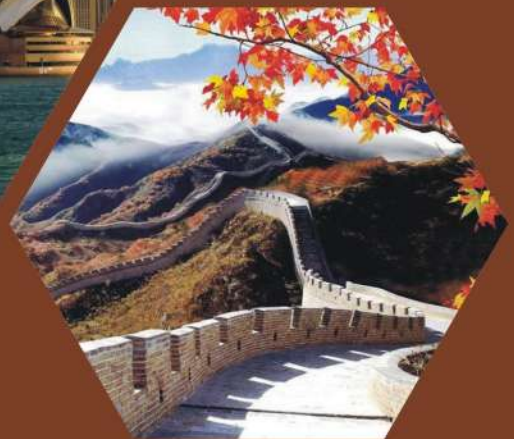


Aussie -Sino Studies

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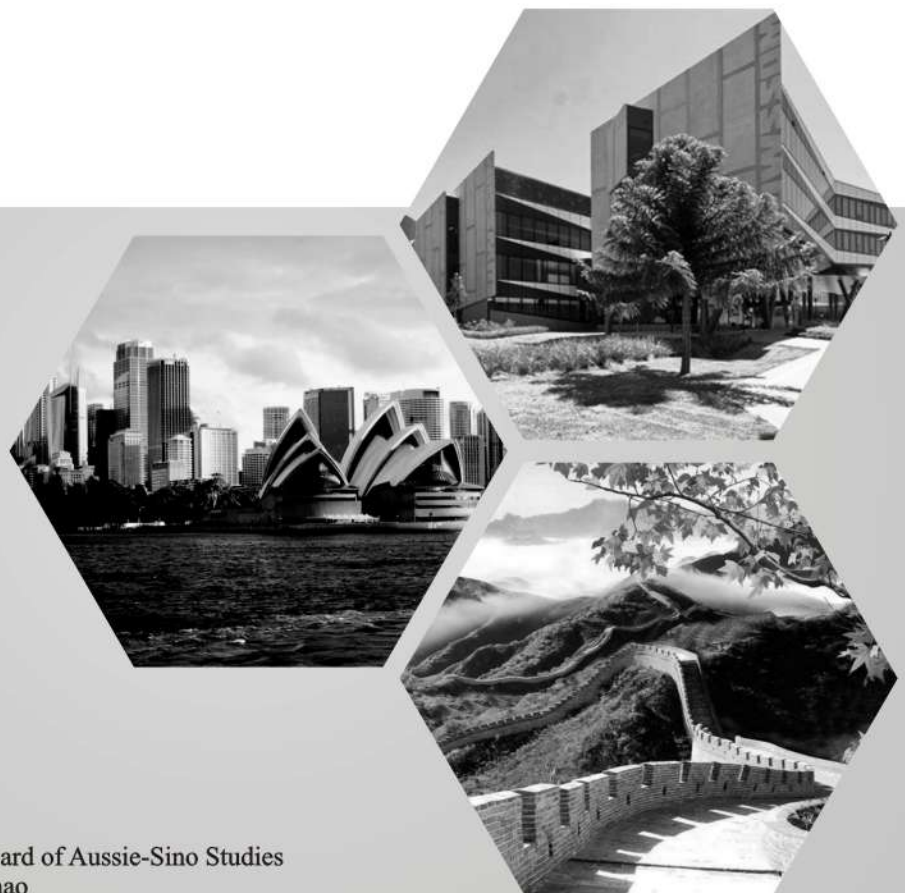
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Globalization and Chinese immigrants to Eastern European: Focusing on Russia

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Abstract: Globalization is a term loaded with political, economic, and cultural implications. The benefits of globalization are typically said to include the increased availability of affordable products, the possibility of instantaneous communication, and the development of infrastructure in previously isolated regions. The drawbacks of globalization typically include the negative impact associated with it on a society's traditional way of life and the damage done to the physical environment because of rapidly developed infrastructures. How globalization appears to the people living in transitional economies and to transnational migrants is little understood in a world in which the process of globalization is often seen through a Western lens and is presupposed to be a homogenizing (i.e. "westernizing") force. Nevertheless, globalization has concurrent narratives, one of which, explored in this paper, is the growing role of China in the process of globalization and, indeed, the influence of China on the world. The impact of globalization on Chinese migration to Eastern Europe is unique as it has a policy interest because in the past decade it has proven to be predictive of trends in Europe. A new flow of entrepreneurial migrants, who often had no connection to the historical, rural-based chains of migration that produced the earlier Chinese migrant populations of Eastern Europe, found it possible and profitable to do business and settle on the European periphery during a brief period of liberal migration controls. Erratic crackdowns on illegal migration in the absence of thought-through migration regimes resulted in a volatile situation, periodically generating migration flows from one country in the region to another. These were facilitated by, and gave further rise to, networks of kinship and information spanning both Eastern and Western Europe. While this paper focuses on East Europe and Russia, it also attempts to review information on other Eastern European countries (particularly Russia, Romania, Yugoslavia, and the Czech Republic) where it is available. In doing so, it intends to fill a gap in information on Chinese in Eastern Europe until more substantial research is produced, as well as to highlight the common features of, and links between, Chinese migration into individual Eastern European countries as well as into some states there, especially Russian.

Key words: Globalization, Chinese migrants, East Europe, Sino-Soviet relations, legally and illegally migration, Integration and transnationalism.

1. Introduction

The researcher will ask some ambitious questions in her work as an effort to characterize the globalization narrative that is "the rise of China". In particular, the paper attempts to understand whether increased Chinese migration since the inception of the reform era is an indicator of China's emergence as a global power. Additionally, the paper offers insights into the relationship between Chinese migrants and host societies, especially in regard to the calibration needed among the latter due to changing economic realities. The distinctiveness of Chinese migration to Eastern Europe and Russia is revealed throughout the book. In Eastern Europe, Chinese migrants tend to be small traders in cheap manufactured goods; in Central Asia, many Chinese are workers or managers on state projects, while in Russia, the tendency appears to be a combination of the previous

two. (The writers do not include the Turkic Uyghur from the northwest of China in their analysis of "Chinese" migrants to Eastern Europe and Russia) Despite this omission, the contributors agree that the outward movement of Chinese to Russia, Central Asia, and Eastern Europe is underpinned by China's economic success. As a result of China's economic strength, its influence with respect to globalization is distinct. "Globalization with Chinese characteristics...occurs through the penetration of Chinese products, investments and most prevalently, people throughout the world" (Tinguy. 1998).

Russia and some Eastern European countries experienced immigration from China until the 1920s, when the Soviet Union sealed its borders. Migration did not start to increase again until the "normalization" of Sino-Soviet relations under Gorbachev, which closely followed the liberalization of the PRC's rules governing travel abroad, made it possible for Chinese citizens to engage in

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trade across the Soviet border. Starting in 1987, northern Chinese began to take advantage of the simplified procedure to obtain private passports to engage in "shuttle trade" between China and the Soviet Far East and Siberia. Many of the first shuttle traders were moonlighting Chinese contract labourers, increasing numbers of whom had been invited to Russia on contracts during the same period. After the collapse of the Soviet Union and especially after the signing of a "Sino-Russian treaty" in 1992 waiving the visa requirement for overland group tourism in the bordering provinces, crossing the border became even easier. Russian news agencies in the era of globalization reported 1 million border crossings by Chinese citizens into the Russian Far East in 1992, rising to 2.5 million in 1993 according to one source. Another source concurs that 1993 was the peak year for the Chinese inflow, but cites a lower figure of 800,000 arrivals, noting that 900,000 Russians went to China in that year (Bagrov. 1999).

Research problem:

In the past few decades, China has undergone enormous political, economic, and demographic changes that have transformed the realities of migration to and from the country in the era of globalization. In addition to large flows of emigrants leaving in search of opportunities elsewhere and the persisting, more traditional streams of internal migrants for which China is known, a new trend of immigration to the fast-developing country is emerging. One aspect of Chinese migration that has captured considerable attention has been the number of Chinese entering countries illegally as so-called "irregular migrants".

On the other hand, as a result of these mentioned issues, Chinese immigrants, especially in Eastern Europe – as our study focus – start to have serious problems related to integration and influence the labour force in the countries in Eastern Europe that they have already immigrated to in the globalization era, as the rising of China as a "big market" in the international markets.

The paper seeks to answer the following questions: -

- 1- What is the nature of China's immigrations past and present?
- 2- What are the main flows of Chinese Migration to Russia and Eastern Europe in the era of globalization?
- 3- What is the Chinese Transitioning into a Period of "New" Migration and globalization?
- 4- What is the nature of Chinese Migration Today in Eastern Europe?
- 5- What is the meaning of Chinese "Irregular Migration" to Eastern Europe?
- 6- Is there any other Chinese new "Migration Transition" to Eastern Europe?
- 7- What is the impact of Globalization on the raising of Chinese migration to Russia and Eastern Europe?

8- What is the influence of Globalization on the integration of Chinese immigrants in Eastern Europe societies?

9- What are the future aspects of the Chinese immigrants' integration into their immigrated societies in Eastern Europe?

10- On the light of the above mentioned, the researcher will conclude: What are the Prospects and challenges of globalization on Chinese immigrants to East Europe and Russia?

I- The historical main Chinese migration flows

The migration out of China that was truncated from the late nineteenth century through to the 1930s, depending on the destination, laid the basis for the present patterns of population movement. These began from Hong Kong and Taiwan from the 1950s and continued with changed immigration laws in the main potential destination areas from the 1960s. Acceleration has occurred since the opening up of China itself from 1979. It is, nevertheless, still difficult to leave China (Sinn, Elizabeth. 1995). There is still no real freedom of movement despite the increased numbers of Chinese migrants. Many who cannot obtain a passport and an exit visa attempt to leave illegally; although this option is expensive and can be dangerous. The numbers going legally and illegally are small relative to the size of China's population. Those leaving are still primarily from the provinces of Southern China, although there are signs that the migration fields are being extended further north, often pioneered by students from the main university centers. The vast majority of China's population is as yet untouched by international migration, either directly or indirectly, although given the upsurge in domestic movements since the early 1980s this cannot be said about internal migration (Seagrave, Sterling. 1995). Though the consequences of migration are varied: whether rising aspirations brought about through the increasing numbers moving to towns and cities, even temporarily, will impel international moves; whether the student migrations that have led to settlement will later generate chain movements through family reunification; or whether the new sojourner migrations will give rise to more permanent settlement and later chain migration will all depend upon policies not only in destination societies, but primarily in the direction taken in post-Deng China (Pan, Lynn. 1990).

Such idle speculation on hypothetical future directions diverts attention from the essential fact that migration is not just about numbers, but about control over wealth and ideas. Although the numbers of migrants from China are relatively small compared with the great migrations out of Europe from a much smaller base population earlier this century, the composition of the migrant flows has been heavily biased towards the postgraduate-level student, the professionals and the wealthier groups. Many of these wealthier groups are from the peripheral areas of Hong Kong and Taiwan, but they often maintain close links with their home areas in China,

commuting regularly to them, and they have business interests there and among the wider networks of the overseas Chinese. Many of the students are indeed from China and their return, if it occurs, like the return of previous generations of students, is likely to have a major impact on the home society (Miao, Jian Hua. 1994).

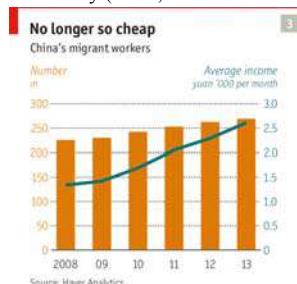


Figure (1): China's migrant workers

* Source: Harver Analytics Survey: China's migrant workers, 2010.

The above mentioned survey indicate to the facts of Chinese migrations encounter barriers of speech, habits and manners the world over, but in China these are heavily reinforced by the system of "hu kou", or household registration, which permits routine discrimination against migrants by bureaucrats as well as by urbanites (a term applied in this special report to city-dwellers who have no rural connections themselves, and nor do their parents). In a survey conducted by the Chinese Academy of Social Sciences, nearly one-third of respondents in Shanghai said they would not like to live next door to a migrant, against only one-tenth who said they would rather not live next to a poor person. In Changchun, a less outward-looking city in the north-east, nearly two-thirds said they did not want to live next to a migrant. Chinese urbanites seem as anxious as Europeans about migration from poor to rich places, even though in China the migrants are fellow citizens (www.economist.com).

Migration from China demonstrates continuities in spatial pattern and in certain types of migrants such as the new sojourners, both rich and poor. There are nevertheless important differences from past patterns in terms of wider participation from regions of origin and in terms of a greater range of migrant types as highly educated men and women, as well as poorer people, participate in population flows integrating China more fully into the world system. Whatever the future direction of political and economic change in China, population migration in and out of China is going to be a profound force for change around the Pacific Rim, elsewhere in the world, and in China itself as we move into the twenty first century (Zhang, Jixun. January 1995).

II- Globalization and the raising of Chinese migration to Russia and Eastern Europe

Much of the former Soviet bloc in the period of globalization has become a destination for new Chinese migrants. Throughout Russia, Eastern Europe and Central Asia, Chinese migrants are engaged in entrepreneurial activities, primarily as petty merchants of consumer goods in unsteady economies. This paper situates these

migrants within the broader context of Chinese globalization and China's economic "rise". It traces the origins of Chinese migration into the region, as well as the conditions that have allowed migrants to thrive. Furthermore, it discusses the perception that Chinese globalization is purely economic and explores the relationship among petty merchants, labourers and institutional investors. Finally, by examining the movement of China's minorities into Central Asia, this paper challenges the ethnic construct of new "Chinese" migration (Xiao, B. 2001).

Informal "shuttle trade" had been a feature of the economies of scarcity in Eastern Europe since at least the 1960s, but Chinese traders developed it to an unprecedented scale, stepping in to fill a market vacuum created by non-existent or broken-down retail networks of low-price clothing and shoes. Venturing farther and farther by train and spending more and more time at their destinations, they first reached European Russia and then Hungary, which in 1988 signed a treaty waiving the visa requirement for Chinese tourists. According to a Chinese source, nearly 10,000 Chinese traders were registered as Moscow residents in 1992 (Humphrey, C. 1999).

* The researcher here looks at the two main factors contributed to the surge of Chinese migration to Eastern Europe in 1989, as:

- First, the crackdown on the student democracy movement in "Tiananmen Square" sent a wave of anxiety through the fledgling private sector. Entrepreneurs were eager to secure an escape path for their capital and families in case the Government reversed the economic reforms.

