be used. For example, the three classes being observed were iPad classes (Table 6.1) in which every student should bring an iPad into the classroom and the teacher should integrate it in the teaching and learning process. In fact, they are not isolated cases; instead, it might be a trend in the near future. Evidence for this assumption is the development of the tablet-project in schools (German: *Tablet-Projekte in Schule*). Concretely, in this project, it was advocated to use tablets in the teaching and learning process (Breiter, 2015). Therefore, it was assumed that tablet adoption is written in the curriculum on school level.

Summarily speaking, the characteristic of the curriculum in Germany is competence-oriented. Regarding the adoption of teaching methods, group study and partner study are indirectly required to be used. Though the adoption of media is not tablet is not officially regulated on a government level, some schools have intended to make change on school level. In other words, the adoption of tablets is in the curriculum on the school level.

8.1.2.2 Curriculum in Chinese schools.

In Section 4.2.2.3.2, it was pointed out that a unified official curriculum for the sample major which is accounting in Chinese secondary VET schools had not been constructed. Even in the same province, schools may have different curriculum just like the three Chinese sample schools involved in this study.

Nevertheless, all of these schools had a common objective: preparing for the accounting certificate exam [22]. The accounting certificate was an entry-level certificate for

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[22] This certificate was cancelled in November 2017. As for the data collected in 2016, this explanation is still applied to the situation at that point of time. This exam was a national one that was organized by the Ministry of Finance and was generally organized by the provincial financial department. With a unified national guideline, local government prepare their own textbooks and arrangement times for the exam. The three exam subjects were Financial Regulations and Accounting Professional Ethics, Basic Knowledge of Accounting, and Accounting Computerization.

the accounting profession, and it was regarded as the primary task for teaching because the acquisition rate of this certificate was seen as one reflection of teaching quality (Cheng, 2015; Gou, 2016). It was also believed that students who have this certification have an advantage in the job market. As proven in one empirical study, students having this certificate was listed as one of the recruiting requirements by the half of the investigated companies, and some companies preferred to recruit candidates with an accounting certificate (Sun, 2015). As a result, it was always advocated to design the curriculum in accordance to the guideline of this exam (Chen, 2016).

With this in mind, it was assumed that the curriculum in Chinese schools is examination-oriented. This is in accordance to what was observed in the classroom. Concretely, in the observation process, the sample teachers often stressed the importance of those contents that might appear on the test and require students to transcribe notes.

Another characteristic perceived was that students are expected to be practical bookkeepers who had sufficient theoretical knowledge of bookkeeping and applying it in practice. Evidence for this statement lies in the teaching contents in the target courses. The course Basic Knowledge of Accounting is more about the theory of debit-credit bookkeeping. In other courses, the objective is to teach students to apply the theoretical knowledge in reality, such as the Course C2 and Course C3 in schools CA (Section 7.1).

8.1.2.3 Different curriculum in the compared countries.

Comparing the characteristics of the curriculum in Germany and China, an apparent difference was perceived. In Germany, curriculum is competence-oriented and attach more importance for the world of work. While in China, curriculum is exam-oriented and more so academically oriented. A difference can be also found with the regulation of the adoption of teaching methods and instructional media in curriculum. In the interpretation process, a different might be the reason for different teaching and learning types and thus it was regarded as one determinant for interpretation.

8.1.3 External – meso level – school – media availability.

On the meso level, only one contextual factor, media availability, was selected (Section 3.4.2). In Section 6.1 and Section 7.1 the classroom infrastructure in the sample schools from Germany and China were described, respectively. In this section, media availability from a broader perspective is introduced. The general situation in the compared countries is described based on the results from other studies. Having glimpse of those relevant studies, a trend that the focus is given to the adoption of modern or digital media in classroom can be witnessed. With regard to the traditional media, it was seldom discussed. Similarly, in Section 8.1.3.1 and Section 8.1.3.2, the availability of modern media in German and Chinese schools is described as it was assumed that there is not so much difference of the availability of traditional media. This assumption is proven by the observation results from this study (cf Section 8.2.2.1). Afterwards, in line with the structure in the former sections, a comparison is made between the situation in the compared countries (Section 8.1.3.3).

8.1.3.1 Media availability in German schools.

In the German context, since the concept Industry 4.0 and Economy 4.0 have been put forward, digitation in schools became a hot topic. It was believed that the influence brought by this transformation was not confined to the macro (working environment) and meso (institutional) level, but also to the micro level (teaching and learning in schools; Wilbers, 2017). Then, in order to keep up with this transformation, education, including vocational education, should be changed accordingly (Padur & Zinke, 2015; Wilber, 2017).

Among the various aspects that should be reformed, installation of digital infrastructure in schools is one significant aspect in that it is the prerequisite for realizing the digitation in reality. Recently, its importance has been recognized by policymakers, albeit gradually, and a large amount of money was planned to invest in the installation of digital media in schools. For example, the state government of NRW made the decision to invest

€10 million Euros to strengthen the digital equipment in vocational education (Die

Landesregierung Nordrhein-Weistfalen, 2018).

From the macro level, the change might be seen. However, regarding to what extend

the infrastructure changed in schools and especially in vocational schools, change is seldom

systematically investigated. Nevertheless, some clues can still be traced from relevant

studies.

In Figure 8.3, the results from an investigation conducted among 502 teachers

working on lower secondary level are presented. As shown, fixed computers and beamers

are the most common digital media in classrooms, as almost every teacher confirmed their

availability. This is consistent with what was observed – in every sample classroom, a

computer for teacher use and beamer were installed. In one iPad class (Class GA-3), there

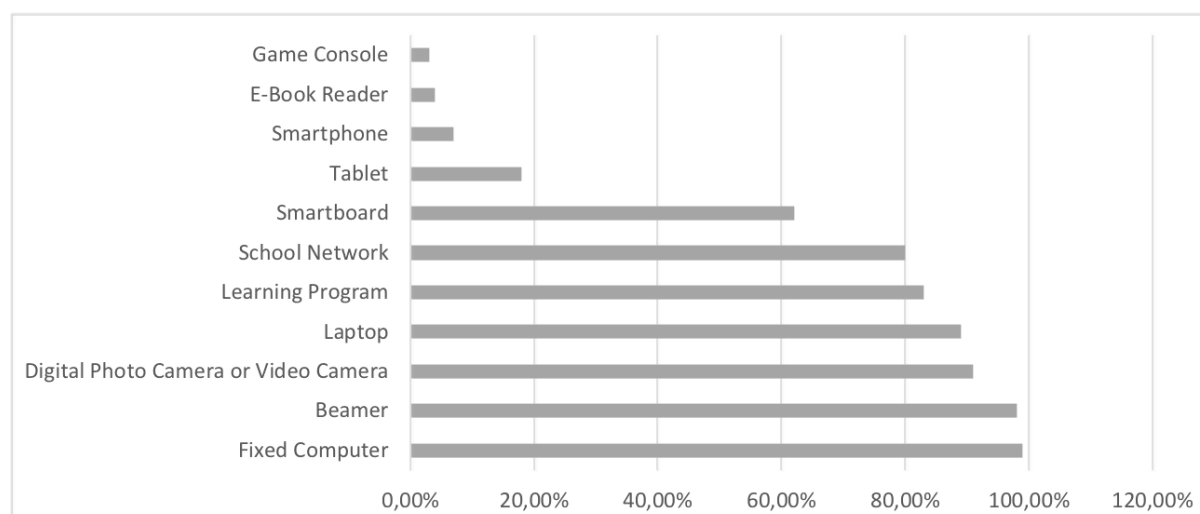were four computers for students' use (Table 6.1).

Figure 8.3. Which of the following electronic media and devices are available at your school for use in the classroom?
Note. Adapted from Bitkom Research.

The tablet was another media that was recorded in the observation process. In Figure

8.3, it is indicated that tablet was only available in a small number of classrooms. This is

different from the situation in the classroom having attended. In German schools, three of the

seven sample classes are iPad classes in which students are required to bring a tablet into the

classroom (Table 6.1), but it still cannot be concluded that at the moment, the tablet is

particularly popular in German schools. At the process of sample selection, these iPad classes were selected on purpose. As mentioned previously, the tablet-project in schools has been widely carried out and nowadays is inserted into the teaching and learning in some schools. Therefore, it could be merely assumed that iPads in schools is the trend in Germany.

Apart from the three-digital media, other media that are mentioned in Figure 8.3 were not recorded in the sample classrooms[23]. Combing the results from others and from observation, it was assumed that three main digital media in commercial VET schools are computers, beamers, and iPads.

8.1.3.2 Media availability in Chinese schools.

In fact, it is not easy to summarize the general situation of classroom infrastructure in Chinese schools. As glaring differences might be found among provinces, among schools in the same city, or even among majors in the same school. Following, some characteristics of the infrastructure in the classrooms for the target major accounting in VET schools were determined.

In the last few decades, increasing importance has been attached to VET in China. In the process of resolving the issue that graduates from VET lacked practical skills, it was advocated to construct a training base on campus. As described in the government document that was issued in 2005, the plan of constructing training bases equipped with advanced technology should be implemented continually (The State Council of the PRC, 2005). By 2010, the central government has invested 3.86 billion yuan (equal to \$57 million USD) to support this project and 2,356 training bases were built (Zhang, Guo, & Chen, 2011). Though precise information about the investment in the past ten years was not retrievable, it can still be concluded that this project moved forward and most of the VET schools, at least in Peking and Shanghai, have their own training base on campus. The influence that might be brought by this movement is the change of instructional media in schools.

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[23] Here, it is only the availability of hardware that is focused.

Generally speaking, in the training bases, a working environment is simulated. In the training rooms for accounting, it was required to have all of the materials and equipment that might be used in reality; for example, such as accounting documents, accounting books, currency counters, an abacus, and so on (Yang, 2008). However, most of them are still categorized as traditional media. Only computers and the software running on them are modern. Specifically speaking, in the training rooms, enough computers for students' use (i.e., one computer for one student) should be installed.

This is in accordance with what was observed, where two of the classrooms involved in this study were training rooms (Table 7.1). As described in these rooms, apart from a computer for the teachers' use, every student had a computer[24] (Figure 7.1). It could be said that the installation of more computers is the major change in the process of digitation for the accounting major in Chinese schools.

8.1.3.3 Different media availability in the compared countries.

In the former two sections, the situation of the modern (digital) media availability in German and Chinese schools are described. Comparing their characteristics, differences can be witnessed. Concretely, in German schools, a tablet is a media type that has been recently integrated into the teaching and learning process. While in China, apart from computers, no other modern media is widely used. And computers for students' use in training room might be seen as its characteristic. It can be said that differences exist, and this should also be regarded as one determinant (D3).

8.1.4 External – micro level – class size.

On the micro level, only one factor was picked out: class size (Section 3.4.2). Having a large student number in one class is often regarded as one characteristic of the confusion-heritage education (Biggs, 1966). However, this was not the situation in the sample classes in Chinese schools. As presented in Table 7.1, the average student number in the sample

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[24] In Training Room 2, computers were hidden under the table.

classes was 23, which was almost the same as in German schools which had 22 students (Table 6.1). Therefore, for explaining the different teaching and learning styles, class size was not the proper interpretation dimension in this study.