- Second, the recession of the Chinese economy in the beginning period of the "globalization" between 1989 and 1991 affected private entrepreneurs, managers at state-owned companies (who could not sell their stock), and workers (whose wages were being held back) alike. In this situation, stories of the success of shuttle traders, able to sell anything in Eastern Europe and getting rich, combined with news of the visa-free treaty with Hungary, sent tens of thousands of people packing (Epstein, Gabby. 2010).

And the researcher here emphasis to the "influences of globalization" on the Chinese migrations to Eastern Europe and Russia by the growth of Chinese businesses, changes in business climate, and immigration policies modified migration flows and generated new ones within the region. After 1993, the number of Chinese entering Russia fell, affected by the violent stand-off between President "Yeltsin" and the Supreme Soviet in October 1993 (Bagrov, M.V. 1999). The total number of Chinese entering Russia in 1997 was 449,000, with 464,200 in 1998. In the first six months of 2000, however, it jumped to 1.5 million, perhaps in response to the recovery of the Russian economy (Migration News, 2000). Many Chinese migrations to Eastern Europe moved on from Moscow to look for better business opportunities and increased safety. The main destination was Hungary. Then, the crackdown on Chinese immigration by Hungarian authorities in 1992 and, subsequently, increasing competition, lower profits, and increasing overheads in

market trading led Chinese in Hungary to move to other eastern European countries (Gall, C. 2000).

Now, in the period of "globalization", Chinese Migrants headed for East Europe appear to be less skilled than those going to Australasia and North America, with large numbers moving into low-order services, trading, and manufacturing jobs. Large numbers of Chinese are also moving to Russian, while smaller numbers are going to other destinations as widely dispersed as the islands of the Pacific and countries in Latin America (Benton, Gregor. 1998). In choosing their destinations, all of these migrants appear to be influenced by the global distribution of the Chinese as established by previous migrations. The researcher explains both:

(1) The responses of host societies towards Chinese migrants, from the Russian Far East to the Balkans.

(2) The migrants' variable rates of progress in assimilating to their new communities in the globalization era. These are complex issues that are justly explored in some depth (Wallace, C. 2009).

The researcher here asserts that negative globalization perceptions of Chinese migrants in part stem from the veneer of illegality surrounding Chinese migration to these regions, mainly vis-à-vis the migrants' circumvention of immigration requirements or commercial tariffs.

Yelena a Russian researcher "Y. Sadovskaya" uses disparate sources to demonstrate how some Chinese traders living in Russia and some Eastern Europe countries have failed to legally register their enterprises with the state (Y. Sadovskaya. 2012).

III- The factors of the surge of Chinese migration to Russia and Eastern Europe in the globalization era

Some Chinese migrants who had obtained "Hungarian" or "Czech" residence permits moved on legally (with tourist or visitor visas) to Western Europe to work in workshops or restaurants. Some of those who failed to get a visa moved on clandestinely. Some were motivated by a preference for low-risk wage labour compared to doing business; others moved because they had lost the money they invested in starting their businesses. The researcher will mention here to the following aspects, as follow:

1) Chinese migration routes to Eastern Europe

Chinese immigrants to Eastern Europe characterize the globalization narrative that is "the rise of China". In particular, the paper attempts to understand whether increased Chinese migration since the inception of the reform era is an indicator of China's emergence as a global power. Additionally, many scholars offer insights into the relationship between Chinese migrants' flows and host societies, especially in the globalization era due to changing economic realities (Todorovic, A. 2000). The main flows to Eastern Europe seem to have been the following:

A) From the Russian Far East to European Russia:

Some migrants from north-east China moved on from the Far East of Russia to Moscow, both as traders and as students. In the questionnaire study conducted by "Vitkovskaya" and "Zayonchkovskaya", one-fifth to one-fourth of respondents had

visited other cities of the Russian Far East or eastern Siberia, apart from the location where they were interviewed. Almost one-tenth had been to a western Siberian city, 3 per cent had been to the Urals region; 15 per cent had been to Moscow and 6 per cent to St. Petersburg (Vitkovskaya. 2013).

B) From Moscow to Hungary, Romania, and the Czech Republic:

Between 1991 and 1993, many Chinese moved on from Moscow to look for better business opportunities and safety. Many others decided to move because of their inability to repatriate profits. Many of the migrants from Fujian in Hungary, Romania, and Italy had followed this trajectory. Neither Romania nor the Czech Republic had imposed a visa requirement on holders of official PRC passports, which were relatively easy to obtain. (For example, the executive vice president of the Fujian native-place association in Romania went to Russia in 1993, then to the Czech Republic where he stayed for one year commuting between the Czech Republic and Hungary. Finally, he moved to Romania in 1994 (Moore, M. 2001).

C) From Hungary to the Czech Republic, Romania, Yugoslavia, Russia, and the rest of Eastern Europe:

Beginning in 1992, Romania and Czechoslovakia (later the Czech Republic) were the most popular destinations to Chinese, but Chinese also went to Slovenia, Poland, Albania, Bulgaria, the Ukraine, Russia, Lithuania, and later, after the end of the Bosnian war, to Yugoslavia and Bosnia. The Hungarian Government had become increasingly intolerant of the Chinese immigrated there. But they are still facing problems in renewing their residence permit in Hungary (Jiang, Y. 1999).

D) From Hungary and the Czech Republic, Austria:

There are some examples of Chinese migration along this route. When the clash between "Yeltsin" and the "Duma" broke out, some Chinese moved from Moscow to Budapest and tried trading at the market, but when business was bad they moved via the Czech Republic with the help of some people. (Li, M. 1995).

2) The legally and illegally Chinese migration to Eastern Europe

The enormous number of border crossings by Chinese into Russia is accounted for mainly by group tourism, which serves as a legal cover for shuttle trading. Of the 800,000 Chinese entrants in 1993 cited by Russian sources, 410,000 entered as tourists, 237,000 for official purposes, and 33,400 on official invitations (57,100 were transport workers) (Bagrov, M.V. 1999).

Local authorities believe that 70 per cent of Chinese tourists engage in trade, which is illegal; others are actually agricultural and construction workers who simply want to avoid paying for the visa. To prevent tourists from remaining in Russia illegally, regional authorities extensively apply expulsions and deportations; each year since 1994, between 2,000 and 7,000 Chinese have been expelled from the maritime region, of which more than 1,000 were deported each year (Gelbras, V. 1999).

In the maritime region, 40 per cent of Chinese entrants

overstayed their visa entitlement in 1994; in 1997, this dropped to 20 per cent and in 1998 to less than 1 per cent. The number of Chinese who received administrative punishment in the region (for violating the visa regime, trading without a permit, and so on) has remained above 8,000 each year since 1994 (Gelbras, V. 1999).

A number of Chinese took advantage of the renewed possibility to study in Russia, the Ukraine, and Belarus and, in the early 1990s, also in central and Eastern Europe. Only a small number of these students were exclusively focused on their studies, while others concurrently engaged in trading, abandoned school after the completion of the preparatory language course, or did not show up at the school at all and merely used the student visa as a means of entering the country. In Belarus, China was the top country of origin of new foreign students in 1996 (Zagorets, 1997). Indicators indicate that only about half of the Chinese students actually study, while the rest only trade. About 10 per cent actually of those Chinese students get a degree. (Kamezhuk, A.V. 1998).

In the late 1990s, some Chinese students began applying to branches of American colleges set up in Eastern Europe that offered students that chance to spend the last year or two of their studies in the United States, at colleges such as "McDaniel College Budapest" (formerly Western Maryland College Budapest). However, most migration to Eastern Europe has taken the form of entrepreneurial migration in which migrants either travelled on passports that needed no visas (i.e. service passports, so-called "xiao gongwu huzhao", supposed to be issued to public employees abroad on official business, but unofficially quite easily available to those on private trips), or applied for business, work or, later, family visit visas. This legal migration also partially relied on migration brokers who arrange for the documents needed to get a passport in China and come to Hungary (invitation letter from a Chinese company or in a relative's name, company registration in the migrant's name, enrolment in a school, and so on). Some of them can then also help migrants cross clandestinely to Western Europe. This was a much higher risk activity requiring greater familiarity with the terrain as it involved getting in touch with local human smugglers or even recruiting them from among local drivers. (Nyíri, P. 1998).

Most Chinese migration brokers subsequently expanded their services to helping new migrants apply for residence permits. According to Chinese in Budapest, before the beginning of the armed conflicts over the Yugoslav succession, the Yugoslav-Austrian and Yugoslav-Italian borders were frequently used for clandestine crossings, as was the Czech-Slovak German border. After the eruption of the Yugoslav conflicts, the southern route went mainly through the Hungarian-Austrian border (Li, M. 2001).

After the crackdown on Chinese immigration in Hungary in 1991 and 1992, snakeheads appeared to redirect their business via Prague (Nyíri, P. 1998). According to Interior Ministry data at Hungary, the number of deportations of Chinese citizens without valid residence documents soared from 44 in 1995 to 843 in 2000, and then dropped to 261 in 2001. Since 1998, when Hungary fully

acceded to the Geneva Convention, some of the detained Chinese applied for asylum. In 2000, there were 200 such applications, accounting for about 3 per cent of all asylum claims. This time, Yugoslavia served as the entry point from which Chinese migrants crossed the border to Hungary, as it was relatively easy to obtain a Yugoslav visa in Beijing. Since China was a political ally of the "Milosevic" regime and Yugoslavia had few other places from which to expect investors, Belgrade had little incentive to tighten its visa regime. This resulted, particularly in the period after the NATO bombing of the PRC's embassy in Belgrade that symbolically sealed the friendship between the two states, in first one and then two Yugoslav flights a week arriving full of Chinese passengers (Morrison, J. 2000).

According to the head of the Yugoslav statistics office, "Srdan Bogusavljevic", 50,000 Chinese arrived in Yugoslavia in 2000. In addition, Yugoslavia attracted a number of Chinese entrepreneurs from other eastern European countries (principally Hungary) in 1998 and 1999 when, after the end of armed conflicts, they expected a post-war business boom. The free movement between Yugoslavia and the Serb controlled part of Bosnia, on the one hand, and loose controls on the Bosnian Croatian border, plus the long and jagged Croatian and Montenegrin coastline, on the other, has resulted in brisk Chinese border traffic, reflected in a growing number of apprehensions (Radulovic, Z. 2000). In the summer of 2000, two Yugoslav soldiers were arrested in Montenegro trying to take 25 Chinese to the coast (Balmer, C. 2000).

IV- Chinese immigrants to Russia

China's presence can be felt all over Blagoveshchensk, a Russian city 5,600 kilometers east of Moscow but only just across the Amur River from China. There are students learning Chinese, plenty of Chinese-manufactured clothes and electronics in the stores, and Chinese restaurants serving stir-fried potatoes chased down with vodka. Yet you won't find many Chinese people here. The following survey indicates to: How many years did some Chinese residents live in Russia?

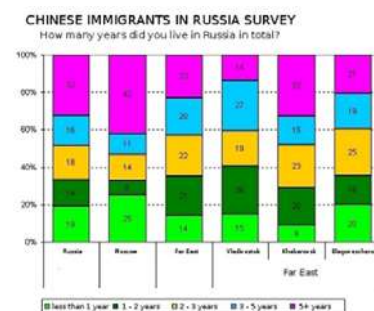


Figure (2): Some details about Chinese immigrants to Russia

* Source: Russia Survey: Chinese immigrants in Russia, 2013.

"According to the above graph", most Chinese immigrants are relative newcomers to Russia. In the critical Far East region, only 23% have spent more than five years in the country.

Few Chinese have affluent lifestyles in Russia – the majority, 61%, view their material condition as "medium" or "satisfactory",

15% as “bad” or “very bad” and 21% are “good” or “very good”.

Most migrants come with the help of those already based there, who give them a hands up. The Chinese communities in Russia are tightly-knit, insular and highly trust-based, albeit fragmented into regional and ethnic groupings. According to the poll, 4% say they are directors or owners of an enterprise, 15% work for a Chinese firm, 9% work for a Russian firm and 53% are “independent entrepreneurs” (Charles, Ganske. 2013).

They typically learn enough Russian to get by, but no more. Only 9% have a good knowledge of the language and another 5% can read; 33% can explain themselves and 43% are bad at the language. Another 6% are currently studying the language at an institute. Only 4% don’t know any Russian. Life is adaptive rather than planned – only 15% acquaint themselves with Russian laws or regulations. This is presumably because doing so makes little difference, with 82% of Chinese experiencing police requisitions, 49% rackets and 45% bribery amongst tax and customs officials (Anatoly, Karlin. 2014).

When the Soviet Union collapsed and the border between Russia and China opened up, predictions were rife of a massive wave of Chinese heading north. And it seemed that was possible: there were numerous opportunities in that part of Russia, the easternmost part of Siberia known as the Russian Far East. There just weren’t many Russians to take advantage of those opportunities (Kucera, Joshua. 2010).

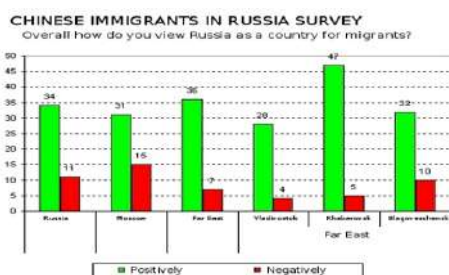


Figure (3): Chinese immigrants in Russia Survey

* Source: UN Survey: Chinese immigrants in Russia, 2010.

This above figure indicated to the issue of Chinese migration to Russia and its political consequences starts with one main question: how many of them are there? All reputable estimates are in the range of 200,000 to 400,000, with 500,000 as the absolute maximum, most of them shuttle traders or seasonal laborers (Cui, Xiaohuo. 2008). According to the Federal Migration Service, in 2006 a total of 202,000 Chinese got registered as temporary workers in Russia, or 20% of all Gastarbeiters; although their numbers increased to 331,000 in 2007, they made up only 17% of all immigrant labor. Meanwhile, just across the river, China is bursting at the seams. The three provinces of north – Eastern China, which are: Heilongjiang, Jilin, and Liaoning have 110 million people between them (Federal Migration Service, 2006).

* The researcher here will indicate some facts regarding the Chinese immigrants to Russia, as follow:

1) It’s impossible to know the exact level of Chinese migration into the Russian Far East; Russia has not run a census in over a decade. But by all indications, a significant river of people is surging across the border.

2) The "Moscow Carnegie Center", the only organization to launch an independent study, claimed that there were about 250,000 Chinese in Russia in 1997. The Interior Ministry has claimed that there are 2 million. Other estimates place the Chinese population at 5 million (International Organization for Migration "IOM". 2013).

3) Regardless, the Federal Migration Service fears a flood. The service has repeatedly warned that the Chinese could become the dominant ethnic group in the Russian Far East in 20 to 30 years. Such an occurrence would require an annual influx of about 250,000 to 300,000 Chinese, less than one-third the rate that currently claims.