8.1.5 Summary: Three determinants for interpreting the comparison outcomes.

In the above section, the situation of the four contextual factors in the compared countries was described and then compared. Finally, apart from the factor of class size, an apparent difference was witnessed with other three factors (Figure 8.4). In this study, there are five determinants that might lead to the different utilization of teaching methods and instructional media. In Section 8.3, their possible relationship with the comparison outcomes derived from the observation is further elaborated.
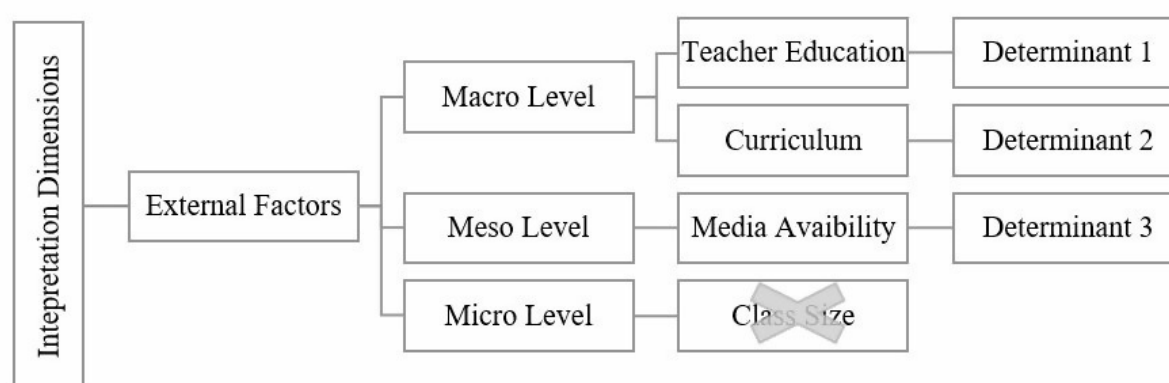

Figure 8.4. Three determinants for interpretation.

8.2 Elaboration of the Comparison Outcomes

As defined in Section 3.3, the teaching and learning that is compared in this study is one significant segment group in a lesson. Then in this section, the focus is shifted to the teaching and learning activities for development, review, practice, and enrichment as previously shown in Chapter Five. Time allocated to this segment group is defined as *engaged time* or *time on task*. As seen in Figure 8.5, engaged time occupies the largest portion of the allocated lesson time in both German and Chinese schools. But, it cannot be concluded that the pedagogical practice in the two contexts are the same as more apparent

differences are identified when a comparison is made on the usage of teaching methods and instructional media.
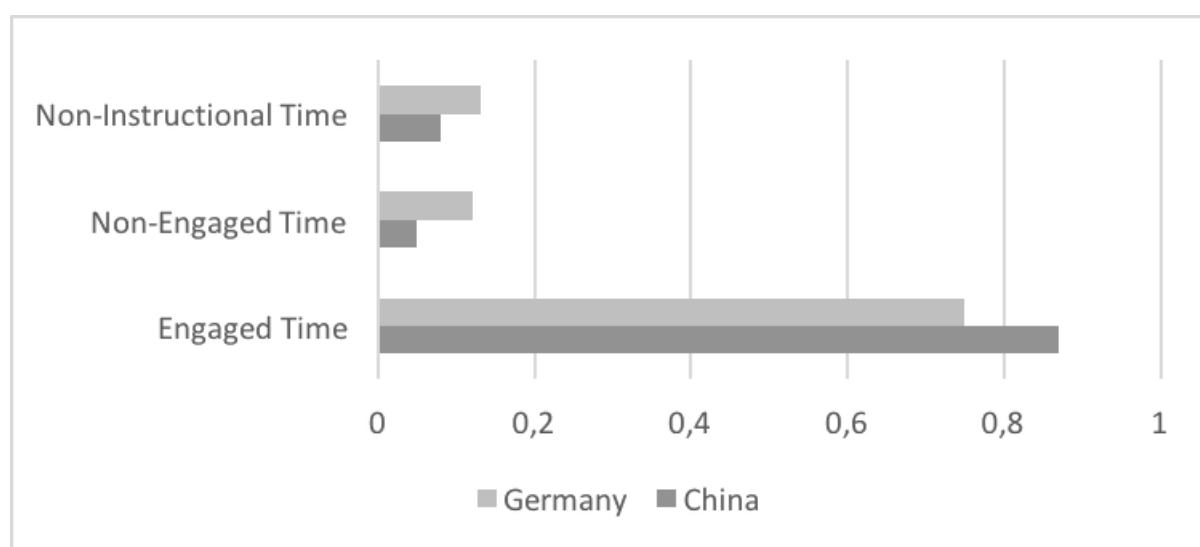

Figure 8.5. Comparison of time usage (Percentage [%] of the allocated lesson time).

8.2.1 Comparing the use of teaching methods in German and Chinese schools.

In Figure 8.6, time allocated for each teaching method in German and Chinese schools is compared. Obviously, both similarities and differences could be found. Specifically speaking, the methods of recitation by teacher, demonstration, recitation by student, report by student, as well as group study and partner study are seldom used in either German and Chinese schools. On average time spent engaged in each of these methods is less than two minutes in every teaching hour (Figure 8.6). In contrast, individual learning is very popular in both of the compared countries. On average, it is around thirteen minutes in every teaching hour. As well, results from the two sample t-Test by using the software Microsoft Excel, indicated that the significant difference in the average time for the methods mentioned above cannot be identified.

Apart from these similarities, the main difference is in the use of the method of lecturing, as well as question and answer. Specifically, there was significant difference in the average time for lecturing in Chinese schools (M = 15.6, SD = 9.9) and in German schools (M = 2.5, SD = 4.1) (t(127) = 11.9, p < .05). In contrast, question and answer is more often

used in German schools (M = 13, SD = 9.3) than in Chinese Schools (M = 7, SD = 5.6)

(t(157) = 5.5, p < .05). These two aspects as outcome 1 and outcome 2 in this study (Figure

8.18).

Above, the average time allocation to each indicator was compared. In the

observation process, it was found that when other aspects were taken into consideration for

comparison, such as the method for different purposes and how the individual method was

utilized, other aspects were perceived. This type of difference has been identified with the

method of question and answer, the cooperative learning method, and individual learning

(Table 8.4). Taking these two types of difference into consideration, it was concluded that a

difference can be seen within four methods: lecture, question and answer, cooperative

learning, and individual learning. In the following sections, how the methods of questioning,

cooperative learning (group study and partner study), and individual learning was utilized

differently, analyzing from other aspects, is elaborated. In other words, the difference that

was reflected by the statistics aspect, or average time allocated to each of them, is not further
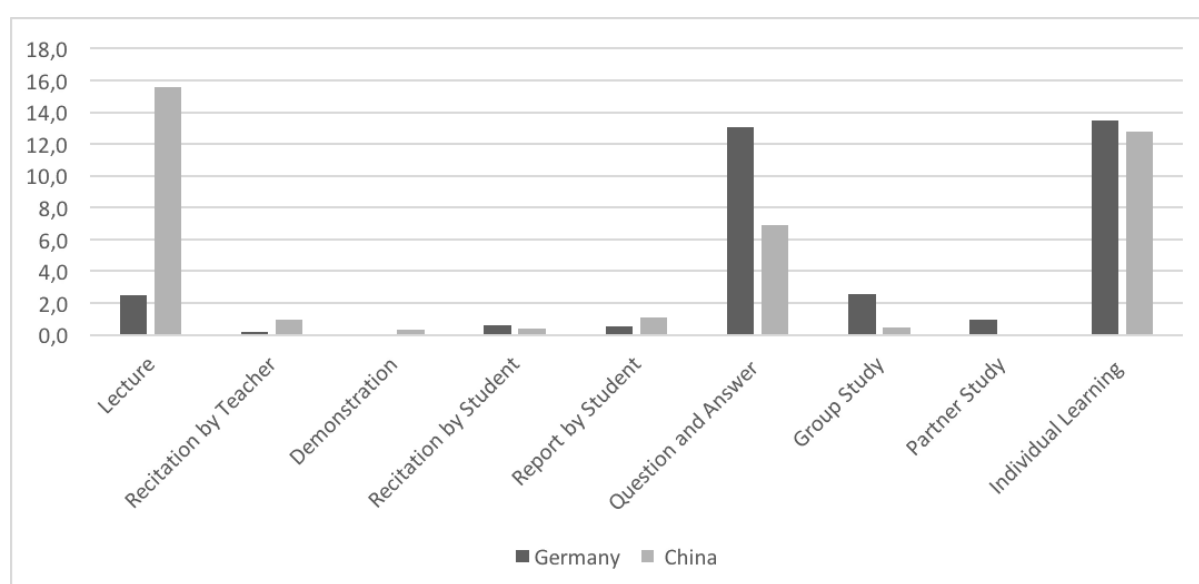
elaborated.

Figure 8.6. Comparison of the time for the concrete teaching methods (Minutes [min.]/teaching hour)

Table 8.4

Comparison Outcomes – Teaching Methods

	Lecture	Recitation (Teacher)	Demon-stration	Recitation (Student)	Report	Question	Group Study	Partner Study	Individual Learning
Statistic Difference	✓	✕	✕	✕	✕	✓	✕	✕	✕
Other Difference	✕	✕	✕	✕	✕	✓		✓	✓
Comp. Outcomes	1	-	-	-	-	2	3		4

Note. "✓" means difference exists; "✕" means difference does not exist.

8.2.1.1 Question and Answer – For different purposes and with different forms.

As mentioned previously, an obvious quantified difference was witnessed with the time allocation to the method of question and answer. Apart from this point, two different aspects have also been identified. One is regarding for what purpose this method was used (Outcome 2a). The other is concerning how students answered teachers' question (Outcome 2b).

8.2.1.1.1 Outcome 2a: Question and learning is more often used for development purpose in German schools.

As was defined in Section 3.3.1, the activities that took place in the segments for the purpose of development, review, practice, and enrichment are regarded as the teaching and learning activities. In the observation process, purposes for different segments were coded and recorded. Then, the result concerning for what purpose a method is used was received. By doing so, an obvious difference was witnessed with question and answer.