4) The researcher believes that there are reasons to believe that the Chinese flow to Russia will hit these levels, with at least tacit help from Beijing. China has more than 1.2 billion people more than eight times Russia’s population. China’s Manchurian population has increased 13 percent in a little more than a decade (Zeihan, Peter. 2014).

5) Any kind of Chinese expansion into the region will eventually bring about a question: What is Beijing’s claim there? Most of the border region - an area roughly the size of Iran - used to be Chinese. China and Russia signed a border agreement in 1999, but the Beijing government has never formally accepted the agreement (Repnikova, Maria. 2009).

6) The Russian Far East also holds resources that are valuable to an ever-growing China. The region is rich in natural resources such as oil, gas and timber. The size of the Russian work force is shrinking as the country grows older. China’s young - and growing - population is more than able to fill the gap and exploit these resources (Nyíri, Pál. 2002).

7) Over time, Moscow will simply let the region slip from its grasp. The territory at stake includes all of Russia’s access to the Pacific Ocean. Vladivostok is Russia’s only warm-water Pacific port. Nikolayevsk, at the mouth of the Amur River, processes most of Siberia’s remaining exports. Both are well within former Chinese territory (Minakir, Pavel A. 2012).

8) Police in Russian cities are responding with aggressive ethnic profiling. Law enforcement personnel check the documentation of foreigners, and they actively target ethnic Asians. The policy results from a widespread feeling that China is the source of undesirable immigration. (newsinfo.inquirer.net).

That’s means that – according to the above facts mentioned – China migrations to Russia cause big challenges to the Russian government. Local Russian officials and media reports often say the region faces a looming threat from a Chinese population that outnumbers Russians along the Far East border. Russian officials and regional governors have long expressed fears that a population drain in the Far East following the collapse of the Soviet Union could see the region one day fall under Chinese control

(newsinfo.inquirer.net).

V- Globalization and the integration of Chinese immigrants in Eastern Europe societies

Chinese Migrants in Russia, Central Asia and Eastern Europe explores the challenges Chinese migrants experience with respect to integration into host societies in the globalization. The researcher describes an "absence of attachment to their destinations", with many migrants often speaking very little of the local language. In addition, a common theme in all the papers is the Chinese migrants' fungible view of their host nations. Russia, Serbia, and Kazakhstan are not considered destinations in themselves but merely represent opportunities to engage in trade. In other locations, such as in the Russian Far East or Eastern Europe, migrants reported being simply en route to more "desirable" destinations. Larin states, "For all the products and labor they provide, if Chinese skirt local laws and continue to remain isolated from the larger community, then they will continue to be received with unease. The prospect of improved relations therefore depends on Chinese desires to assimilate and stay" (Larin. 2013).

However, while conceding, "much of the new Chinese Diaspora in Eastern Europe does not desire to integrate", Rucker-Chang details how an increasing desire among Chinese migrants to bring their children from their hometowns and send them to local schools is an indicator of longer-term settlement. Rucker-Chang concludes her absorbing assessment of Chinese representations in Serbian, Croatian, Bosnian, and Slovenian film saying, "The fact that these migrants are given treatment in cultural products presents an interesting case study of development of acceptance and identity in the Yugoslav successor states" (Rucker, Chang. 2014). The researcher here will indicate the main activities for the Chinese immigrants to Russia and Eastern Europe, as follow:

A) Economic activities

Most Chinese in Eastern Europe deal with the import, wholesale, or retail of low price clothes and shoes from China. The Chinese took advantage of economies that were, to varying degrees, undersupplied, and filled a supply gap by offering cheap but popular clothes of the kind made in China for low-price Western retail chains. Contrary to traditional Chinese migrants to Western Europe, these migrants, thanks to their background, had the cultural capital, the mobility, and the means of communication necessary to develop close ties with state enterprises in China, which supplied them with merchandise at low subsidized prices and on favourable credit terms. (For the enterprises, this was a means of expanding into new markets and to pull down stocks). Overseas companies informally affiliated with businesses in China could serve as channels for reinvesting money transferred to them in China in the guise of joint ventures, securing not only more favourable tax treatment but also the possibility to "repatriate" profits, taking them out of China (Nyíri, Pál. 2002).

As most of the Chinese are self-employed, only a minority is employed by other, almost exclusively Chinese, enterprises. In

Hungary, according to the International Labour Organization (ILO), 1,700 Chinese had work permits in 1999. According to the Russian Federal Migration Service, 24,256 Chinese held work permits in Russia in 1999, but most of these were employed in agriculture and construction in the Far Eastern and Siberian regions of the country (International Labour Organization "ILO". 2000).

B) Integration and transnationalism

Chinese migration, even illegal migration, is happening not just from East to West, but also in the opposite direction. Many Chinese, especially those from "Zhejiang" and "Fujian" Provinces, have family members working in garment or leather workshops in Italy or in restaurants in Spain, Germany, or England, most of whom made their way there from Hungary. Individual stories of Chinese in Eastern Europe reveal an extraordinary degree of mobility. In the process of my fieldwork in Hungary since 1992, you can meet people who started trading in Hungary, were unsuccessful or lost their money at the casino, and went to Italy or Germany to work in leather workshops or restaurants for three or five years. Now they consider investing the money earned in Hungary or Romania once again as they want to develop their own businesses. Others, whose applications for political asylum in Germany had been turned down, chose to re-enter Hungary or Russia illegally because they thought it was easier to re-legalize their status there. Several more who started trading in Russia in the early 1990s went on to Hungary, but as residence permit policies were tightened in 1992, returned to Russia (Larin, A.G. 1998).

For such Chinese migrant families at Hungary, as the cash-generating destination in which Chinese can be bosses, albeit harassed by the authorities and the local people, is one of the nodes in a transnational migratory portfolio. Another node is the destination that offers them existential security, international mobility, and a good living environment for their later years, and their children access to education and to professional jobs (Blokhin. 2001).

X- Globalization and Immigration policies of Eastern Europe and Russia to Chinese immigrations

Immigration policies of Eastern European countries show considerable variations. Russia created a Federal Migration Service soon after the collapse of the Soviet Union to cope primarily with ethnic Russian refugees and forced migrants from the other successor states, but also with huge numbers of other, particularly Afghan, refugees. A Federal Migration Programme was enacted in 1992 and has been periodically reviewed (the latest version is for the period from 2010 to 2014) (Blokhin. 2001). Here, the researcher will indicate the impact of globalization on Chinese immigrants to Eastern Europe, as follow:

A- Globalization and the political practices towards Chinese migration to Russia and Eastern Europe

The reality of Chinese migration to Russia has been much more affected by federal and regional policies on entry, entrepreneurship, and labour than by federal migration policy. On the one hand, this is

because Chinese in Russia are more interested in the security and returns of their economic activities, the ability to repatriate profits and to be free of official harassment, than in long-term efforts at integration.

In Gelbras' (1999) study, about one third of Chinese respondents in Moscow intend to return home, while another third say their decision will depend on how their business goes; only one-third would like to stay in Russia. While 35 per cent would like to expand their business in Russia, almost as many would like to open a business in China (Gelbras, V. 1999). Only 10 per cent would like their children to live in Russia, while 40 per cent do not, and 40 per cent "have not considered the question" (Gelbras, V. 1999).

As already stated above, most Chinese entering Russia took advantage of the visa waiver for border tourism to engage in trade. But, at the same time, some regional political leaders have emphasized the "demographic, economic, and ecological danger" posed by Chinese migrants who supposedly plunder Russia's natural resources, take profits out of the country, and gradually displace the local population (Larina, L. 1999).

The emphasis in immigration practices towards Chinese still varied considerably across the countries. Hungary, the country with the smallest relative and absolute numbers of immigrants among the three front-runners for accession, has gradually emerged as the country with the smallest immigrant population (144,000, or 1.5% of the population, in 1997 – of which most are ethnic Hungarians – and the most restrictive immigration practices. Thus, contrary to Poland and the Czech Republic where asylum seekers enjoy a certain degree of freedom of movement and, under certain conditions, the right to work, in Hungary they are detained in prison-like centers if they have no legal title to be present. Yet, in effect, Chinese have been treated with pointed discourtesy. Most Chinese in Hungary, as detailed above, enter with visitor, employee, or entrepreneurial visas, with which they can apply for temporary residence permits valid for one or two years. Getting a visa to Hungary is much more difficult than to Russia and, beginning in 1992, it has progressively moved toward even tighter restrictions. Foreign residents do not have the automatic right to bring dependants, even minor children, to Hungary. My Chinese informants maintain that (Mao, C. 2000).

Neither central nor local governments in Eastern Europe have formulated a reception policy or undertaken any efforts to integrate Chinese migrants, seeing them purely in terms of a case of policing. Both in Budapest (1995) and Moscow (1999), city governments supported surveys of the Chinese populations, but then did nothing with the resulting findings (Maslov, A. 2003).

B- Globalization and the correlation between Chinese migration and Chinese government influence in Russia and Eastern Europe

The correlation between Chinese migration and Chinese government influence in Russia, Central Asia, and Eastern Europe is explored, but some areas of research remain unexplored. Importantly, the some researchers describe how in the view of the Chinese state, "Chinese migration has even evolved from, treacherous to tolerate

but ideologically suspect to patriotic", as can be seen through the pro-PRC bent of voluntary overseas Chinese associations".

Some other researchers explain, "Notwithstanding their informality, the Han Chinese often seeks or receives protection from local Chinese embassies". This is where an examination of ethnic minority migration from China would have provided a richer analysis. In general, foreign connections among the "Uyghur", for example, are still viewed suspiciously, especially in Central Asia, as China often cites security concerns posed by the "Uyghur". Chinese migration often precedes or is concurrent to greater Chinese state approaches to other nations. The Chinese government's involvement in large-scale natural resource projects in Central Asia is one such case. Originating from the necessity to secure oil and gas to fuel economic growth in eastern China, as well as being a strategic gambit, the Chinese government's increased engagement with Central Asia has been significant. Despite unease among the local population about China's intentions and disputes over commercial information sharing between joint ventures, China has managed to impose its agenda among Central Asian governments on rooting out Uyghur activism in Central Asia. Given this influence, the analyses on Central Asia would have benefited from more discussion on the Shanghai Cooperation Organization (SCO), which is an emerging model for an association of nations independent of "western" power (Henryk Szadziewski. 2014).

Conversely, the researcher thinks here about: how the volatile economies and corruption – in globalization era – in many of the host nations under review in essence present opportunities for Chinese migrant traders, forming a significant migratory pull factor a force that induces individuals to select a particular migratory destination. In some countries, such as Serbia, rather than competing with local businesses, Chinese migrants have been instrumental in supplying consumers with everyday items when the domestic economy could not otherwise provide them due to political instability. Writing about Russia, Flex, explains that corrupt societies require a sort of "criminal adaptation" on the part of the migrants, which they justify as a "[response] to a broken system within which their rights are violated" (Felix, B. 2013).

While lack of transparency in host nations necessitates Chinese traders operate in the shadow economy, the authors argue that the more rooted Chinese migrants become in their new surroundings, the more migrants view corruption as a problem. Larin writes that corruption is the greatest source of unhappiness among Chinese in the Russian Far East, even more upsetting than xenophobia. Interestingly, the domestic political environment in Russia is most likely responsible for anti-Chinese sentiments, according to Larin. Politicians aspiring to western ideals of democracy, as well as nationalists, are culpable due to their fears over China's rise "as a counterweight to the West" (Larin. 2013). Some other researches also propose it is the small numbers of Chinese that add to anti-Chinese feeling. In surveys conducted in the Russian Far East, he found "the smaller the number of Chinese, the more intense the

fears and phobias" (Felix, B. 2013).

The researcher here concludes that perhaps the most intriguing quirk of history concerning Chinese migration and subsequent xenophobia is the case of Serbia. A rumor has persisted in the country that Chinese were brought in by "Slobodan Milosevic" to influence elections in his favor in exchange for citizenship. Despite the small number of Chinese in "Serbia" small enough that they would not have been able to influence any election the migrants' presence has been tarnished with the discredited Milosevic. And that's an evident that Chinese Migrants in Russia, Central Asia and Eastern Europe explore the challenges Chinese migrants experience with respect to integration into host societies in the era of globalization.

- Conclusion: The Prospects and challenges of globalization on Chinese immigrants to East Europe and Russia

Chinese migration to Eastern Europe has a particular policy interest in that it has in the past decade until the era of globalization, as it proven to be predictive of trends in Russia and Eastern Europe as a whole. A new flow of entrepreneurial Chinese migrants, who often had no connection to the historical, rural-based chains of migration that produced the earlier Chinese migrant populations of Eastern Europe, has found it possible and profitable to do business and settle on the European periphery during a brief period of liberal migration controls. Erratic crackdowns on illegal migration in the absence of thought-through migration regimes resulted in a volatile situation, periodically generating migration flows from one country in the region to another. These were facilitated by, and gave further rise to, networks of kinship and information spanning both eastern and Western Europe. Gradually, models of entrepreneurial activity initiated in Russia and Eastern Europe, namely the importing and distribution of Chinese-made clothing and other consumer goods, has been picked up by Chinese migrants to southern Europe and then in Eastern Europe, countries with more mature and regulated trade regimes and higher business costs.

The distinctiveness of Chinese migration to Russia, Central Asia, and Eastern Europe is revealed throughout this paper. In Eastern Europe, Chinese migrants tend to be small traders in cheap manufactured goods; in Central Asia, many Chinese are workers or managers on state projects, while in Russia, the tendency appears to be a combination of the previous two. The contributors agreed that the outward movement of Chinese to Russia, Central Asia, and Europe is underpinned by China's economic success. As a result of China's economic strength, its influence with respect to globalization is distinct. As Rucker-Chang explains, "Globalization with Chinese characteristics . . . occurs through the penetration of Chinese products, investments and most prevalently, people throughout the world"

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Comparative Study on Rationale of Senior Secondary Mathematics Curricula Standard in Ethiopia and Australia

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Abstract: The main objective of this study is to compare the rationale of the senior secondary mathematics curriculum standard in Ethiopia and Australia. The study was investigated qualitatively with document analysis and semi-structured interview as methods of research. The documents were analyzed and supported by interviews. The rationale of senior secondary mathematics curriculum in Ethiopia and Australia were analyzed and compared through five themes. The study revealed both similarities and differences of the rationale between two countries. The study indicated that the substantial difference in their rationale is the underlying principle of content standard organization. Even though considerable difference exists, the similarities are: the adoption of constructivist approach, the objectives of mathematics teaching and the notions of active learning approaches in teaching and learning mathematics. By acknowledging the similarities, the study concluded with recommendations. To improve the quality of mathematics education in Ethiopia, Mathematics teachers should be given continuous (pre-service and in-service) training on the existing curriculum/syllabus, especially, on the constructivism, active learning and continuous assessment. Unless, it is hardly possible to achieve the purpose the curriculum was reformed for.