As shown in Figure 8.7, a similar quantified result was seen with the segment purposes of review, practice, and enrichment. By contrast, a significant difference lies in the average time for the development purpose. More specifically, in German schools, the method of question and answer was more often used for developing new knowledge. It

accounted for more than 60% of the total time for the method of question and answer (Figure 8.8). In Chinese schools, however, question and answer was more often used for the purpose of review.
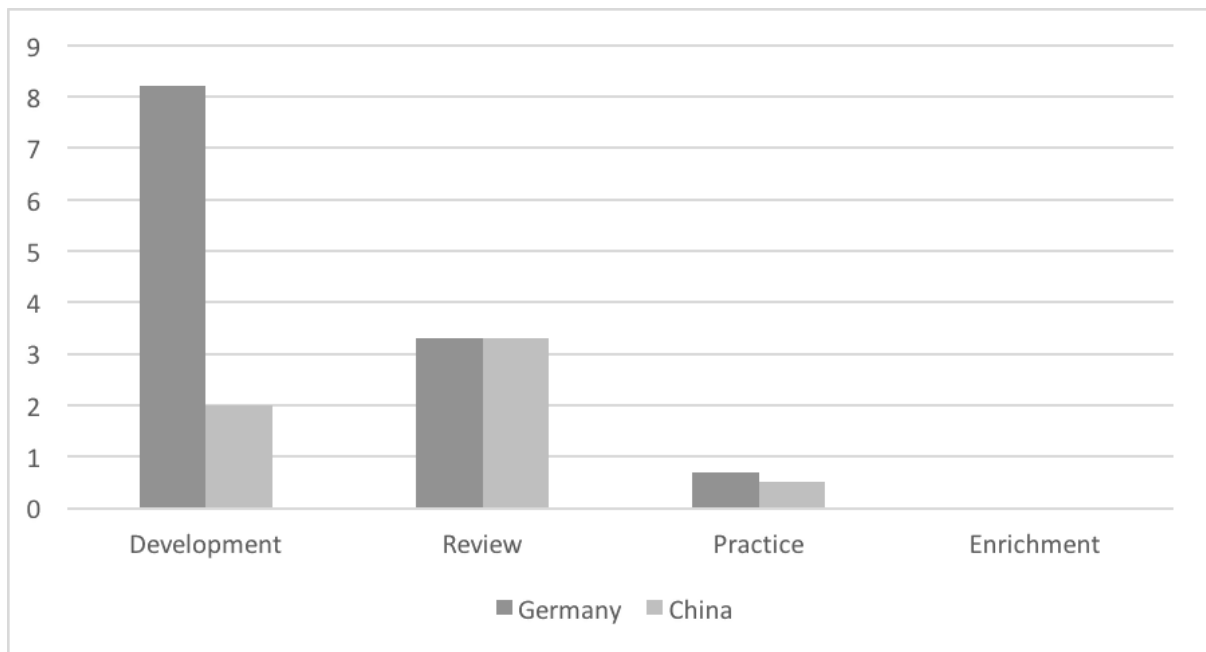

Figure 8.7. Comparison of question and answer with different segment purposes (Minutes [min.]/teaching hour).
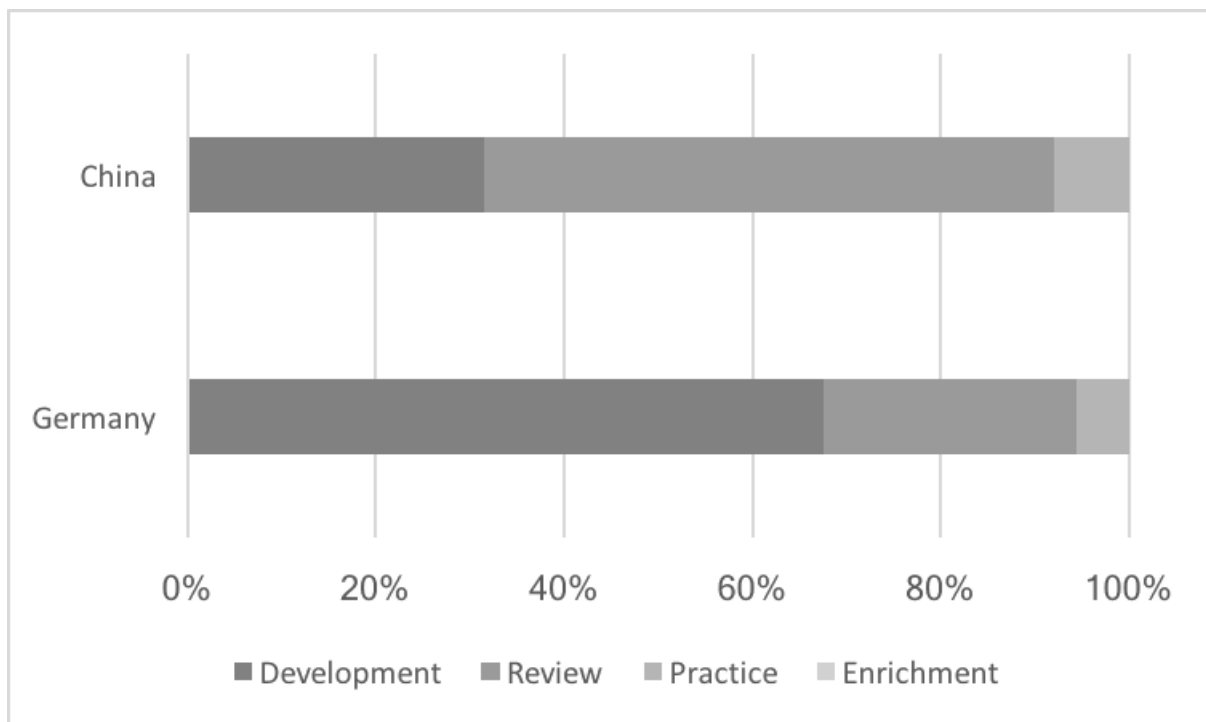

Figure 8.8. Comparison of question and answer for different purposes (Percentage [%] of the total time for question and answer).

8.2.1.1.2 Outcome 2b: Questions are usually answered by some students together in Chinese schools.

Another difference perceived lies in the interaction mode with this method. In German schools, teachers usually posed a question to the whole class and then asked the students who had raised their hands to answer the question. If the answer was wrong, the teacher would not directly point out the error. In the most situations, they preferred to guide students to the correct answer by giving more information. In Chinese schools, it was a different picture. Teachers usually posed a question that had a unique answer, such as calculation results or selecting the correct subject. In most cases, they posed a question and randomly selected a student to answer the question. It was found that teacher preferred to ask the students who misbehaved (e.g., sleeping, playing mobile phone, etc.) to answer the question as a way to interrupt their misbehavior.

With respect how question was answered, it was quite different in the compared countries. In Chinese schools, questions were usually answered by some students together (Indicator: Question and Answer 2). Time for this indicator accounted for almost 60% of the total time for this method (Figure 8.9). However, such a situation was seldom recorded in German schools. The percentage for question and answer 2 is small enough that it can be disregarded (Figure 8.9).
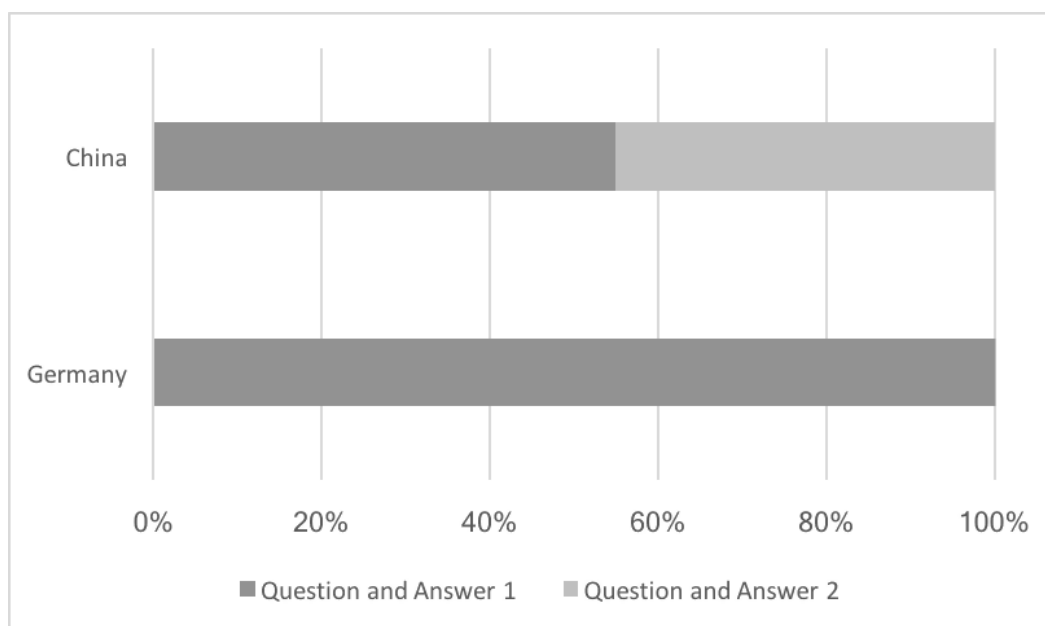
Figure 8.9. Comparison of the usage of question and answer (Percentage [%] of the total time for question and answer).

8.2.1.2 Cooperative learning - Outcome 3a: Diversified utilization of group study and partner study in German schools.

Though the average time for group study and partner study in the two compared countries had a similar small scale, a different aspect was found when the teaching concepts behind these methods were taken into consideration.

Concretely, in German schools, group study and partner study were found to be embedded into the teaching concepts of a group puzzle or station learning as described in Section 6.2.3.2. Such a utilization took place during 25% of the time for the cooperative learning method (Figure 8.10). In contrast, in Chinese schools, group study and partner study were only used in the traditional way. From this respect, it was assumed that group study and partner study are more often used for some other teaching concepts in German schools.
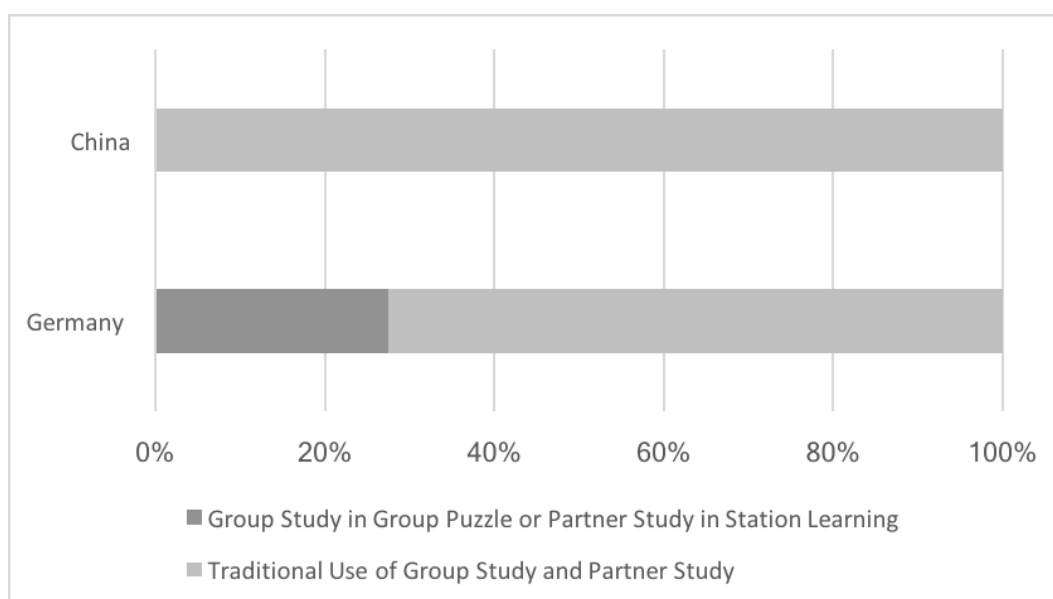
Figure 8.10. Comparison of the use of group study and partner study (Percentage [%] of the total time for these two methods together).

8.2.1.3 Individual learning – with different organizational structures and for different purposes.

As mentioned previously, there was no statistical difference regarding time allocation to individual learning (Table 8.4). Or to say, this method was particular welcomed in both German and Chinese Schools (Figure 8.6). However, two different aspects have also been found: individual learning with different organization structures (Outcome 4a) and for different purposes (Outcome 4b).