Key words: comparative study, view of mathematics, teaching mathematics, content organization, constructivism, active learning and assessment

Introduction

Due to growing demands of mathematics in science and technology, over 2000 mathematics educators from sixty-nine countries gathered in Adelaide, Australia, in August 1984 at the Fifth International Congress on Mathematical Education (ICME 5) to discuss problems in the field of Mathematics Education (UNESCO, 1984). One of the outcomes of this conference was '*Mathematics for All*'. Particularly since this conference, special emphasis has been given to mathematics education all over the world. The main reason according to UNESCO (1984) is the move towards universal elementary education in developing countries, and the move towards universal secondary education in industrialized countries and worldwide mathematics curriculum developments.

Moreover, because of the growing demands for mathematical competence in science and technology, nowadays, the move towards secondary education is also the leading issues for developing countries, like Ethiopia. Due to these effects of globalization (a process by which regional economies, societies, and cultures have become integrated through a global network of communication, collaboration, transportation, and trade (Cai & Howson, 2013)), in contemporary world, many countries are revising and developing their mathematics curriculum. Ethiopia revised and developed new senior secondary school mathematics curriculum/syllabus in 2009 endorsed by ministry of education (MOE, Mathematics Syllabus, Grades 11 and 12, 2009). Likewise, after long process of school

mathematics curriculum development, Australia's first national senior secondary mathematics curriculum was endorsed, in December 2012, by the council of federal, state and territory education ministers (Evans, 2016).

Therefore, the main objective of this study is to compare the *rationale* of senior secondary school mathematics curriculum in Ethiopia and Australia. The corresponding research question is 'what are the differences and similarities between Ethiopia and Australia *rationale* of learning mathematics at (senior) secondary school level?'

Why Australia was chosen? Australia was chosen for three main reasons: (1) the first Australian National Senior Secondary Curriculum was published in 2012; (2) the necessary documents, from the curriculum design to the published curriculum and others are available on the www.acara.edu.au and www.australiancurriculum.edu.au websites and (3) there are no comparative research conducted on mathematics curriculum, so far, between Ethiopia and Australia.

Overview of Mathematics Curriculum Reform in Ethiopia

Following the change of government in Ethiopia on May 28, 1991, the education reform took place and the new education and training policy was launched in 1994 (FDRGE, 1994). The former regime's education structures, the 6-2-4 structure (six years of primary education, followed by two years of junior secondary education, followed by four years of senior secondary education)

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was replaced by a new 8-2-2 structure. Eight years in Primary education consists of an eight-year cycle divided into a basic education cycle covering grades 1–4 and a general primary cycle covering grades 5–8, followed by two years of general secondary education (grades 9–10) and two years of senior (preparatory) secondary education (grades 11–12). The main objectives of this policy are to:

Develop the physical and mental potential and the problem-solving capacity of individuals by expanding education and in particular by providing basic education for all.

Bring up citizens who can take care of and utilize resources wisely, who are trained in various skills, by raising the private and social benefits of education.

Bring up citizens who respect human rights, stand for the well-being of people, as well as for equality, justice and peace, endowed with democratic culture and discipline

Bring up citizen who differentiate harmful practices from useful ones, who seek and stand for truth, appreciate aesthetics and show positive attitude towards the development and dissemination of science and technology in society.

Cultivate the cognitive, creative, productive and appreciative potential of citizens by appropriately relating education to environment and societal needs (p. 7-8).

Based on this policy, the secondary school mathematics curriculum was developed and implementation was started in 1999/2000. The responsibility of developing curriculum/syllabus was given to ICDR-Institute for Curriculum Development and Research. This curriculum served as the country's secondary school mathematics curriculum/syllabus up to 2010. According to the senior mathematics curriculum expert at ministry of education, the need to reform the curriculum/syllabus was based on: General Education Quality Improvement Program (GEQIP) (MOE, 2008, p. 3-4), the findings of the research conducted by Curriculum Development and Implementation Directorate (CDID) (MOE, 2010, p. 1), needs assessment, focus group discussion with teachers partly and inputs from stakeholder such as Technical and vocational training (TVT), NGO and others. Some of the drawbacks of the old curriculum according to *Curriculum Development and Implementation Directorate (CDID)*, were lack of relevance, difficulties to implement continuous assessment and student-centered approaches and contents overload (ibid)

In addition to the above limitations of the old curriculum in general, according to my interviewee, the senior mathematics curriculum experts at ministry of education, the limitations of old *Senior Secondary School Mathematics Curriculum* (hereafter denoted by SSSMC) were: lack of relevance, doesn't gave high emphasis to problem solving, content overload; more of theoretical rather than practical, more of memorization, It lacks diversity-consider that all students will be enrolled to university and

below the international standards-when compared with Japan, Canada and America mathematics curriculum standards.

Thus, the curriculum reform was based on the above stated limitations of old (mathematics) curriculum and other government strategies such as the Growth and Transformation Plan (GTP) and Education Sector Development Plan (ESDP IV). The other issues necessitated the curriculum reform was poverty reduction and sustainable development strategies, Education for All (EFA) and Millennium Development Goals (MDGs) (ibid). According to the education and training policy (FDRGE, 1994), the preparations of the curriculum development was based on stated objectives of the education and training policy.

Based on the stated objectives of the education and training policy (FDRGE, 1994) and the mandates given to the curriculum experts, the mathematics curriculum experts developed the drafts of the SSSMC/syllabus. And it was endorsed in collaboration with regional curriculum experts and launched in 2010. Since then, it has been in operation.

Overview of Mathematics Curriculum Reform in Australia

The Australian Curriculum, Assessment and Reporting Authority (ACARA) is an independent statutory authority with responsibility to improve the learning of all young Australians through world-class school curriculum, assessment and reporting levels (CACSRA, 2012). One of the main responsibilities of ACARA is to develop and administer *a national school curriculum*, including *content standards* and *achievement standards*, for school subjects (ACARA, 2013a). Based on its mandate, ACARA developed the senior secondary Australian curricula in 2012 (ACARA, 2016). The development of the curricula was based on four documents. These are: *Melbourne Declaration on Educational Goals for Young Australians* (MCEETYA, 2008), *the shape of Australian Curriculum version (4.0)* (ACARA, 2013c), *Curriculum Design Paper version (v3)* (ACARA, 2013b), and *Curriculum Development Process version (6)* (ACARA, 2012a). Depending on these documents, ACARA was committed to the process of curriculum development and renewal that focuses on providing world-class curriculum. The writings of two curriculums: the draft of K-10 and years 11 and 12 Australian curriculum began in May 2009 and August 2009 respectively (Evans, 2016).

Educational Goals for Young Australians

The Australian Ministerial Council on Education, Employment, Training and Youth Affairs declared new education goals for young Australians in December, 2008. The decree of new education goals for young Australians were in response to the five major changes in the world (MCEETYA, 2008) and better schooling for all young Australians. These major changes were: global integration and international mobility, complex environment, social and economic

pressures globalization and technological change, the influence of fast Asian growing countries and advances in information and communication technologies (p. 4-5).

Australian government believed that through commitment of all it may concern; *equity and excellence (Goal-1)* will be promoted so that all young Australians become *successful learners, confident and creative individuals, and active and informed citizens (Goal-2)*.

The main emphasis of Melbourne declaration is on the importance of *knowledge, understanding and skills of learning areas*, general capabilities and cross-curriculum priorities as a basis for a curriculum design to support twenty-first century learning (MCEETYA, 2008). Accordingly, curriculum was designed to *develop successful learners, confident and creative individuals and active and informed citizens* (ACARA, 2013b). The Australian curriculum development process passed through the four interrelated phases: curriculum shaping, curriculum writing, preparation for implementation and curriculum monitoring, evaluation and review (ACARA, 2012a).

Overview of Senior Secondary Australian Curriculum: Mathematics

The writing process of the Australian senior secondary mathematics curriculum was commenced in 2009 with reference to *national mathematics curriculum: framing paper* (NCB, 2009a), *shape of Australian curriculum: mathematics* (NCB, 2009b), and *the Curriculum Design Paper Version* (ACARA, 2012b). The writings were started by categorizing the curriculum into four subjects: *Essential Mathematics, General Mathematics, Mathematical Methods and Specialist Mathematics* (ACARA, 2013a). Thereby, the first draft of Australian senior secondary school mathematics was brought in to national consultation in 2010. This first draft has passed through serious public national consultation, stakeholders' feedback, curriculum authorities' consultation and group discussion with professional associations in between June and July 2010 (*ibid*). In response to these all feedbacks the writings of the second drafts commenced in May 2011 followed by national consultation in August 2011 (ACARA, 2013a). The second draft passed through national public consultation between May and July 2012. The final revised and quality assured Senior Secondary Australian Curriculum: Mathematics was approved by the Standing Council of Ministers in December 2012. The state and territory school and curriculum authorities are responsible to implement these curricula (*ibid*).

Framework of the Study

At any grade level mathematics curriculum/syllabus could be expected to address at least (CSBE, 1981) the following six points. These are:

1. Describe a *rationale* for the mathematics education program;
2. Specify *goals and objectives* of mathematics for each

learning level;

3. Establish *sequences of learning* both within and between grade levels;

4. Specify *instructional strategies (teaching methods)* most useful for meeting mathematics goals and objectives;

5. Identify instructional activities to meet the needs of students with varying abilities and needs, and Suggest a variety of *methods' for evaluating progress* towards learning objectives (adapted from CSBE, 1981, p. 11).

Therefore, having these features of the curriculum/syllabus in mind, the rationale and objectives of SSSMC were analyzed based of the following assumptions proposed by Dacheng Zhao (2016), Mogens Niss (1991) and OERI (2003). Based on these three views, the similarities and differences between SSSMC rationale and objectives of Ethiopia and Australia were analyzed and conclusions with pragmatic recommendation were revealed.

The *rationale* of mathematics education at senior secondary school of Ethiopia and Australia were compared through the following basic five questions. The first three questions were adopted from Zhao (2016, p. 129) and the other two questions were developed for the purpose of more understanding of the mathematics education rationale of Ethiopia and Australia to investigate the similarities and differences between them.

1. What is mathematics?

2. Why is it important to teach mathematics in senior secondary school?

3. How should mathematics be taught and learned at senior secondary school level?

4. How contents are organized within and across grade levels?

5. How to address assessment towards learning objectives?

The first question is concerned about the view of mathematics in Ethiopia and Australia. Through document analysis, the view of mathematics were analyzed and compared. The second question is about the objectives of teaching school mathematics. According to Niss (1996) there are three fundamental reasons of teaching mathematics. These are: *for individual purpose, for society at large and to contribute to the cultural developments*. Likewise, the OERI (2003) proposed three aims of teaching school mathematics for *social, personal and cultural development*. According to Niss teaching school mathematics are:

The third question concerns about the methods of teaching school mathematics. Different scholars proposed different methods of teaching mathematics. Every method has its own pros and cons. Therefore, teaching methods proposed in Ethiopia's and Australia's documents were analyzed and compared to one another. The fourth question is about the content organizations both within and between grade levels. So, the rationale for organizing the content standards were compared and contrasted. The last question is about the comparisons of assessment methods of the learning outcomes.

Methodology of the Study

The main objective of this study is to compare the rationale of (senior secondary) school mathematics curriculum standard in Ethiopia and Australia. As the source of this study was curricular documents of both countries, qualitative research methodology was considered the most appropriate method used in this particular study with document analysis as research method. According to Bowen (2009) it is systematic way of reviewing and evaluating documents. Bowen argued that, like other qualitative research method, “document analysis requires that data be examined and interpreted in order to elicit meaning, gain understanding, and develop empirical knowledge” (p. 27). Bowen in his article, Document Analysis as a Qualitative Research Method, suggested seven advantages of document analysis as methods of qualitative research methods. These are: Efficient Method, Availability, Cost-effectiveness, Lack of obtrusiveness and reactivity, Stability, Exactness and Coverage.

The Australian Curriculum and other documents related to curriculum design and development are available on www.acara.edu.au and www.australiancurriculum.edu.au websites. Likewise, the Ethiopian syllabus and textbooks are available online. However, documents concerning curriculum design and development and other important materials were not available online. Therefore, to make the study realistic, the semi-structured interview guide was prepared and interview was conducted with senior mathematics curriculum experts at ministry of education, on issues concerning curriculum design through implementations.

In this study, press publications and reports: government policies and guidelines on mathematics teaching and learning and assessment and other related teaching programs that seek to produce specific mathematics outcomes, published by Ethiopia and Australia were analyzed according to the adopted framework of the study. Moreover, the analyses of the Ethiopian documents were supported by semi-structured interview conducted with senior mathematics curriculum experts.

Major Findings of the Study: Results and Discussion

View of Mathematics

Recently in Ethiopia high emphasis has been given to science and mathematics education. In one way or another, it could be addressed through secondary education for they are promising students to be enrolled to university. In Ethiopia mathematics is viewed as a fundamental field of study that has great role in the development of science, technology, business, and computer science. The document, *Curriculum Framework for Ethiopian Education (KG – Grade 12)*, define mathematics as:

Mathematics is about relationships of numbers, measurement, shapes and solids and data handling. It is a useful tool whereby students actively acquire knowledge through doing and problem

solving in relation to the challenges faced in their day-to-day lives (MOE, 2010, p. 16).

The definition implied that mathematics is a science dealing with the logic of quantities, shape and arrangement. This is highly applicable in other fields of science. It seems that depending on this definition, the SSSMC/syllabus was prepared as it addresses the issues of numbering and its relationships, algebra, measurement, geometry, probability and statistics and calculus. Concerning the theory of learning, the new SSSMC was developed based on constructivism theory of learning.

...it is essential that *teachers do not spend* whole lessons talking, but plan in opportunities for class discussions in which students can exchange ideas, resolve misunderstandings and make sense out of what they are listening to, or engage in a variety of different activities which give them the *opportunity to construct meaning* for themselves out of the information they are receiving (MOE, 2010, p. 2)

This view suggested that the Ethiopian curriculum was developed based on Constructivism approach. This is similar to the interview results. “The senior secondary school mathematics curriculum was developed based on constructivism theory”, said one of my interviewee, the senior curriculum expert at ministry of education. Constructivism is an alternative approach to the traditional mathematics curriculum development and instruction known by *transmission* approach (Clements & Battista, 2009). In this view, students are considered as passive learner. However, in *constructivist* view, students construct their own knowledge rather than receiving it in finished form from the teacher or teaching materials (Major & Mangope, 2012; Clements & Battista, 2009). In philosophy of mathematics education, constructivism is considered as “reconstructing mathematical knowledge” (Ernest, 1991). This viewpoint suggested that in constructivism based teaching and learning process, learners’ construct mathematical knowledge through active learning process.

In comparison, the Australian documents *A National Statement on Mathematics for Australian Schools* (AEC, 1990) and *The Senior Australian Mathematics Curriculum* (ACARA, 2016) defines *mathematics* as follows:

Mathematics is often defined as the science of space and number ... [but] a more apt definition [is that] mathematics is the science of patterns (AEC, 1990, p. 4)

Mathematics is the study of order, relation and pattern (ACARA, 2016, p. 5)

Both definitions showed that mathematics is a science of patterns. This viewpoint considered mathematics as the process of exploring, manipulating and discovering human activities (Zhao, 2016). Australian Mathematical Sciences Institute (AMSI) believed that without good ground in mathematics, it is hard to achieve good skills in trades such as plumbing, electrical, carpentry and building

(CAG, 2008). Thus to establish good ground in mathematics, *Australian National Statement on Mathematics* (AEC, 1990) suggested *four* mathematics learning principles:

1. Learners *construct their own meanings* from, and for, the ideas, objects, and events which they experience;
2. Learning happens when existing *conceptions are challenged*;
3. Learning requires *action and reflection* on the part of learner;
4. Learning involves taking risks (p. 16–17).

The phrases “construct their own meaning, conceptions are challenged, action and reflection” in the above learning principles indicated that the teaching and learning process should give students to come up with their own constructed understanding in a given lessons. These points out that the new Australian SSSMC was developed based on the *constructivism* theory of learning. It is a theory which encourages the students to construct their own understanding and knowledge of the world through experiencing things and reflecting on those experiences. Therefore it suggests that the foundation of Australian mathematics curriculum is based on constructivism, which is similar to the recent research findings of Zhao (2016). Thus, the results indicated that the underlying principle of mathematics curriculum in Ethiopia and Australia is based on constructivism approaches.

Need to Teach Mathematics at Secondary School

Under this section, the analyses of the importance of teaching mathematics in general and at senior secondary level in particular, in Ethiopia were compared with Australia. The Ethiopian senior secondary mathematics syllabus (MOE, Mathematics Syllabus, Grades 11 and 12, 2009) proposed the needs of teaching mathematics at senior secondary as follows:

To contribute to the students' growth into good, balanced and *educated individuals and members of society*;

To acquire the necessary *mathematical knowledge and develop skills* and competencies needed in their *further studies, working life, hobbies, and all-round personal* development.

To contribute to the students' *lifelong learning* and *self development* throughout their lives.

These objectives of teaching mathematics at senior secondary school in Ethiopia have addressed the three fundamental reasons of teaching mathematics proposed by Niss (1996). These are *for individual purpose, for society at large and to contribute to the cultural developments*, which are directly or indirectly addressed in the above stated objectives. The Ethiopian government believed that these objectives could be realized through connecting mathematics with other school subjects such as physics, chemistry, science, engineering, geography and other disciplines that needs mathematics directly or indirectly (MOE, Mathematics Syllabus, Grades 11 and 12, 2009).

In comparison, according to the *Australian National Statement*

on Mathematics (AEC, 1990) the importance of studying mathematics is to use: in daily life, civic life, at work place and to recognize mathematics as part of all Australian culture (p. 6-7). In addition to this importance of studying mathematics in Australia, *National Statement on Mathematics* recommended three imperative needs why mathematics should be studied in Australia and by Australians.

A wider range of people should gain access to and success in mathematics than has been the case in the past;

Access to and success in school mathematics should be independent of gender, social class or ethnicity and

Access to and success in mathematics is important for the students with special needs (p. 7-9)

In addition to this viewpoint of studying mathematics in Australia, the Australian Education Council (AEC, 1990) believed that as a result of studying school mathematics, all students should be able to be active, thinking citizens, interpreting the world mathematically (p. 5). These objectives, likewise Ethiopia, revealed that teaching mathematics in Australia, in general, is for individual purpose, for society at large and to contribute to the cultural developments.

Content Organization

This section addressed the content organizations of SSSMC/Syllabus in Ethiopia and Australia. The interview results showed that Ethiopian SSSMC was organized for the purposes of making good foundations for university science courses. Similar to the interview results, the document analysis showed that senior secondary school is program to prepare the students for higher education (FDRE, 2004). This implied that the curriculum was organized as lists of topics introductory to the university courses. These topics may include the fundamental ideas of mathematics grouped into: number, algebra, measurement, geometry and statistics and probability, and introduction to calculus. However, whatever the purpose was to make good foundations for university, students must learn mathematics should be taught at senior secondary levels. The document analysis of the Ethiopian grade 11 and 12 syllabus, indicated that the major components of the syllabuses are: introduction, objectives of mathematics learning in the second cycle of secondary education, expectations of students at second cycle of secondary mathematics and each unit's competencies, content, teaching/learning activities and assessment.

In contrast to Ethiopia, the Australian senior secondary mathematics curriculum is logically organized. It is organized into four subjects: *Essential Mathematics, General Mathematics, Mathematical Methods and Specialist Mathematics* (ACARA, 2016). Each of the subjects has its own aim to meet the needs of senior secondary students. The curriculum includes a rationale and a set of aims for the subject, a description of how the subject was organized,

how general capabilities and cross-curriculum priorities are represented (ibid).

The curriculum has content (knowledge, understanding and skills that are to be taught and learned) and achievement (the quality of learning expected of students) standards. According to the National Mathematics Curriculum: Framing paper (NCB, 2009a) the senior secondary mathematics has three content standards: *Number and algebra, Measurement and geometry, and Statistics and probability*. While the corresponding proficiency standards were: *understanding, fluency, problem solving and reasoning* (p. 3). Unlike the Australian, the Ethiopian senior secondary mathematics curriculum content standard was randomly organized, without any descriptions of the organizations.

Methods of Teaching Mathematics

As far as this sub-title concerned with methods of teaching mathematics, the literature established that even though there are lots of teaching methods, there is no best method. What matter are the selection of appropriate teaching method suitable to the nature and culture of the students. In this section, the analysis was focused on the similarities and differences of Ethiopian and Australian methods of teaching mathematics.

In Ethiopia:

...children learn best when they are *actively involved in the learning process* through *participation, contribution and production*...using this approach, students should become *more active participants* in their own *learning through exploring, observing, experimenting and practicing*... (MOE, 2010, p. 2)

This view suggests that teaching and learning of mathematics in Ethiopia is based on active learning approaches. The most commonly known active learning approaches in Ethiopia are: *Activity-based, Student-centered methods, teacher presentation and collaborative leaning* (NMSIC, 2014). The details of these activities are described in Ethiopian mathematics syllabuses grade 1-12. It's believed that through this approach, the students actively construct their mathematical knowledge. However, the implementation of this approach in Ethiopia remains doubtful. Because, the interview result, on the process of mathematics curriculum development, conducted with curriculum experts at ministry of education showed that, the new curriculum has not been pilot-tested. Moreover, the document analysis indicated that mathematics syllabus is not available in some schools. And the other result from document analysis is that, although, few mathematics teachers were trained, most of them have not been trained on new curriculum/syllabuses. And the results are similar to findings made in earlier studies Alemu & Schulze (2012) and Areaya (2008). In their study on 'Active Learning Approaches in Mathematics Education at Universities in Ethiopian' Alemu & Schulze (2012) found that there is a gap between policy and practice, which, is higheddd in this study either.

In comparison, the *shape of Australian Mathematics*

Curriculum (NCB, 2009b) stated that:

...a fundamental aim of the mathematics curriculum is to educate students to be *active, thinking citizens, interpreting the world mathematically*, and using mathematics to help form their predictions and decisions about personal and financial priorities (p. 5).

One of the goals of *Australian National Statements on Mathematics* (AEC, 1990) is to "realize that mathematics is an *activity requiring the observation, representation and application of patterns*" (p. 15). These objectives could be addressed in one way or another through appropriate pedagogy and assessment. According to *Australian National Statements on Mathematics* (AEC, 1990), mathematics learning is likely to be enhanced by: activities which build up on and respect students' experiences; activities which the learner regards as purposeful and interesting; feedback; using and developing appropriate language and challenge within a supportive framework (p. 18-20). These ranges of learning mathematics tell us that Australian mathematics teachers are responsible to encourage the students to: bring their experience into classroom; be confident in learning mathematics-which in turn, enhances the students' attitudes and com-up with their own solutions and descriptions. These indicate that teaching and learning of mathematics in Australia is based on active learning approaches. Because, active learning is considered as any instructional approaches which encourage the students to take-part in learning process (Braun, 2015). Thus, the finding is similar with Ethiopia's as analyzed above under same section, even though, the implementation remains doubtful, in Ethiopia.

Assessment

This section discussed the assessment of school mathematics in Australia and Ethiopia. It's believed that the objectives of assessment are to improve learning and teaching, help students achieve the highest standards. Australian Education Council believed that, assessment is a basic part of learning process. Concerning the assessment mechanism, to assess the students' mathematical development, the Australian Education Council, developed two assessment principles (AEC, 1990):

Assessment should reflect all the goals of the school mathematics curriculum

Assessment should be demonstrated fair, valid and reliable (p. 21)

The main purpose of school mathematics assessment in Australia is to achieve the goals of mathematics proposed in National Statement on Mathematics for Australian School. And the second one is that through fair, valid and reliable assessment, the students' future learning of the subject will be enhanced.

Concerning the Ethiopian school assessment, the detailed descriptions and procedures of assessment method is described in

Curriculum Framework (MOE, 2010) document.

...a key requirement of the implementation of the revised curriculum will be the planning of assessment tasks as part of the school program that will show teachers whether or not students are achieving the expected competencies. These tasks are intended to be completed throughout the year. Such assessment is known as continuous assessment (p. 35)

Nowadays continuous assessment is considered as an alternative of the old assessment at the end of the term or year to assess the knowledge, understanding, and skills attained by students. As the name implies, it asks the teachers to administer assessments in a variety of ways over time to allow students to observe multiple tasks and to collect information about what students know, understand, and can do. The detail implementation directives of the continuous assessment are described in Ethiopian (senior secondary) mathematics syllabuses. However, the effective implementation remains questionable. Because, the research result conducted, by *Curriculum Development and Implementation Directorate, Ministry of Education* (CDID, 2014) showed that:

Some mathematics teachers expressed that the *syllabus is not available* in their school and therefore, they have not used it yet...they have *no orientation* as they are *not introduced to the syllabus* (p. 64).

This showed that there is a shortage of syllabuses, as well as, gap of training on the new materials. This finding is similar to the interview results, which indicates that, the curriculum has not been pilot-tested. One of the limitations of the old curriculum was difficulties in the implementations of the continuous assessment (MOE, 2010). And the result of this study gave highlights that this difficulty will remain same to the existing curriculum. In contrast to Ethiopia, the Australian senior secondary mathematics curriculum was pilot-tested at classroom level.

Summary

The main objective of this study is to compare the rationale of (senior secondary) school mathematics curriculum of Ethiopia and Australia. The study was investigated qualitatively with documents review and interview as methods of research. The documents were analyzed and supported by interviews. The rationale of (senior secondary) school mathematics of Ethiopia and Australia was analyzed and compared through five themes, described under framework of the study section. The study revealed both similarities and differences. The study revealed that the substantial difference in their rationale is the underlying principle of content standard organization. Even though considerable difference exists, the similarities are: the adoption of constructivist approach, the objectives of mathematics teaching and the notions of active leaning approaches in teaching and learning mathematics.

Conclusion

Ethiopia and Australia recently developed the school (mathematics) curricula to address national educational objectives and to get international standards. Taking the case of mathematics curriculum from Ethiopia and Australia, the main objective of this study is to compare the rationale of the senior secondary school mathematics curricula standard in Ethiopia and Australia. A comparative study in mathematics education according to Zhao (2016) is "a comparison of mathematics education in different countries or contexts to identify differences and similarities and to interpret and explain the similarities and differences identified" (p. 14). In this study, both differences and similarities of the two countries' senior secondary school mathematics curricula rationale were explored. By acknowledging the similarities, the study concluded with providing recommendations. The Ethiopian senior secondary school mathematics content standard has to be organized with the strong rationale in line with proficiency standards. To improve the quality of mathematics education in Ethiopia, Mathematics teachers should be given continuous (pre-service and in-service) training on the existing curricula/syllabi, especially, on the constructivism, active learning, and continuous assessment. Unless it is hardly possible to achieve the purpose the curricula were reformed for.

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An Analysis of the Significance of the China-Australia Free Trade Agreement

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Abstract: China-Australia Free Trade Agreement (ChAFTA) is the agreement signed by China and Australia after nearly 10 years of negotiations. Due to its broad scope, advanced systems of trade and investment, the agreement is one of the deepest regional integration agreements relating to China since the Free Trade Agreement signed in 2002 with ASEAN. Therefore, its signing and implementation have a great significance to deepen Sino-Australia bilateral trade, investment, and to bring the benefits of both sides, the stability and security of the Asia-Pacific region.

Key words: China-Australia Free Trade Agreement, significance, trade and investment

Introduction

Following over a decade of negotiations, the China Australia Free Trade Agreement (ChAFTA) was signed on 17 June, 2015. The ChAFTA came into force on 20 December 2015. It lays an historic foundation for the next phase of Australia's economic relationship with China. The agreement unlocks significant opportunities for Australia in China which is Australia's largest export market for both goods and services, accounting for nearly a third of total exports, and a growing source of foreign investment. Therefore, it has the great significances in terms of Sino-Australian relations, economic development and legal meanings.

1. The main contents of the ChAFTA and its Significance to Sino-Australian relations

The ChAFTA includes the text and four annexes. In addition to the preamble, there are 17 articles in the text, namely, the initial articles and definitions, trade in goods, rules of origin and enforcement procedures, customs procedures and trade facilitation, sanitary and phytosanitary measures, technical barriers to trade, trade remedies, trade in services, investment, Natural Person Movement, Intellectual Property Rights, Electronic Commerce, Transparency, Mechanisms Clauses, Dispute Resolution, General Terms and Exceptions, Final Clauses.

In addition to the text of the Agreement and the Annex, the Sino-Australia FTA negotiations package includes two Memorandums of Understanding on investment facilitation arrangements and the Holiday Work Visa Arrangement, as well as an exchange of notes on Chinese medicine services. These three documents are signed at the same time as the agreement.