8.2.1.3.1 Outcome 4a: Individual learning with group arrangement is more often used in Chinese schools.

Time allocation to individual learning was composed of two parts: time for the individual learning with the group arrangement (Indicator: Individual Learning 1) and time for the individual learning with the individual arrangement (Indicator: Individual Learning 2). In the two compared countries, time allocated to these two indicators was different (Figure 8.11). In Chinese schools, time for Individual Learning 1 accounted for 30% of the time for individual learning. By contrast, in German schools, it occupied only 10%. From this

comparison, it was assumed that individual learning is used slightly more often with group
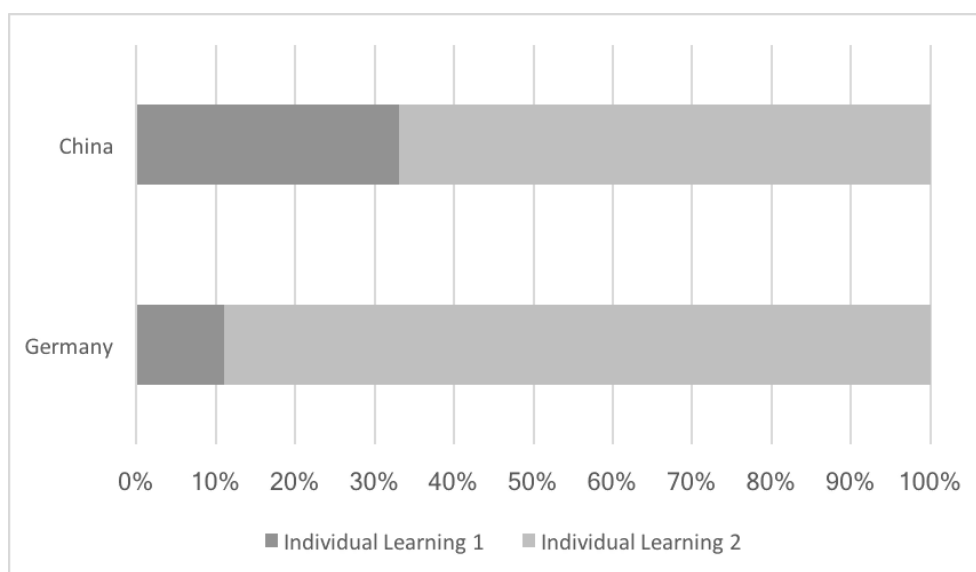
arrangements in Chinese schools.

Figure 8.11. Comparison of the time percentage for individual learning with different organizational structures (Percentage [%] of the total time for individual learning).

8.2.1.3.2 Outcome 4b: Individual learning is more often used for development purpose in German schools.

Another different aspect lies in the purpose for which individual learning was utilized.

In the observation process, it was found that individual learning was mainly used for two

purposes: development and practice. And a clear difference exists in the time percentage

used for them (Figure 8.12). To put it another way, results from this comparison indicated

that in Chinese schools, individual learning was only used for students doing exercises while

in German schools the majority of the time for individual learning was used for students

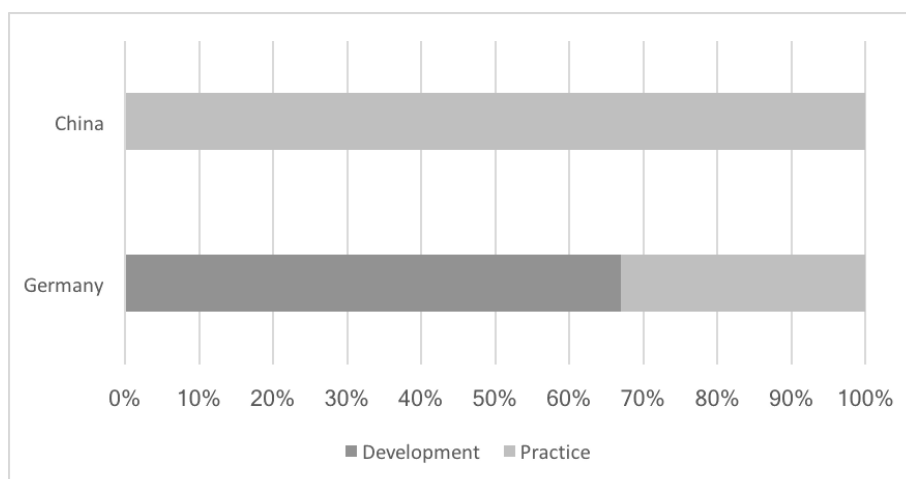learning new knowledge by themselves.

Figure 8.12. Comparison of the time percentages of individual learning used for different purposes (Percentage [%] of the time for individual learning).

8.2.2 Comparing the use of instructional media in German and Chinese schools.

As shown in Figure 8.13 and Figure 8.14, in both German and Chinese schools, time allocated to no media and mixed use of modern and traditional media accounts for only a small part of the engaged time (no media: 11% in Germany and 18% in China; Mixed use: 5% in Germany and 3% in China). By contrast, significant difference can be seen with the other two sub-categories. Concretely, the results indicated that modern media are more often used in Chinese schools (M = 13.4, SD = 11.5) than in German schools (M = 1.6, SD = 4.9) (t(128) = -9.3, *p*< .05). And traditional media are more often adopted in German schools (M = 26.1, SD = 11.5) than in Chinese schools (M = 16.8, SD = 12.4) (t(189) = 5.4, *p*< .05). At the same time, some other meaningful results were noted when comparing on the indicator-level, as shown in Section 8.2.2.1 and 8.2.2.2.[25]

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[25] Time for the mixed use of modern media and traditional media was calculated as part of the time for the modern media in the combination. For example, time for the combination of computers with Microsoft, beamers, Microsoft and textbooks are added to the time for computers with Microsoft, beamers. Besides, when in the combination two or more modern media are used at the same time, the prominent one is given emphasis.
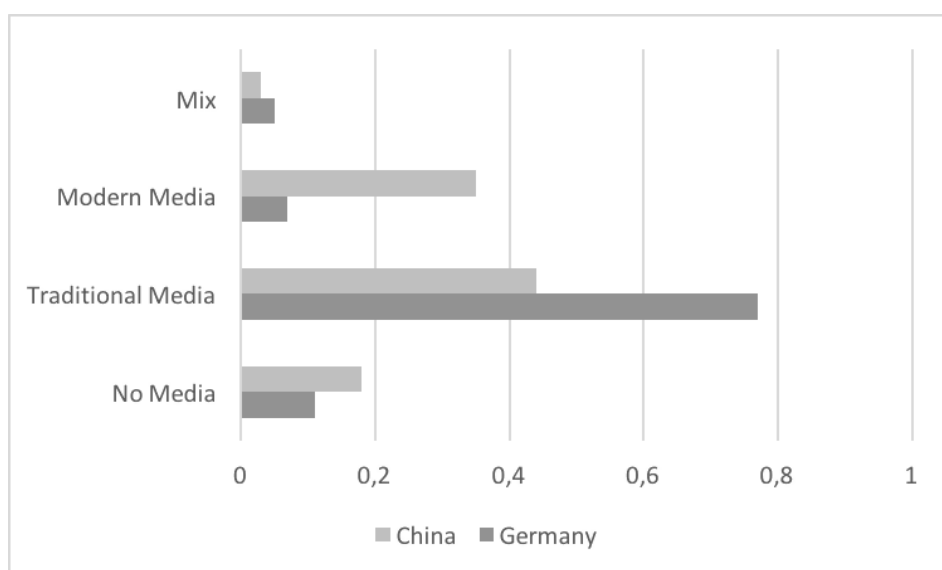
Figure 8.13. Comparison of the use of instructional media (Percentage [%] of the engaged time).
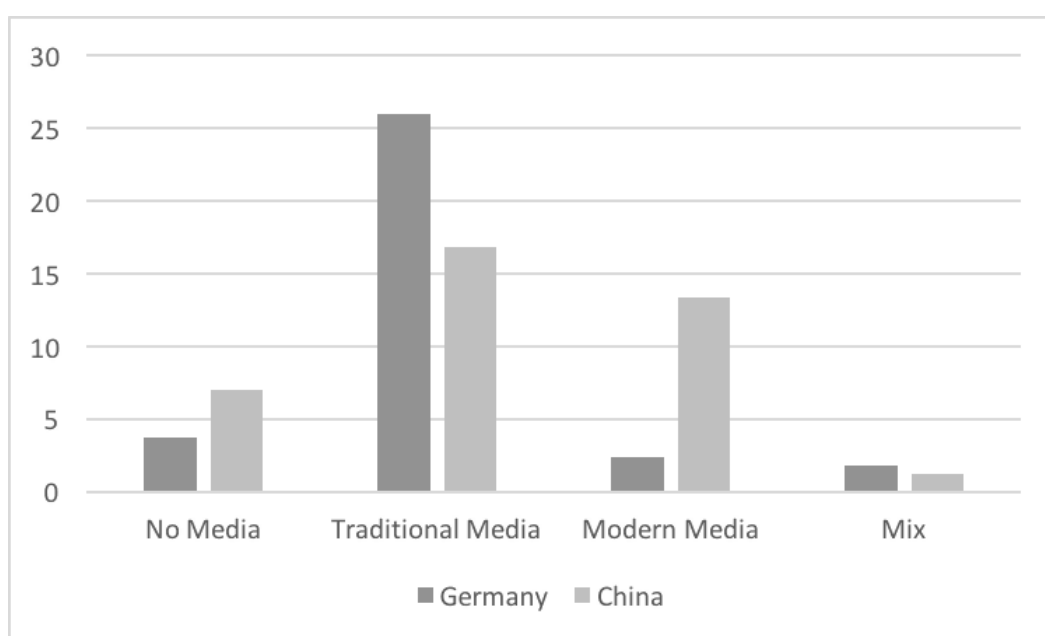
Figure 8.14. Comparison of the use of instructional media (Minutes [min.]/teaching hour).

8.2.2.1 Comparing the use of traditional media.

With respect to the use of traditional media in the classroom, there is no significant difference. As shown in Table 8.5, workbooks were the only media type that was recorded in one country, which was China. Apart from workbooks, other resources were available in both German and Chinese schools. As described in Section 7.2.4.1, within workbooks, various simulation-practice exercises were listed. In fact, it was similar to worksheets that

were widely used in German schools. Additionally, the model used in Chinese schools refers to the original documents for accounting which was printed out. It could be also seen as a kind of worksheets. So, they are seen as one comparable unit (Unit 3 in Table 8.5). With a similar examination, chalkboards and whiteboards are regarded as one comparison unit (Unit 1 in Table 8.5).