1). Matters related to the ChAFTA text

(1) The law and tax assessment in Australia and China. The two countries have each conducted a legal assessment of this text, and in line with ChFTA's principle of maximizing corporate interests, Australia and China have agreed to assess bilateral tax arrangements, including the lifting of double taxation. It also enhances the transparency of non-tariff measures, ensures that these measures do not create unnecessary obstacles to bilateral trade, and establish special mechanisms for the progressive review and resolution of non-tariff measures.

(2) ChAFTA will promote the further growth and diversification of China's investment flows to Australia, such as for the non-sensitive sectors identified by The Foreign Investment Review Board (the Board), which will allow China's private sector investment exemptions to be waived from Au \$ 252 million to Au \$ 1,094 million. However, the Australian Government has set strict thresholds for sensitive sectors of China's investment retention, including media, telecommunications, and defense-related industries. At the same time, Australia maintains a review of foreign investment in agricultural land and agribusiness investment proposals for over \$ 15 million in agricultural land and over \$ 5.3 million in agribusiness. All investments in Chinese SOEs will be reviewed irrespective of the size of the transaction.

2). The Significance of ChAFTA to Sino - Australia Relations

ChAFTA has achieved a comprehensive, high-quality and balanced interests of the target, which is of great significance. Firstly, ChAFTA is China's important decision to implement the strategy of opening to the outside world, and it is an important and solid step in the implementation of the Third Plenary Session of the 18th CPC Central Committee, the construction of a new open economy system

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and the construction of a high-standard free trade area network step. The signing of the agreement fully demonstrates China's confidence and ability to establish closer trade relations with its trading partners, and will continue to unswervingly deepen reform and promote opening to the outside world. Secondly, ChAFTA will comprehensively enhance the economic and trade relations between China and Australia to further promote the flow of capital, resources and personnel between the two countries and promote the complementary and lasting development of the economic advantages of the two countries so that both producers and consumers Benefit. According to the Australian Center for International Economic Research preliminary forecast, ChAFTA will drive the Australian GDP growth of 0.7 percentage points, boosting China's GDP growth by 0.1 percentage points. Finally, China and Australia, both major economies in the Asia-Pacific region and the world's major economies, reached a free trade agreement will be the 2015 APEC Economic Leaders 22nd informal decision to start the Asia-Pacific Free Trade Area process to provide a solid pedal for the Asia-Pacific Regional pragmatic advance economic integration process, to achieve lasting stability and prosperity to play a positive role in promoting.

2. Significance of ChAFTA trade rules for the economic development of two sides

(1) From both sides of the economy, the ChAFTA will help to expand trade between China and Australia, the scale of investment and increase the welfare of both peoples. ChAFTA covers mainly goods, services trade and investment. For China, exports of goods, including agricultural products and bulk commodities, which have comparative advantages in Australia, can make up for the shortage of Chinese resources and meet people's demand for high-quality food. At the same time, China's current encourage enterprises Going out to carry out overseas investment strategy.

(2) For Australia, the benefits are obvious. As the Australian Department of Foreign Trade and Investment has said: ChAFTA builds on Australia's large and successful commercial relationship with China, by securing markets and providing Australians with even better access to China across a range of Australia's key business interests, including goods, services and investment. Trade and investment with China is central to Australia's future prosperity.

Consistent with Australia's other bilateral trade agreements, remaining Australian tariffs on Chinese imports will be eliminated progressively. This includes removal of the five per cent tariff on Chinese manufacturing exports, electronics and white goods, with consumers and businesses to benefit from lower prices and greater availability of Chinese products. It is based on the following facts: for Australian goods exporters: More than 85 per cent of Australia's goods exports to China, more than 85 per cent of Australia's goods exports to China (by value in 2015) now enter duty free or at

preferential rates thanks to ChAFTA, and this percentage will rise to 93 per cent by 1 January 2019 and 97.9 per cent when ChAFTA is fully implemented (1 January 2029). China buys more of Australia's agricultural produce than any other country. In 2014-15, this market was worth \$9 billion to Australian farmers and the broader agricultural sector. Especially in dairy: tariffs up to 20 per cent eliminated by 1 January 2026; Beef: tariffs of 12 to 25 per cent eliminated by 1 January 2024; Wine: tariffs of 14 to 20 per cent eliminated by 1 January 2019; Wool: a new Australia-only duty free quota (commencing 1 January 2016), in addition to continued access to China's WTO quota.

The resources and energy products are the one of the Australia's export largest market to China. In 2014-15, Australia exported more than \$70 billion worth of resources, energy and manufactured products to China Starting from 20 December 2015, 92.8 per cent of China's imports of these products from Australia now enter duty free, with most remaining tariffs to be removed by 1 January 2019. On full implementation of the Agreement (1 January 2029), 99.9 per cent of Australia's resources, energy and manufacturing exports will enjoy duty free entry into China. Iron ore, gold, crude petroleum oils and liquefied natural gas: ChAFTA locks-in existing zero tariffs on these major exports providing greater certainty for Australian exporters : Coking coal: tariff of 3 per cent was completely eliminated on 20 December 2015; Thermal coal: tariff of 6 per cent was reduced to 4 per cent on 20 December 2015, fell to 2 per cent on 1 January 2016 and will be completely eliminated on 1 January 2017; Refined copper and alloys (unwrought), aluminium oxide (alumina), unwrought zinc, unwrought aluminium, unwrought nickel and titanium dioxide: tariffs of up to 10 per cent eliminated, many on 20 December 2015 Pharmaceuticals, including vitamins and health products: elimination of tariffs up to 10 per cent, either on 20 December 2015 or progressively by 1 January 2019 ; Car parts and engines, plastic products, opals and other precious stones: elimination of tariffs on these and some other manufactured products will take place by 1 January 2019.

In addition to the above-mentioned trade in goods, trade in services is also a profitable sector for Australian exports to China: China is Australia's largest services market, with exports in services valued at \$8.8 billion in 2014-15. China offers Australia its best-ever services commitments in an FTA, most valuably, this includes new or significantly improved market access for Australian banks, insurers, securities and futures companies, law firms and professional services suppliers, education services exporters, as well as health, aged care, construction, manufacturing and telecommunications services businesses in China. The agreement also includes a Most-Favoured Nation (MFN) clause.

(3) In terms of investments, China's commitments on investment in ChAFTA protect the competitive position of Australian businesses in China into the future. Increasing numbers of Australian

businesses are entering the Chinese market with great success, with banking and wealth management the leading sector of Australian direct investment in China. At the end of 2014, Australia's stock of investment in China totaled \$57.9 billion.

Investors for China, the benefits are obvious. Because ChAFTA has greatly reduced the threshold of bilateral trade and investment between China and Australia, it has established a more open, convenient and standardized institutional arrangement for the future development of bilateral economic and trade relations. It will help deepen the potential of bilateral cooperation, further promote the two-way flow of capital, resources and personnel, comprehensively promote and deepen bilateral economic and trade relations, enhance the level of cooperation, to enrich the comprehensive strategic partnership between the two countries to provide important content. Second, China and Australia have strong economic complementarities and have great potential for cooperation in the fields of energy, minerals, agricultural products and industrial products. The signing of the FTA between China and Australia will help to further close trade and investment relations between the two countries and achieve a win-win situation.

Firstly, in terms of investment: Australia is China's second largest overseas investment destination after Hong Kong. Chinese investment in Australia has been growing strongly in recent years - up from \$2 billion 10 years ago, to around \$65 billion at the end of 2014. ChAFTA will promote further growth of Chinese investment into Australia, in particular by liberalising the Foreign Investment Review Board (FIRB) screening threshold for private Chinese investors in non-sensitive sectors from \$252 million to \$1,094 million. Investment Facilitation Arrangement is made by the developed countries for the first time under the Chinese investment projects and technical staff to make special facilitation arrangements.

Secondly, Australia is the second country in the world to negotiate a FTA on "Holiday and Work Visas" in trade, in services and other areas. Australia is also the first country to make a commitment to trade in services on a negative list basis, and to professionals with Chinese characteristics to make a commitment to Australia, which is the developed country to give the relevant easy access in contrast to the largest number of developed countries.

Thirdly, in the area of trade in goods: ChAFTA reached a high level of liberalization in the area of goods. China 96.8% of the tax items will be liberalized, and the use of linear tax reduction is a simple and straightforward way to reduce taxes, of which 5 years to complete the tariff reduction ratio of 95% tax items, the remaining product tax transition period of not more than 15 years. All of Australia's products are fully tariff reductions in China, with the level of liberalization reaching 100%. 91.6% of the tariffs are reduced to zero at the time of entry into force. 6.9% of the tariff items are reduced to zero in the third year after the entry into force of the agreement. The last 1.5% Tariffs and tariffs shall be reduced to

zero at the fifth year after the entry into force of the Agreement.

From the perspective of trade, China's liberalization of imports of products from Australia accounted for 97% of total imports from Australia, which entered into force when the tariff is reduced to zero imports of products accounted for 85.4%, 5 years tariff reduced to zero Of the product imports accounted for 92.8%. When the Australian Agreement came into force, the import of products with zero tariffs was 85.4% of the total imports from China, and 98.4% of the tariffs were reduced to zero within three years. All products tariffs would be reduced to zero within five years.

To sum up, the signing of ChAFTA will further promote the development of economic relations between China and Australia, including trade and investment. More importantly, this further development will be guaranteed by the law. It can be predicted that in the future China-Australia economic and trade relations will be able to achieve a win-win situation based on the situation between China and Australia and ChAFTA.

3. The Legal Meaning of ChAFTA 's Rule Innovation

(1) One of the innovative aspects of the rules of the ChAFTA is to provide an important content for the development of a comprehensive strategic partnership between the two countries. Because ChAFTA both sides are important countries in the Asia-Pacific region: Australia is the world's GDP ranked the world's 12th developed Western economies, OECD and the Group of Twenty important members, it has a mature market economy and match Of the legal system and governance model in the Asia Pacific region and the world have an important influence. China is the world's second largest economy, is working hard to participate in the international economic and trade system. The signing of the ChAFTA has greatly reduced the threshold for bilateral trade and investment and set up a more open, convenient and standardized institutional arrangement for the future development of bilateral economic and trade relations. It will help deepen the potential of bilateral cooperation, further promote the two-way flow of capital, resources and personnel, comprehensively promote and deepen bilateral economic and trade relations, enhance the level of cooperation, to enrich the comprehensive strategic partnership between the two countries to provide important content.

(2) The significance of ChAFTA's international regional economic integration: The 22nd APEC Informal Meeting of APEC decided to start the Asia-Pacific Free Trade Area (APTA) process, and ChAFTA could become the Asia-Pacific Free Trade Area in the Asia-Pacific region, which will help promote the process of Asia-Pacific economic integration and promote the deep integration and common development of Asia-Pacific economies.

(3) ChAFTA's liberalization of trade rules for goods is at the highest level on both sides. Such as China 96.8% of the tax items will be liberalized, and the use of linear tax reduction is a simple and

straightforward way to reduce taxes, including 5 years to complete the tariff reduction ratio of 95% tax items, the remaining product tax transition period of not more than 15 year. All of Australia's products are fully tariff reductions in China, with the level of liberalization reaching 100%. 91.6% of the tariffs are reduced to zero at the time of entry into force. 6.9% of the tariff items are reduced to zero in the third year after the entry into force of the agreement. The last 1.5% Tariffs and tariffs shall be reduced to zero at the fifth year after the entry into force of the Agreement. From the perspective of trade, China's liberalization of imports of products from Australia accounted for 97% of total imports from Australia, which entered into force when the tariff is reduced to zero imports of products accounted for 85.4%, 5 years tariff reduced to zero Of the product imports accounted for 92.8%. When the Australian Agreement came into force, the import of products with zero tariffs was 85.4% of the total imports from China, and 98.4% of the tariffs were reduced to zero within three years. All products tariffs would be reduced to zero within five years. Compared with the Australia-Korea-Australia-Japan FTA, Australia's liberalization arrangements for Chinese products are superior to those for Japan and South Korea, mainly due to the five-year tax cut for Chinese products in Australia. The tariff reduction period for Japan and South Korea products are up to 8 years; in Australia through the tariff reduction period of tariff reduction products, the Australian tax cut in China for 3 years the proportion of tax items higher than similar products in Australia and Japan Australia and South Korea FTA in the proportion. The above is not only beneficial to both sides, but also for the further implementation of the liberalization of the international trading system is also of great significance.

(4) ChAFTA is the first high level of free trade agreements signed by China with one of the major developed countries, and one important sign is the two sides reached a high level of service in the field of negotiations results. Australia's level of openness to China's services is higher than the newly reached Australia-Japan-Australia-Korea FTA. Namely in the regional economic integration service trade system breakthrough, specifically in the following four aspects:

Firstly, ChAFTA is the first trade partner to "negative list" of China's trade in services made an open commitment to the agreement. Australia has agreed to open the service sector on a negative list to become the first country in the world to make a commitment to trade in services on a negative list basis. Based on China's WTO commitments, the Chinese side promised to open some service sectors to the Australian side in a positive way.

Secondly, personnel exchanges between the two sides to achieve a major breakthrough. The Australian side agreed to establish an investment facilitation mechanism to facilitate the opening of "Green Corridor" for Chinese enterprises to apply for Australian visas and work permits for engineering and technical

personnel under Chinese investment. This mechanism is the first time that developed countries have made special facilitation arrangements for China in this field. The Australian side will provide a "Holiday Work Visa Scheme" to provide Chinese youths with a visa for 5,000 people a year to promote youth exchanges between the two countries. Australia also provides entry allowances for 1,800 professionals each year to professionals with Chinese characteristics (Chinese medicine practitioners, Chinese teachers, Chinese chefs and martial arts coaches).

Thirdly, to prepare to "upgrade" both sides of trade in services. The two sides agreed to implement the FTA, the two sides agreed in the future time to conduct a negative list of trade in services negotiations, to promote a higher level of mutual openness. In addition, the two sides reached a series of important agreements on cooperation in such key service areas as finance, education, law and Chinese medicine. China's commitment level is also higher than other free trade agreements China has signed (except CEPA and ECFA).

Fourthly, in terms of the structure of the agreement, it mainly includes service chapters, financial annex, natural person movement chapter, natural person movement specific commitment annex, Chinese specific commitment schedules, Australia side nonconforming measures negative list, five areas cooperation exchange notes and two memorandums of understanding. In terms of the contents of the agreement, the following points are highlighted: First, Australia has opened its service sector on a negative list, with the exception of a few areas, giving China the most MFN status; the other is that Australia specializes in engineering and technical personnel under Chinese investment. Australia has set up a new facilitation mechanism to facilitate Chinese enterprises to engage in investment activities in Australia. The mechanism is developed for the first time in China to make special arrangements to facilitate China to ease the Australian labor shortage and high labor costs and other pressures; Third, Australia unilaterally for the Chinese youth to Australia to provide 5,000 annual holiday work visa, (Chinese, Chinese language teachers, Chinese chefs and martial arts coaches), a total of 1,800 people a year of entry quotas in Australia for the first time to stay the longest period of time Up to 4 years, can be renewed after expiration; Fifth, at the request of the Chinese side, Australia promised to foreign bank branches of the liquidity coverage requirements from 100% to 40%, Chinese banks in Australia branch of the cost of capital Will be significantly reduced.

(5) ChAFTA provides institutional convenience for Chinese enterprises to invest abroad. Under the framework of the China-Australia FTA, China and Australia signed a Memorandum of Understanding (MOU) on Investment Facilitation Arrangements to provide certain visa facilitation arrangements for Chinese enterprises investing in Australia. Chinese personnel engaged in large-scale investment and construction projects in the fields of food and

agricultural enterprises, resources and energy, transportation, telecommunications, power supply and power generation, environment and tourism will enjoy convenient treatment in Macao. More importantly, in the future, Former national treatment plus a negative list of models to negotiate with the Australian side to further enhance the level of investment liberalization and facilitation, but also on banking, securities, anti-money laundering and other issues of common interest to carry out dialogue and cooperation. At the same time, Chinese organizations can provide payment services in Australia, on the basis of national treatment, as payment system members and payment system operators. These will create a favorable business environment for Chinese financial institutions to "go global". These will be China's investment, financial system, one of the important measures to promote reform.

(6) ChAFTA has breakthrough significance in more than a dozen FTAs signed in China: rules cover a wide range, and have the depth of regional depth integration. Including, inter alia, initial terms and definitions, trade in goods, rules of origin and enforcement procedures, customs procedures and trade facilitation, sanitary and phytosanitary measures, technical trade barriers, trade remedies, trade in services, investment, movement of natural persons, intellectual property, E-commerce, transparency, terms of the mechanism, dispute settlement, general terms and exceptions, final clauses and more. Especially in the ChAFTA into the investor (investor) and the host state (host state) dispute settlement mechanism (ISDS). This mechanism provides procedural and substantive rules for the settlement of investment disputes, and these detailed and explicit provisions establish effective mechanisms for resolving investment-related disputes. In the case of a dispute between the two parties, the mechanism will provide investors with adequate means of remedy and strong institutional guarantees to further enhance investor confidence. In addition to the investor-host dispute settlement mechanism described above, the FTA also provides detailed procedures and treatment for specific dispute settlement in the interpretation and application of the Agreement and,

in the event of a commitment to a dispute, to do its utmost to Consultation, seek common satisfaction solution. The scope of the agreement on the dispute, the venue for the settlement of disputes, consultation mechanism, the composition and functions of the tribunal, the implementation of arbitration reports to make clear. Compared with the dispute resolution section of FTA, which has been signed by China earlier, the dispute settlement section of this Agreement is more complete, disciplined and friendly.

Conclusion

In conclusion, the signing of the ChAFTA is of great economic importance for the two Parties, as well as for the economic integration in the Asia-Pacific region and for further reform in China. Therefore, the successful operation and implementation of the ChAFTA and the implementation of the ChAFTA rule benefits from it are the tasks of the two sides in the future. This is more to rely on China and Australia to comply with ChAFTA, to deepen the study of free trade rules, to further deepen cooperation in the field of trade and investment.

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Economic Growth Public Debt and Public Expenditure in India – An Empirical Analysis

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Abstract: Since 1980s, the discussion over debt hovers around such questions as how does debt matter and what are its implications on the economy in the short and long run. It also hovered around answering questions like whether public debt was a burden on the present generation in whose lifetime the debt was created or the future generations in whose lifetime the debt has to be serviced / retired. According to the views of “new orthodoxy”, it is the present generation, in whose lifetime the debt is created, that bears its burden since the transfer of real resources to the government deprives the current generation of the benefit of these resources and it is forced to sacrifice current consumption as a consequence. While future generation is not burdened at all. However, critiques of this view claim that current generation is not burdened at all, while the future generation is burdened by either having to pay taxes to compensate bond holders (Buchanan, 1958) or through lost capital formation(1961).

Various factors play an important role while considering the burden of public debt like interest rate, strains and frictions imposed on the economy, ratio of total debt to total national income, unemployment, impact of work incentive, saving propensities, impact on income distribution etc. Another important question is whether the system of financing a project by means of public debt shifts the burden to the future generation? This paper focuses on the inter relationship between public debt, public expenditure and GDP of India.

Key words: Economic Growth, public debt, public expenditure, India, Empirical Analysis

Introduction

Public debt or national debt or sovereign debt is the debt owed by the central government for financing its operations in the economy. Public debt comprises of both internal and external debt components. External debt may further comprise of short and long term debt. Debts are owed to either official lenders or to private lenders (mainly international banks in the case of external debt). The borrowed funds can be utilized in two ways: they can be utilized for public expenditure or they can be used for investment purpose. Investing debt funds can help in generating income within the economy which may further generate savings and help in repayment of the debt. However, debt utilized for expenditure purpose cannot be used for repayment of the debt. The government should therefore strike an equilibrium between the amount of the debt to be invested and spent for economic purposes. Developing countries are particularly faced with the problem of rising indebtedness over and above repayment of the debt. Debt repayment is also influenced by the amount of loan taken and the interest component it carries.

Economists have tried to answer the question of repayment of the debt and whether the burden of debt falls on current or future generations most popularly through Debt Overhang Theory and Liquidity Constraint Hypothesis. Debt Overhang Theory was first discussed by Myers in 1977. According to the debt overhang theory, the external debt of the country is so high that the country is unable

to meet its obligation to pay back the debt. In such a scenario, a large portion of the current output of debt burdened country accrues to foreign lenders. Due to very high external debt to GDP ratios, such countries may have relatively lesser funds available for investment purposes. This may make the business environment less conducive in these countries. Such changes are bound to have an impact on the economic growth of the country (Krugman,1988 and Sachs,1989). There is further evidence in literature which suggests that if there is a future likelihood that external debt will be larger than the country's ability to payback the debt then the future debt service ratio would be so high that it would discourage further domestic as well as foreign investments and this would harm economic growth of the country (Pattillio,2002). The liquidity constraint hypothesis states that countries with very high external debt service ratio affects their ability to borrow further from external resources. This puts pressure on domestic borrowing and leads to crowding out effect. Hence, for a debt ridden economy to increase its current investment and growth, a reduction in current debt service ratio is crucial (Cohen 1993).

The problem of repayment of the debt particularly the external debt becomes critical where the country faces debt management issues. Inappropriate debt management may arise due to structural economic rigidities (Sharan, 2012) in a developing economy for example, (i) fall in investment productivity (ii) improper foreign exchange rate management (iii) spill over effects due to changes in external economies (iv) lack of economic diversification (v)

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concentrated and narrow export base (vi) high population growth rate (vii) rising fiscal deficit (viii) widening current account deficit. Public debt is therefore bound to be affected by these macro economic factors at large and vice versa. This leads us to hypothesize that public debt in a country affects its economic growth. The focus of this paper is to analyse the inter relationship between public debt, public expenditure and GDP of India.

Literature review

Mercantilists favoured public debt but classical economists like David Hume, Adam Smith and David Ricardo condemned public debt because their lack of faith in the role of state in the economic activities. According to the modern economists, public debt is an essential means of increasing employment and has become an instrument of economic policy and strategy of growth today.

According to Ricardo-Pigou thesis, if the government expense is financed by taxation, the first generation hands on to the second generation nothing but tax receipts; if by bond issue, the first generation bequeaths the bonds to the second generation and along with them, a tax liability in the form of annual charge on the debt for interest. The welfare of the second generation, however depends not on whether it inherits tax receipts or government bonds, but on what it inherits in the way of real stock of capital and this depends upon the usage of real resources by the first generation which it takes from the government.

Buchanan holds that the financing of a project by the government by means of borrowing does shift a burden to the future generations. According to him, the concept of burden should be interpreted in terms of the individual attitudes towards their economic well being rather than in terms of changes in private sector outputs and real income because of the inheritance by the latter generations of a larger or smaller amount of capital instruments.

Musgrave explains the transfer of public debt through reduced capital formation, transfer with generation overlap, transfer with foreign debt, borrowing by state and local governments and burden transfer in development finance.

According to Modigliani, public debt is advantageous to the current generation as it enables present generation to escape from increased taxation but shares enhanced resources generated from investment from debt funds at the time of debt redemption. Redemption of public debt invariably necessitates the raising of taxes from future generation(s), provided that new loan is not raised to liquidate the existing ones.

The aspect of debt servicing is the key element to external debt management by a country. Writers like Domar (1944) and Krugman (1988) and Sachs (1989) felt that debt service is like an implicit tax, that has the ability to discourage investment and hence retards economic growth and makes it difficult for highly indebted countries to escape poverty (Clements et al. 2005). This concept is famously coined as "Debt overhang".

Musebu Sichula (2012) has tried to study the impact of debt

overhang on economic growth with a focus on HIPC countries with special reference to south African development community. The paper focuses on panel data taken from the 5 SADC HIPC completion point countries namely; Zambia, Mozambique, Malawi, Tanzania and Madagascar for time period of 31 years from 1970 - 2011. The author uses pane data regression model analysis as the main tool of statistical analysis. The dependent variables in the study are growth rate of GDP and Private investment of the respective countries focused in the study. The external variables included in the study are the countrys terms of trade, external debt to Gross national income ratio, private investment to output ratio, exchange rate and corruption index. The author finds that HIPC countries have suffered economic decline due to the brunt of high external debt. They have been burdened by having high debt service obligations. The completion point countries (that are given high debt relief upon meeting certain conditions) show that one of the biggest effects of completion is economic growth. And Reduction of external debt and HIPC completion point attainment are the key forms of growth in these countries.

Hwang et al used panel data of 20 high external debt countries selected from Asia and Latin-America to investigate the financial sector development-debt-growth mechanism. Their main findings include that among 20 high external debt countries, the external debt-to-GDP ratio is significantly negatively correlated with economic growth rates, indicating that excessive debt is detrimental to the growth of an economy. The simultaneous GMM equations fitted between financial sector development and economic growth to evaluate the inter relation between economic growth, external debt, and financial sector development show that the negative impact of high debt on growth appears to operate through a strong negative effect, in terms of compulsion to resort to financially repressive policies. In addition, the authors also find a two-way relationship between financial sector development and economic growth.

Stella et al in their research paper empirically tests the applicability of the debt overhang hypothesis in Zimbabwe using time series data covering the period 1980 to 2009 by analyzing the inter relationship between economic growth and external debt. Main tools of statistical analysis used in the study are cointegration analysis as well as Granger causality tests to test the causal relationship between external debt and investment. Regression results from the growth model indicate the presence of a debt overhang in Zimbabwe as evident from the negative relationship between external debt and economic growth, while those from the external debt investment model show the absence of an indirect debt overhang.

Kobayashi in his paper provides a theoretical basis for a possible formation of public debt overhang that simultaneously brings low growth and low interest rates in Japanese economy. According to the author, as public debts (government bonds) function as liquid assets, their increase itself has the effect of promoting economic growth. The author correlates the liquidity

supply effect with income effect. If productive economic entities are taxed and subsidies are paid to the labor sector as a result of fiscal policy, workers whose income has increased reduce the supply of labor (income effect). As a result, the wage rate rises, prompting highly productive companies to reduce production. When the income effect prevails over the liquidity supply effect, fiscal deterioration reduces production. In addition, market interest rates fall because highly productive companies' demand for borrowings declines. In this way, fiscal deterioration (increases in public debts and subsidies) leads to decreases in both productivity and interest rates.

Current Scenario

The government of India's total debt obligations were only 2865.4 crore in march 1951 but shot to Rs 4594142 crores in March 2011. The total liabilities of GOI as a percentage of GDP are 51.8 % as on year end March 2011. Out of these 3.3 % are contributed by external debt and 48.5 % by internal debt. External debt of a country indicates contractual liability of residents to non-residents. In rupee terms, external debt stood at ` 1,767,702 crore, reflecting a rise of 29.4 per cent over the end-March 2011 estimate.

	2007	2008	2009	2010	2011	2012
	(Rs Crore)	(Rs Crore)	(Rs Crore)	(Rs Crore)	(Rs Crore)	(Rs Crore)
Internal debt	2435880	2725395	3036132	3395873	3781135	4300765
External debt	201199	210086	264062	249306	271570	293377

Source : finmin.ac.in

Data Base

The study uses time series data from the year 1980-81 to 2013-14, taken from Economic Survey, Ministry of Finance, Govt. of India and Reserve Bank of India. It also uses data taken from the publications of C.S.O., Government of India.

Models and Methods

The paper has employed regression model in empirical analysis. Since the paper deals with time series data, verifying it for stationarity prior to empirical analysis becomes essential.

The stationary time series is characterised by the following three features:

$$\text{Mean} = E(Y_t) = \mu$$

$$\text{Variance} = \text{Var}Y_t = E(Y_t - \mu)^2 = \sigma^2$$

$$\text{Co-Variance} = V_m = \{(Y_t - \mu)(Y_{t+m} - \mu)\}$$

Time series, in fact, may or may not be stationary and regression models, based on non-stationary time series can not furnish reliable results. This necessitates the evaluation of the assumption of stationarity of the series as a preliminary step. In several cases, non-stationary time series is affected by auto-correlation. Value of the coefficient of determination, estimated from time series data, often furnish an extremely high value, while two or more time series of variables may have no true relation between them. It implies the presence of spurious or pseudo correlation and regression estimates from such time series make no sense. Some time series, especially the financial time series, and export earnings do involve finances, which may approximate random walk phenomenon, the basic characteristic of non-stationary time series. Regression models, based on time series, may also be used for forecasting the validity of which will depend upon stationarity of the series used for it. Test of causality should be preceded by the test of stationarity.