In Figure 8.15, the average time for each comparison unit is presented and compared. As shown, time allocated to unit 1 (blackboard and whiteboard), unit 2 (textbook) and unite 3 (Worksheet, Workbook and Model in Chinese Schools) are almost the same. And the results from t-test indicated that no significant difference could be determined. But there was a significant difference in the average time for Unit 4 (project media) in German schools (M = 2.4, SD = 7.1) and in Chinese Schools (M = 0.1, SD = 1.1) (t (100) = 3.1, p < .05) (Outcome 5). As well as for the Unit 5 (calculator). It was more often used in German schools (M = 6.1, SD = 10.2) than in Chinese schools (M = 1, SD = 2.9) (t (110) = 4.7, p < .05) (Outcome 6).
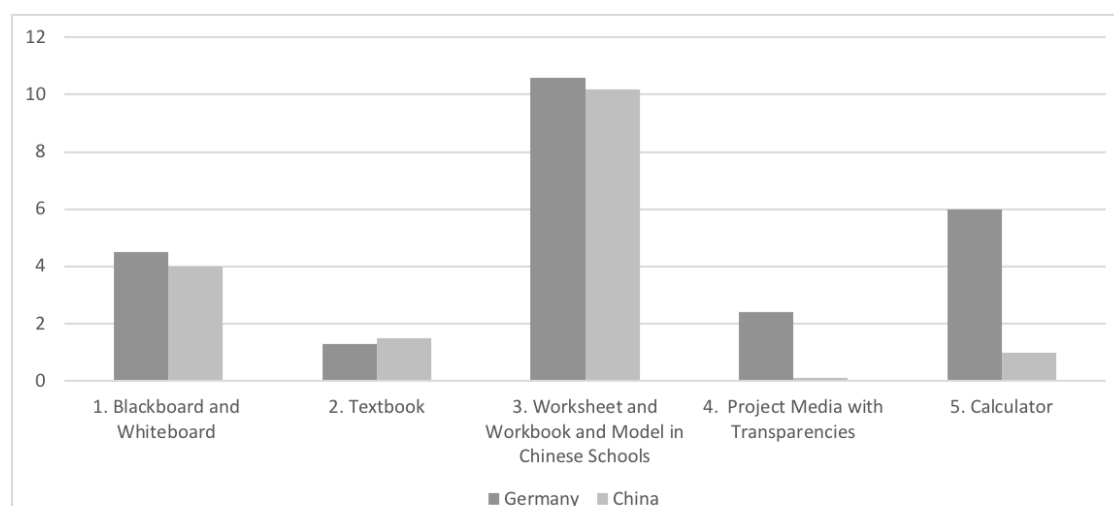

Figure 8.15. Comparison of the use of traditional media (Minutes [min.]/teaching hour).

Table 8.5

Comparison Outcomes – Traditional Instructional Media

	Chalk-board	White-board	Text-books	Work-sheets	Work-books	Models	Project Media[26]	Calculators
Availability Comparison								
Germany	✓	✓	✓	✓	✗	✓	✓	✓
China	✓	✓	✓	✓	✓	✓	✓	✓
Comp. Unit	1		2	3			4	5
Quantified Comparison								
Difference exists Yes or no?	✗		✗	✗			✓	✓
Comp. Outcome	-		-	-			5	6

Note. In the table block availability comparison: "✓" means media available in the classroom and "✗" means not available; in the table block quantified comparison: "✓" means difference exists; "✗" means difference does not exist.

8.2.2.2 Comparing the use of modern instructional media.

In all the classrooms attended, one computer for teacher's use and a digital projector were available both in Germany and China. In some classrooms, computers for students' use were installed (one classroom in Germany and one classroom in China). In addition, some other modern media tools were also noted, specifically a tablet (iPad) and mobile phone. The projector is usually used together with other media. The three units compared are thus computer, tablet (iPad) and mobile phone (Table 8.6).

In Figure 8.16, a comparison of the average time each tool is used in every teaching hour is shown. Apparent differences can be seen in the use of the computer, i.e. more often used in Chinese schools (M = 13.9, SD = 12) than in German schools (M = 2.5, SD = 6.8) (t (150) = -8.1, p < .05). Regarding to Tablet and Mobile Phone, no significant difference was found and both of them are seldom used in German and Chinese schools.

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[26] Project Media with Transparencies.

In addition, time used running different software on the hardware mentioned above is compared. The four software types recorded were: learning software, Microsoft Office (Word and PowerPoint), simulation software, the Internet, and apps. As presented in Figure 8.17, time used with learning software, simulation software, internet and app are all on a small scale and the t-Test results indicated that no significant difference exists between the countries. By contrast, differences are seen with Microsoft Office use, more time in Chinese schools (M = 12.8, SD = 12) than in German schools (M = 2.6, SD = 6.9) (t (152) = -7.1, p < .05).

In most cases, when one device is used with Microsoft Office (Word and PowerPoint), its function is to present information, as with other traditional media. Then it could be assumed that the computer is more often used in Chinese schools (Outcome 7), but merely used for presenting information.

Table 8.6

Comparison Outcomes – Modern Instructional Media

	Mobile Phone	Tablet (IPAD)	Computer	Beamer
Availability Comparison				
Germany	✓	✓	✓	✓
China	✓	✗	✓	✓
Comp. Unit	1	2	3	-
Quantified Comparison				
Difference exists yes or not?	✗	✗	✓	-
Comp. Outcome	-	-	7	-

Note. In the table block availability comparison: "✓" means media available in the classroom and "✗" means not available; in the table block quantified comparison: "✓" means difference exists; "✗" means difference does not exist.
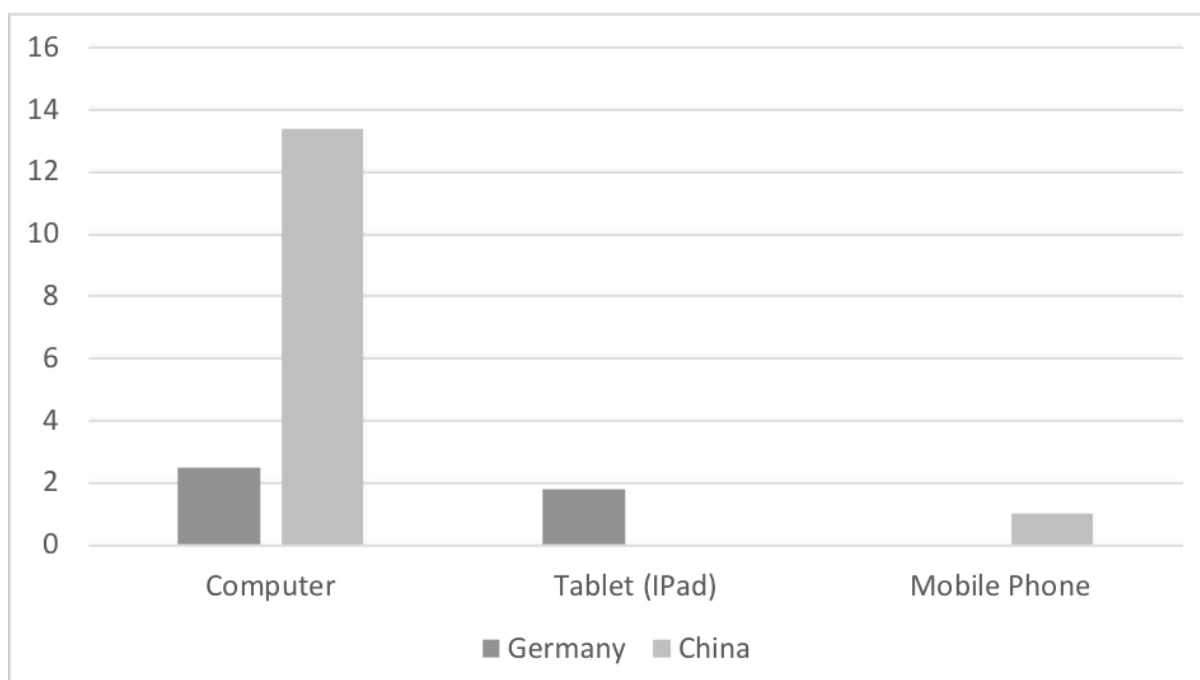
Figure 8.16. Comparison of the use of modern media (Minutes [min.]/teaching hour).
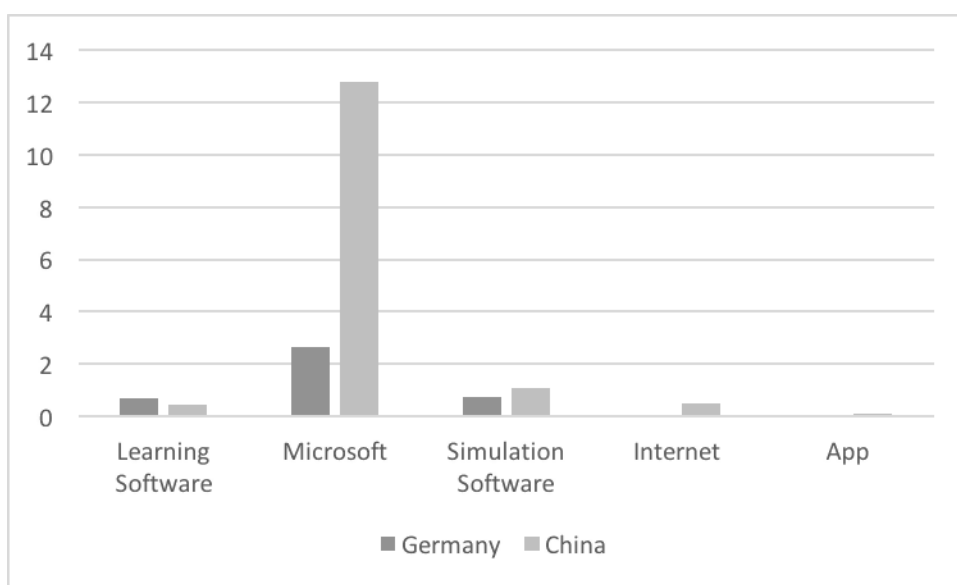
Figure 8.17. Comparison of the utilization of software (Minutes[min.]/teaching hour).

8.2.3 Summary: Ten comparison outcomes within seven observation indicators.

In Section 8.2.1 and Section 8.2.2, the adoption of teaching methods and instructional media in German and Chinese schools were compared respectively. Generally speaking, both similarities and differences have been perceived. Regarding those different aspects, ten outcomes within seven indicators were found: lecture, question and answer, cooperative learning methods (including partner study and group study), individual learning, project

media, calculators, and computers. In Figure 8.18, all of these outcomes are summarized and listed. It should be mentioned that the results are highly aggregated and might be oversimplified as they are derived from an observation in which a small number of samples was included.
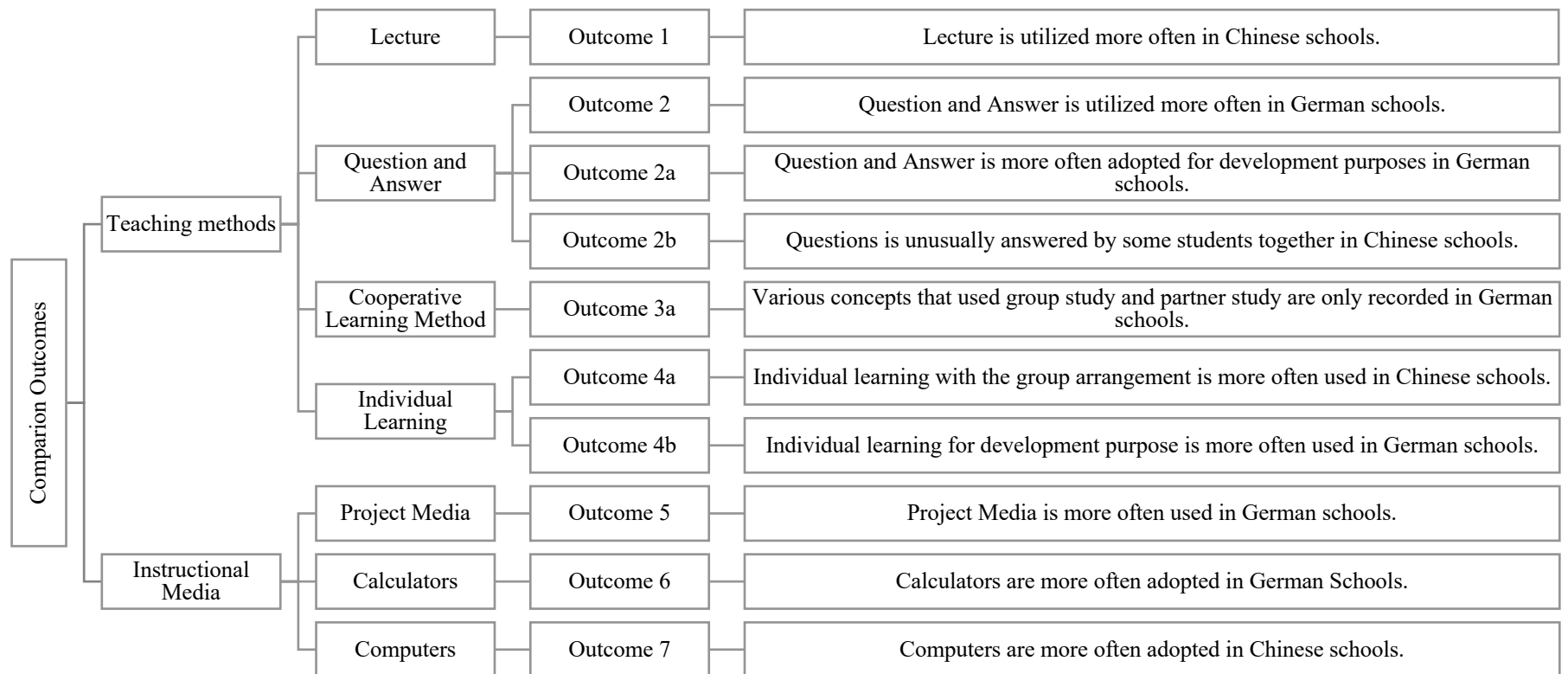
Figure 8.18. Overview of the comparison outcomes.

8.3 Relating the Comparison Outcomes to the Contextual Differences

In Section 8.1, three contextual differences between Germany and China were identified (Figure 8.4). In Section 8.2, ten comparison outcomes were uncovered (Figure 8.18). This section attributes the comparison outcomes to those contextual differences. In other words, the question of to what extent each contextual difference can be used to explain the different teaching and learning styles in German and Chinese schools is answered.

8.3.1 The influence of different teacher education.

In Section 8.1.1, how pedagogically related knowledge is imbedded into teacher education in the compared countries was elaborated upon, and obvious differences were found. Specifically speaking, in Germany, teacher education is standardized. Pedagogically related knowledge is not only required to be taught, but also imbedded into the curriculum for teacher education. In China, a different picture is presented. Due to the historical reasons, teacher education is disordered. Most current in-service teachers have not gleaned pedagogical knowledge in their initial teacher education, and the efficiency of their on-the-job training is uncertain. As a result, these teachers have insufficient pedagogical knowledge, unlike their German counterparts. In this study, such a difference is reflected in three comparison outcomes (Figure 8.19).

The situation of lecture being popular in China is a result in of many factors. A lack of pedagogical knowledge might be one reason why lecture is so welcomed in Chinese schools (Outcome 1). Teacher education is a significant factor as Chinese VET teachers do not receive sufficient knowledge of teaching and learning. As a result, they know little about other methods. At the same time, influenced by Chinese traditions, they teach via the traditional approach. This assumption was proven by Outcome 3a and Outcome 4a.

It was found that partner study or group study were more often integrated into the other teaching concepts in German schools (Outcome 3a). However, in Chinese schools, such a situation was not recorded. Here, it was assumed that this kind of application was

based on a solid knowledge of cooperative learning. More evidence lies in that individual learning was more often adopted with an individual arrangement in Chinese schools (Outcome 4a). Two situations recorded in Chinese school were:

- **Example 1**: before the teaching hour began, the teacher asked students to change their seat arrangement into groups. The teacher said, "We are going to do group study." However, this method was usually used for students doing exercises or calculation.
- **Example 2**: in the training room where a round desk was equipped, students in a group sat at the same table. During the observation process, the students' task was to document materials like a bookkeeper in a company and each student had the same task. During this "group study," students might talk with each other.

In these two situations, method of cooperative learning was not adopted. In reality, students merely arranged their seats to sit together and worked as an individual group. Thus, in a so-called cooperative learning environment that the teacher constructed, no real cooperative learning took place. However, the teachers indicated that it was used. It might be further assumed that Chinese teachers have insufficient knowledge of other methods and the fundamental reason for this phenomenon the insufficient teacher education.
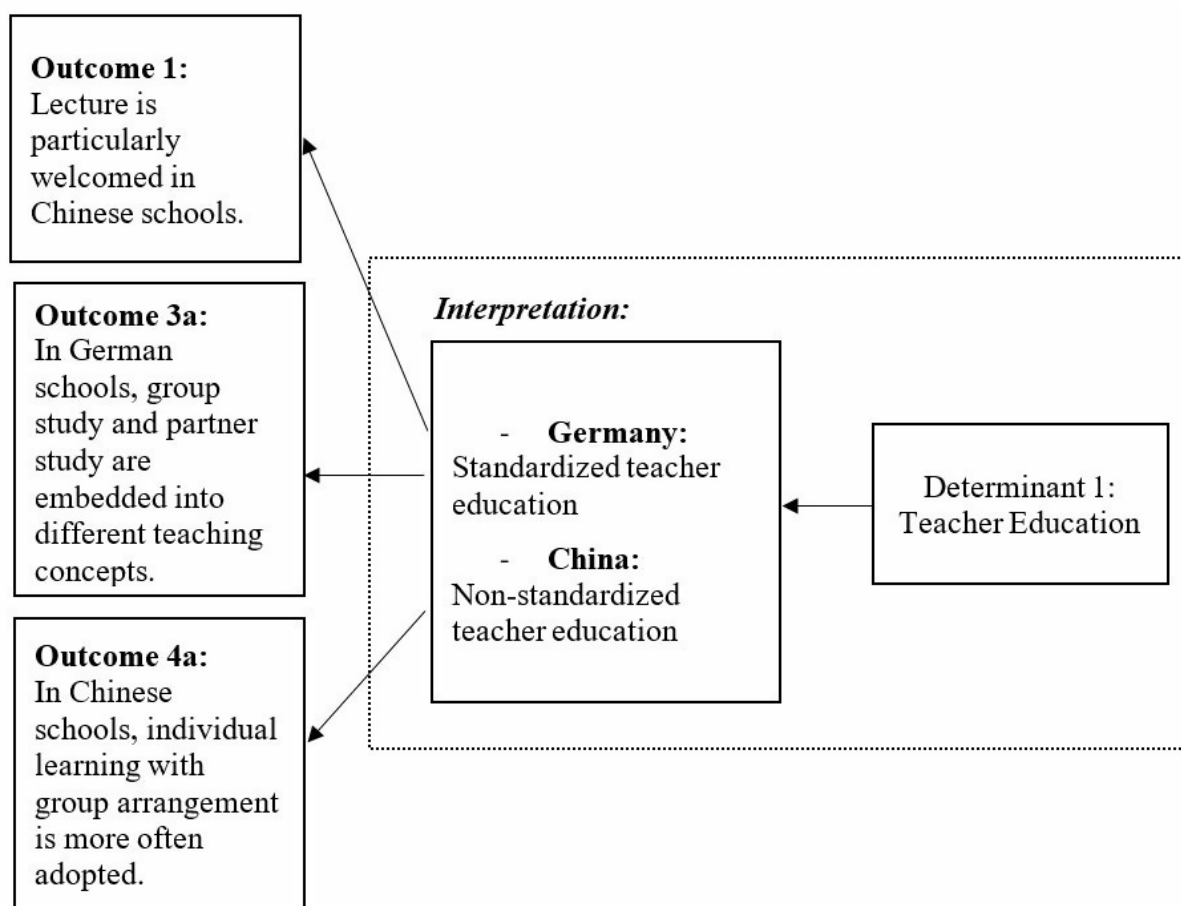
Figure 8.19. Different teacher education systems and their possible influence.

8.3.2 The influence of different curriculum.

In Section 8.1.2, it was concluded that a difference could be seen in the curriculum of the target major. This section explores to what extent these differences were reflected in the comparison outcomes.

Firstly, the concept behind the curriculum was examined. In Germany, the curriculum of the sample German course had competence-oriented characteristics, and it pursued a thoughtful bookkeeper approach. In China, a unified official curriculum did not exist; in other words, every school has its own curriculum. Additionally, an examination-oriented characteristic was reflected in all schools. Moreover, the educational purpose could be summarized as cultivating a practical bookkeeper who can record figures correctly in a working environment.

Such a difference can be used to explain Outcome 1 and Outcome 6. Since in China, the curriculum is examination-oriented, and the theoretical knowledge is emphasized as it is to be tested on the examination. Therefore, this might be one reason why lecture is so often utilized in Chinese schools (Outcome 1) as it is often believed as an efficient way for imparting theoretical knowledge. As mentioned in German curriculum, students are required to have the ability to make decisions on the basis of calculation results; therefore, calculation is one significant part of the lesson. By contrast in the Chinese curriculum, students were required to know how to keep records on the basis of the original documents. Then, in the entire teaching and learning process, calculations were not given more emphasis as their compared counterparts were. Then, such a difference might lead to Outcome 6 that calculators were used more often in German schools.

Secondly, a difference concerning how teaching methods were written into the official curriculum was identified in Section 8.1.2. Concretely, in German curriculum, it was clearly pointed out that the method of cooperative learning and self-regulated learning should be adopted in the teaching and learning process. However, in China, a unified curriculum did not exist and most of the discussion on the topic of curriculum is still on the macro level. With regards to the adoption of teaching methods that might be seen as a more concrete level, there is a lack of attention.

In fact, the relationship between this difference and those comparison outcomes is rather limited. Though it is written in the curriculum in German context, the results from the observation indicated there is no significant difference on the time allocation to partner study and group study (Figure 8.6). Specifically speaking, they are not often used either in German or Chinese schools.

But the outcome that group study and partner study are more often imbedded into some teaching concepts, such as group puzzle and station learning (Outcome 3a), can partly be attributed to such a difference. Usually, group puzzle and station learning are regarded as

part of the self-regulated concept (Herold & Landherr, 2003; Methodenpool Uni Köln, n.d.).

Then it might be assumed that due to its presence in German curriculum, it was used more often.

  Lastly, the final focus is on the different presence of media in curriculum. In German curriculum, the adoption of a tablet (iPad) was included in the curriculum on school level. By contrast, in China, a unified official curriculum did not exist. In other words, every school has its own curricular guidelines. The adoption of media was not clearly pointed out. Though a difference exists, the results that a tablet was more often used in German schools was not received. In other words, at the moment, its utilization rate is still low.
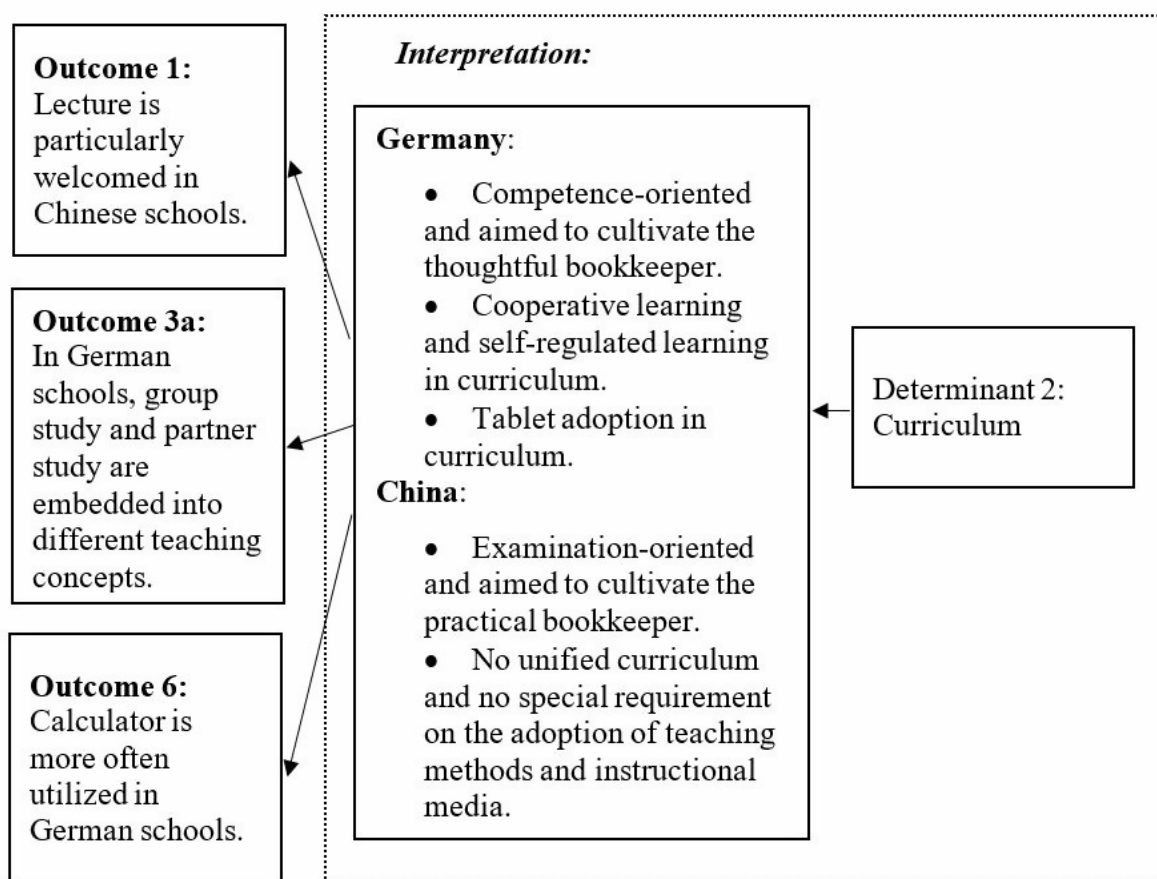
Figure 8.20. Different curriculum and their possible influence.

8.3.3 The influence of different media availability.

As summarized in Section 8.1.3.3, regarding to the availability of modern media, in some German schools, tablets (iPad) are available in classrooms. However, the results indicated that tablets were not often adopted in German schools. In other words, their availability in classroom did not affect their utilization.

In Chinese schools, the change lay in that more computers for students' use were installed. This might be one reason of Outcome 7 – computers are more often adopted in Chinese schools.

The availability of traditional media was seldom discussed, and a general picture cannot be determined. Based upon what was observed, it was assumed that there no great difference exists. It is worthwhile to mention that some traditional media are available in every classroom while some are not. Project media with transparencies is of this category.

For example, in classrooms in Germany, project media were available almost in every classroom. By contrast, in China, they were observed only in one classroom. Such a difference might lead to Outcome 5 that in German schools, project media with transparencies was more often adopted.
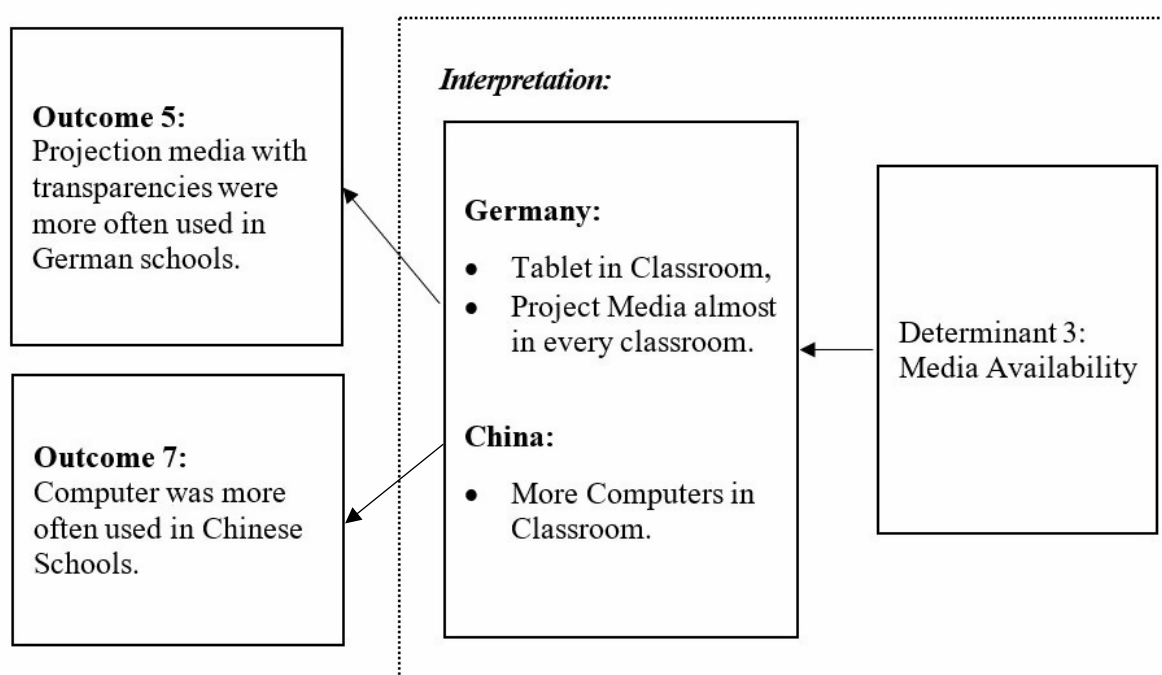
Figure 8.21. Different media availability and their possible influence.

8.3.4 Those unaccounted relationships.

At the beginning of this chapter, it was pointed out that there are three contextual factors that might be used to interpret the comparison outcomes. In the above sections, their possible influence on teaching and learning was elaborated.

By contrast, some of the comparison outcomes were not mentioned, which are Outcome 2, Outcome 2a, Outcome 2b and Outcome 4b. However, it does not mean that they cannot be explained.

In fact, Outcome 2, Outcome 2a and Outcome 4b might be attributed the constructive concept behind the teacher education and curriculum in Germany. Though neither in the standards for teacher education nor the curriculum is it clearly pointed out that teaching and learning should be constructive, but it could still be assumed that teacher education and

curriculum in Germany are constructed on the basis of this concept as it is the pedagogical tradition in Germany – a Socratic or constructivist dialogue model (Hammond & Gao, 2002; Holmes, 2004). Influenced by this concept, it might be easily understood that in German schools, question and answer is utilized (Outcome 2) and used for students constructing knowledge by themselves (Outcome 2a and Outcome 2b).

Moreover, Outcome 2b might be resulted from the factor on the meta level that was not discussed in this study. Briefly speaking, China is a typical collectivist society and Germany is an individualistic society ("Country Comparison – Germany and China", n.d.). Outcome 2b might be seen as the concrete reflection of this difference. As it seems that Chinese students prefer to answer questions together.

Lastly, it is worthwhile to pointed out that Outcome 7 might be also explained by the method adopted. During the observation, it was found that in Chinese schools, computers were always used for presenting knowledge when the teacher gave a lecture. It was then hypothesized that a positive correlation might exist between the adoption of lecture and computer. This assumption was proved through the correlation test. Specifically speaking, the r value is larger than 0.5. So, apart from the influence brought by media availability (Section 8.3.3), other reasons for Outcome 7 can be traced back those contextual factors that led to Outcome 1 (Figure 8.22).
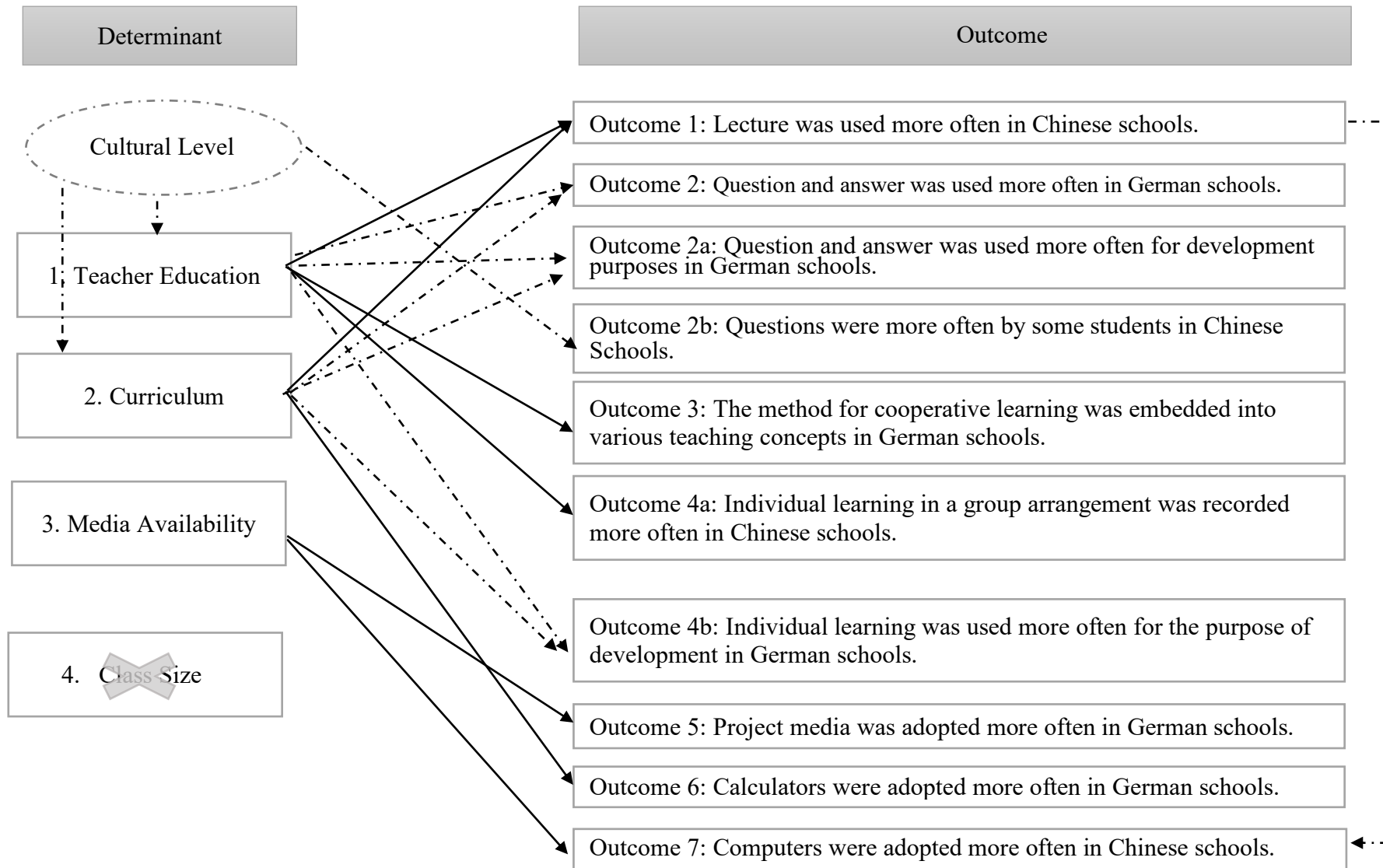
Figure 8.22. Overview of the Relationship between the Contextual Differences (determinants) and comparison outcomes.

Note. "→" means the relationship derived from the observation; "⇢"means that the relationship is not derived from the observation directly.

Chapter Nine: Conclusion, Implications for Practice and Policy, Limitations and

Perspectives

In this final chapter, conclusions drawn from the data comparison in Section 8.2 and interpretation in Section 8.3 are presented in Section 9.1. Afterwards in Section 9.2, suggestions for policy-borrowing between Germany and China are given based on the results from this study. Lastly, the contributions and limitations of this study, as well as the implications for future study, are elaborated upon in Section 9.3.

9.1 Conclusions

Generally speaking, three conclusions have been drawn from the data comparison and interpretation.

9.1.1 From a comparative view: Teacher-dominant in Chinese schools and students-dominant in German schools.

The first conclusion is derived from the comparison of the adoption of teaching methods. As mentioned in Chapter Two, a common practice to judge whether a classroom is teacher-dominant or not is typically based on the analysis of the time allocation to whole-classroom arrangement and group arrangement. Concretely, a larger time allocation to whole-classroom arrangement and less time for group arrangement are always seen as the characteristic of a teacher-dominant classroom (e.g., Götzl et al., 2013; Seifried et al., 2006).

Based on this criterion, the observation results from this study indicated that both German and Chinese schools are teacher-dominant. A large amount of time was allocated to whole class arrangement – 50% in German schools (Figure 6.4) and 66% in Chinese schools (Figure 7.5); and least amount of time was for group arrangement – 15% in German schools (Figure 6.4) and 12% in Chinese schools (Figure 7.5).

However, such an approach is questionable when other criteria are taken into consideration. Specifically, in German schools, students were encouraged more often to involve themselves in the process of knowledge construction together with teachers, either

with the method of question and answer (Outcome 2b) or through individual learning (Outcome 4b). By contrast in China, students were seldom provided with this kind of opportunity. In other words, Chinese students are passive and mainly listen to teachers' lecturing (Outcome 1). Then from a comparative perspective, teaching and learning in German schools is rather student-dominant, though partner and group study are seldom used. By contrast in Chinese schools, it is teacher-dominant.

9.1.2 No essential difference of the modern (digital) media utilization.

In Section 8.2.2, when traditional media and modern media are seen as two units for comparison, it was found that modern or digital media were more often adopted in Chinese schools. However, when taking a closer look at how each medium is used in reality, it was found that there is no essential difference of the digital media utilization between German and Chinese schools.

As described in Section 8.2.2.2, computers are the only single digital medium with which a quantified difference was identified – it was used much more often in Chinese schools. However, they were habitually used as a medium to present teaching content which acted, to some extent, as a function of other traditional media rather than promoting students' active learning.

A similar situation might be found with other digital media being recorded. Though in German schools some of the sample classes were iPad classes (i.e., iPad usage was written into the curriculum), the iPad was not widely utilized and also limited to the function of simply presenting information.

In Chinese schools, the utilization of mobile phones depended highly on the teachers' preference and were used on a small scale. Taking these items into consideration, it can be concluded that there is no essential difference regarding the adoption of digital media in the classroom. In other words, apart from computers, at the moment not many other types of digital media are adopted in either German or Chinese schools. Additionally, the function of

digital media that were adopted in the classroom was mostly confined to the function of information presenting.

9.1.3 Teacher education and curriculum are the key points for explaining the different teaching and learning in German and Chinese schools.

Lastly, it was found that teacher education and curriculum are the key points for changing teaching and learning in the classroom. In this current study, teacher education, curriculum, and media availability are three determinants that are related to the comparison outcomes (Figure 8.22). In other words, they are three possible reasons for explaining the different teaching and learning styles in German and Chinese schools.

Among them, the influence of media availability was rather limited. As it was concluded that there is no essential difference of the adoption of modern media in accounting teaching and learning in German and Chinese schools. Then, for the purpose of policy-borrowing, focus should be given to teacher education and curriculum.

9.2 Implications and Recommendations for Policy-Borrowing

In the previous section, it was concluded that teacher education and curriculum are two important factors to explain the different teaching and learning styles in the compared countries. This section formulates suggestions from these two aspects.

It should be noticed here that in the process of policy borrowing between Germany and China, all the borrowings should be based on the understanding of the cultural scripts of another culture (Tan, 2015), in order to avoid the borrowing on superficial level (Schweisfurth, 2013).

9.2.1 Pedagogical knowledge should be given more emphasis in Chinese VET teacher education.

Historically, reforming VET teacher education has been a hot topic in China, and it is a common practice to draw lessons from other countries. However, most Chinese scholars pay more attention to questions on an institutional level. For instance, studying the overall

VET teacher education system in other countries and then glean hints concerning how to design a suitable system for China (e.g., Gao & Yuan, 2017; Shen, 2017; Tang, 2016). By contrast, the subtle but significant components in this system such as the pedagogical knowledge discussed in this study have been neglected to some extent. In other words, though it was criticized that in-service teachers have insufficient pedagogical knowledge, it was not clearly pointed out how to change this situation (e.g., He, 2010; Zhao et al., 2017). With this in mind, suggestions are given to alleviate this issue.

9.2.1.1 For those in-service teachers.

In Section 8.1.1.2, it was mentioned that most of the in-service teachers did not accept the pedagogical knowledge systematically in their initial teacher education. For this group, it is suggested that stress should be placed on on-job-training programs. In other words, more programs that aim to broaden teachers' pedagogical knowledge should be issued from the government level, and the concept of constructivism should be emphasized. Here it should be noticed that the discussion should not be stopped at the presentation of theoretical knowledge, such as what is constructivism and the methods to be used, and so on. Instead, its essence should be deepened; concrete examples concerning how different teaching methods are embedded in teaching and learning via a constructivist approach should be given and afterwards teacher should be given opportunities to practice in the training process.

9.2.1.2 For those pre-service teachers.

For those pre-service teachers who are the reserve personnel for teaching in VET schools in the future, initial teacher education is particular important. Therefore, something should be changed to equip those pre-service teachers with sufficient pedagogical knowledge.

To improve the standard issued in 2013 is the suggestion that the author proposed (MoE, 2013). As described in Section 8.1.1.2, in this standard, pedagogical related knowledge is indeed included. However, it is not so concrete as in the teacher training standards from Germany (see Section 8.1.1.1). From the author's view, the key issue lies in

the absent of a principle for discussion. In other words, it is not clearly pointed out whether the teaching and learning should be constructivism or dialectic, teacher-centered, or student-centered. As a result, all of the discussion is disordered, and it is not possible to approach the problem on a more practical level. For example, one item in the standard from China is that understanding students' psychological characteristics and learning characteristics, and master relevant educational methods. Which methods to be used is not further discussed; therefore, to some extent, it might be seen as an empty talk. Besides, if it is possible, the credit allocation ratio of the course teaching pedagogical knowledge should be also advised in the standards.

9.2.2 From examination-oriented to competence-oriented: The curriculum for major accounting in Chinese VET schools.

In Section 8.1.2.2, it was mentioned that at the moment, there is no unified curriculum for the majors in secondary VET schools. It is still at the explorative stage to formulate such a unified curriculum. Then, based on the results derived from this study, suggestions were thrown out.

The first suggestion concerns the guidance for formulating curriculum. As summarized in Section 8.1.2.2, examination-oriented is one characteristic of the curriculum for the major of accounting in Chinese schools. Here, it was suggested to change it and formulate a competence-oriented curriculum. In fact, this suggestion might be seen not only in government documents, but also in research papers (e.g., MoE, 2008; Tang, 2007).

In Chinese schools, students' skills, such as completing various documents, are stressed. Or to put it another way, practical bookkeepers are cultivated. By contrast in German schools, it is students' competence in analyzing the problems behind the data that is emphasized. In the era of Industry 4.0, skilled workers can be easily replaced. From the perspective of students' long-term development, a competence-based approach provides students with a wider opportunity.

Based on the competence-based concept, teaching methods and instructional media should also be highlighted in the curriculum. This is the next suggestion being put forward. In Section 8.3.2, it was explained that teaching methods regulated in German curriculum might be one reason for that partner study and group study is more often used within some teaching concepts. Regarding the different use of other teaching methods and modern instructional media, no significant difference has been recognized. However, it is still meaningful to write them into the curriculum as a guidance for teaching.

9.3 Contributions, Limitations of this Research and Implications for Future Study

In terms of the contributions of this study, four aspects should be mentioned, and they are also the four aims of this study. **Firstly**, the observational instrument that was developed for this study can be used in other future studies. **Additionally**, classroom life in German and Chinese schools were broadly depicted instead of within the confines of their own cultures. **Most importantly**, this study might be seen as the first try to span the research gap that was outlined in Chapter Two – no comparative study on teaching and learning in VET sector and limited number of comparative studies on teaching and learning between Germany and China. **Lastly**, the fourth aim of this study provided clues for policy-borrowing between the two compared countries.

However, due to some objective reasons for carrying this pilot study, some limitations have still been identified.

Firstly, this study utilized a comparatively small sample size (i.e., 96 teaching hours in Germany and China, respectively), and all of the observation samples were from one field, which was accounting taught by several teachers from only two representative cities (Cologne in Germany and Peking in China). Teaching and learning is comprised of various fields and teachers, and education in different states or provinces presents its own characteristics. Therefore, caution must be applied as the findings might not be transferable to other sample groups.

Secondly, in this current study, a few dimensions were used to explaining the differences that were reflected by the statistical results. Here, it should not be concluded that only these dimensions influence teaching and learning. Instead, there are a large number of factors that were outlined Chapter Three, but due to time and resource limitations, it was not possible to conduct a subsequent study to investigate why the different methods and media were adopted in the classroom from teachers' or students' perspective. With the similar reason, the interpretation in Section 8.3 is highly selective.

In the future, similar studies aiming to compare teaching and learning in other VET fields with larger samples should be conducted and the generality of the conclusions derived from this study might be verified. Additionally, the studies aiming to answer the "why" question, based on the conceptual model (Figure 3.5), should be conducted for the purpose of deepening the understanding of the "how" question.

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Publications

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