Random Walk Model (RWM)

RWM Without Drift

$$Y_t = Y_{t-1} + U_t$$

Or

$$Y_t - Y_{t-1} = \Delta Y_t = U_t \dots\dots\dots(1)$$

Random Walk Model with Drift

Random Walk Model with Drift is a variant of model 1:

$$\Delta Y_t = \beta_0 + U_t$$

Or

$$Y_t = \beta_0 + Y_{t-1} + U_t \dots\dots\dots(2)$$

β_0 , the coefficient of drift, takes cognisance of value that is loaded additionally on the influence of random errors on Y_t . This drift takes the value of Y_t away from Y_{t-1} . Model 2 is derived from the following auto-regression model of first order, if $\beta_1 = 1$ is substituted in relation 1:

$$Y_t = \beta_0 + \beta_1 Y_{t-1} + U_t \dots\dots\dots (3)$$

If either model 1 or 2 is found to fit the given time series well, then the series is non-stationary. However, the first differences of Y_t , that is, ΔY_t may still approximate stationary time series. It is possible that ΔY_t is also a non-stationary series but it may still encompass deterministic trend. In that case, first order differences with trend may be taken in the regression model:

$$\Delta Y_t = \beta_1 Y_{t-1} + \beta_2 T + U_t \dots\dots\dots (4)$$

Unit Root Test

Unit root test of stationary time series has gained great popularity among researchers. The unit root test is outlined below:

$$\Delta Y_t = (r-1) Y_{t-1} + U_t \dots\dots\dots (5)$$

Model 5 is obtained if we substitute $(r-1) = \beta_1$ in model 4

Where Δ denotes first order difference operator. If $(r-1) = 0$ in model equation 5, then, $r=1$. It is this condition which is referred as

unit root problem for testing whether given time series is stationary. In such cases, $\beta_1=0$ will hold, and both Y_t and ΔY_t will be non stationary. If, however, $r<1$, β_1 will be negative and the series will be stationary.

Trend Analysis of Public Debt and Public Expenditure

Time series have been used in regression model for trend analysis as follows:

$$PD_t = \alpha_0 + \alpha_1 T \dots\dots\dots (6)$$

$$PE_t = \alpha_0 + \alpha_1 T \dots\dots\dots (7)$$

Where, PD_t = Public Debt, PE_t = Public Expenditure

Growth of Public Debt and Public Expenditure

$$\ln PD_t = Y_0 + Y_1 \ln T$$

$$\ln PE_t = Y_0 + Y_1 \ln T$$

$$\ln G_t = Y_0 + Y_1 \ln T$$

Inter relation between GDP, Debt and Expenditure

$$PD_t = \alpha_0 + \alpha_1 G_t$$

$$PD_t = \alpha_0 + \alpha_1 PD_{t-1} + \alpha_2 G_t$$

Where, G_t = GDP

$$PE_t = \beta_0 + \beta_1 PE_{t-1} + \beta_2 G_t$$

Empirical Investigation

Random Walk Model (RWM) is applied as the preliminary step to evaluate if the time series is stationary.

Unit Root Test of GDP of India

OLS estimates of 3 versions of RWM are reported hereunder with a view to evaluate the value of the root of the regression functions:

$$\Delta GDP_t = 0.153GDP_{t-1}, R^2=0.973, F=1105.81 >F^*=1.2E-24$$

$$\tau : (33.25) \dots\dots\dots (1)$$

$$\Delta GDP_t = -26433.89+0.1603GDP_{t-1}, R^2=0.95, F=655.93>$$

$F^*=1.83E-21$

$$\tau : (-1.61) (25.61) \dots\dots\dots (2)$$

$$\Delta GDP_t = 29475.21 + 0.18 GDP_{t-1} - 6804.44 T, R^2=0.96, F=391.48$$

$> F^*= 3.42E-21$

$$\tau : (1.09) (14.65) (-2.51) \dots\dots\dots (3)$$

The above results show that the root of all above functions does not satisfy the unit root condition of Dickey-Fuller test. Hence, the time series of GDP of India may be treated as non-stationary. However, the linear combination of 2-3 non-stationary time series in a regression model may still be stationary provided that the residuals of such regression model satisfy the Dickey-Fuller unit root test of residuals which is known as Engel-Granger test.

RWM : Public Debt

$$\Delta PD_t = 0.120PD_{t-1}, R^2=0.987, F= 2297.56 >F^*=3.6E-29$$

$$\tau : 47.93 \dots\dots\dots(4)$$

$$\Delta PD_t = 124.21 + 0.115PD_{t-1}, R^2= 0.975, F= 1177.08 >F^*=$$

$4.97E-25$

$$\tau : () (34.3) \dots\dots\dots(5)$$

$$\Delta PD_t = 96.99+0.112PD_{t-1}+ 3.56T, R^2= 0.976, F= 570.27 >$$

$F^*=2.05E-23$

$$\tau : (0.93) (12.65) (0.31) \dots\dots\dots(6)$$

Above results show that RWM also holds true for the above models. The time series of public debt is thus non stationary.

RWM : Public Expenditure

$$\Delta PE_t = 0.14PE_{t-1}, R^2=0.857, F= 181.08 >F^*=5.33E-14$$

$$\tau : 13.45 \dots\dots\dots (7)$$

$$\Delta PE_t = -1.82 + 0.143PE_{t-1}, R^2=0.760, F= 92.16 >F^*= 1.65E-10$$

$$\tau : (-0.01) (9.6) \dots\dots\dots(8)$$

$$\Delta PE_t = -62.93+ 0.13PE_{t-1}+ 7.19T, R^2= 0.76, F= 44.75 >$$

$F^*=1.90E-23$

$$\tau : (-0.3) (4.12) (0.35) \dots\dots\dots(9)$$

RWM holds true for the time series of Public Expenditure as well. Hence the series is non stationary.

Inter relation Between Public Debt and GDP

Application of distributed lag model is preceded by step-wise regression with a view to detect the location and pattern of multi-collinearity, if any (Klein, 1965, Tinbergen, 1947). The OLS estimates of the distributed lag functions of GDP, Public Expenditure and Public Debt are reported hereunder:

$$PD_t = 124.21+1.11PD_{t-1}, R^2 = 0.999, F = 110043.6 > F^*= 1.85E-53$$

$$t : (2.26) (331.72) \dots\dots\dots(10)$$

$$PD_t = 836.11+0.585 GDP_t, R^2 = 0.985, F = 2100.93 > F^*=2.46E-29$$

$$t : (2.21) (45.83) \dots\dots\dots(11)$$

$$PD_t = 145.17+1.075PD_{t-1}+0.02 GDP_t, R^2 = 0.999, F = 57279.59 > F^*= 2.71E-51$$

$$t : (2.61) (40.10) (1.47) \dots\dots\dots(12)$$

The results of step wise regression show that (i) auto-regression model fits the data well (ii) regression of public debt on GDP fits the data well as the function explains nearly 98% of total variation in public debt and the coefficient attached to GDP is statistically significant; (iii) the distributed lag model fits the data well. GDP cannot be considered to be a significant determinant of public debt. The value of coefficient of determination in distributed lag model shows an improvement of 0.5 percentage points, indicating that inclusion of lagged value of public debt is not redundant. But coefficient of determination of distributed lag model has exactly the same value as that of relation (10). It means that introduction of GDP as an additional explanatory factor does not raise the explanatory power of relation (10), which suggests that GDP is not an explanatory factor of public debt of India. So, the non-significance of the coefficient of GDP in relation (12) cannot be attributed to multi-collinearity. In view of this, auto-regression model is accepted for public debt. However, the coefficient of lagged value of public debt is positive and statistically significant.

Inter relation Between Public Expenditure and GDP

OLS estimates of the functions are as follows:

$$PE_t = -1.82 + 1.14PE_{t-1}, R^2 = 0.995, F = 5873.147 > F^* = 4.93E-35$$

$$t: (-0.01) (76.63) \dots\dots\dots(13)$$

$$PE_t = -63.20 + 0.29GDP_t, R^2 = 0.997, F = 13155.63 > F^* = 3.28E-41$$

$$t: (-0.822) (114.69) \dots\dots\dots(14)$$

$$PE_t = -60.02 + 0.13PE_{t-1} + 0.26GDP_t, R^2 = 0.997, F = 6115.41 > F^* = 1.05E-37$$

$$t: (-0.73) (0.75) (5.67) \dots\dots\dots(15)$$

The high proportion of total change in public expenditure explained by models (13) and (14) show that both these functions fit the data well. The proportion of total change explained by (13) is 99.5% and that of (14) is 99.7%. Introduction of current GDP as an additional explanatory variable in relation (13) enhances the explanatory power of the function in (15) in comparison to function 13 by 0.2 percentage points. However, introduction of lagged expenditure in (15) does not improve the explanatory power of (14), indicating redundant nature of lagged expenditure. So the non-significance of the coefficient of lagged expenditure in (15) is not attributable to multicollinearity. So, model (14) is accepted. So public expenditure depends on current GDP.

Inter relation Between GDP and Public Expenditure

OLS estimates of the models are as follows:

$$GDP_t = -264.33 + 1.160GDP_{t-1}, R^2 = 0.999, F = 34360.72 > F^* = 3.92E-46$$

$$t: (-1.61) (185.36) \dots\dots\dots(17)$$

$$GDP_t = 221.57 + 3.84PE_{t-1}, R^2 = 0.996, F = 8548.91 > F^* = 2.18E-37$$

$$t: (0.68) (92.46) \dots\dots\dots(18)$$

$$GDP_t = -270.61 + 1.17GDP_{t-1} - 0.05 PE_{t-1}, R^2 = 0.999, F = 16598.09 > F^* = 9.12E-44$$

$$t: (-1.56) (9.18) (-0.13) \dots\dots\dots(19)$$

These results of 17, 18 and 19 are in consonance with earlier results. OLS estimate of regression functions of GDP show that (i) Auto-regression function 17 fits the data well and the explained proportion of total variation in GDP is as high as 99.9%; (ii) the coefficient attached to lagged value of GDP is highly significant statistically in function 19; (iii) Regression of GDP on lagged public expenditure fits the data almost as well as the auto-regression function; the explained proportion of total variation of GDP in this case also is as high as 99.6%, which is 0.3 percentage points less than that explained by auto-regression function; (iv) these two regression functions show that the lagged values of both GDP and public expenditure are equally significant determinants of current values of GDP of India. (v) the coefficient of lagged public expenditure is not significant statistically in function 19 due to which auto regressive model is accepted here as the main model.

GDP depends on its own past values rather than on lagged public expenditure. Thus, the auto-regression models may be taken to be valid for public debt and GDP, while current public expenditure depends on current GDP.

Growth curves of Debt, Expenditure and GDP in India

$$\ln GDP_t = 5.09 + 0.05T, R^2 = 0.997, F = 11410.84 > 2.76E-40$$

$$t: (509.19) (106.82) \dots\dots\dots(21)$$

$$\ln PD_t = 2.84 + 0.05T, R^2 = 0.990, F = 3291.23 > 3.15E-32$$

$$t: (145.73) (57.36) \dots\dots\dots(22)$$

$$\ln PE_t = 2.57 + 0.05T, R^2 = 0.997, f = 12052.25 > 1.22E-40$$

$$t: (265.34) (109.78) \dots\dots\dots(23)$$

Annual compounded rate of growth of public debt, public expenditure and GDP is significant. The rate of growth for all the three variables is 5%. There exists remarkable similarity in growth of public debt, public expenditure and GDP as all the three growth rates are same.

Conclusions

Autoregressive model fits the data well in case of public debt and GDP but distributed lag model fits well for public expenditure. Greater GDP leads to mobilization of greater revenue resources to finance public expenditure. Public expenditure comprises both welfare and development expenditure. Since 1990, it is the private expenditure which rose as an important variable in the economy influencing GDP. This is the main reason behind GDP not being affected by lagged value of public expenditure. However, public expenditure is affected by GDP significantly. Public expenditure, has been greatly affected by the roles and functions of the government in the social and economic affairs of the nation. The growth paths of the center and state intersect with each other largely and they are functionally related to each other, consequently, the growth of the economy also results in more rapid growth of the public expenditure. Also the relation between cost and benefits is disproportionate since public does not weight the benefits accrued from availing public amenities due to public expenditure with the taxes they pay for doing so. In the current scenario through which Indian economy is passing it needs to be analysed what impact the government's flagship policy like Make in India will bring on public expenditure and the economy at large. The current strategy of the government needs to focus upon (1) clearly defining percentage of expenditure for the industrial projects which will be state financed and center financed (2) a separate pocket to be created for expenditure on recurrence of natural calamities and disasters in an economy (3) income elasticity of demand to be considered while pricing public goods (4) Focus on reducing the debt burden on future generations in terms of Aid absorptive capacity so as to make efficacious use of aid and minimizing fragmentation of the aid provided to projects.

Limitations

The study restricts itself to the inter relationship between only three variables, that is, overall debt, expenditure and GDP of India. It does not take into account other macro variables affecting public debt in the economy. Moreover, the study does not take into account sector wise analysis of the debt consumption and payment patterns

which could have given a microscopic view of the problem.

Directions for Future Research

With the announcement of Make in India Policy by the Indian government it becomes imperative for economic experts and fraternity to study its impact on the growth of the economy vis a vis the public debt, expenditure and income generated therein. The question which would need more focus would obviously be how much capital generation / depletion will take place and whether future generations would be better off than the present generation or not in lieu of employment generated, infrastructure development and technological advancements that would be taking place in the economy then.

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Rational Thinking on Equal Rights in China

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Abstract: Equality is the most basic and important human rights, and it is the basis of citizens' exercising other rights. There is still a gap between the legal provisions and the protection of equality in China, and there are still wide inequalities in political, economic and cultural rights. Its deep roots are mainly the lack of human rights concepts and the recognition of equal rights.

Key words: Equal rights, human rights, rights, obligations

1. Introduction

Citizens' right to equality means that all citizens have equal rights and obligations under the law and are equally protected by law. The basic requirement of the right of equality is to combat discrimination and to prohibit discrimination. The right to equality and freedom together constitute the foundation of the human rights system, the prerequisite for the exercise of other rights, and the most fundamental and important human right around the world.

2. Equal rights has been addressed by the international community and China

Equal right is the product of overthrow of the feudal autocratic system and against the feudal class privilege of, and it is the basic requirements of the rule of law and market economy. During the bourgeois revolution, Enlightenment thinkers Locke and Rousseau have put forward the "natural equality" and "natural equality". In 1789, the French Declaration on Human Rights raised the banner of human rights for the first time, proposing that "all citizens are equal before the law". Since then, human rights have become the most important and fundamental value of the constitution of democratic countries. Equality has become the basic right of the constitution and the basic right to realize other rights. "Modern Constitution is based on equality and freedom as the ideological basis and value of the pursuit of". After World War II, a series of international human rights conventions have set out a wide range of human rights, in which equal rights provisions are particularly prominent. Such as the International Covenant on Civil and Political Rights and the Covenant on Economic, Social and Cultural Rights.

In order to realize the equal rights of citizens, the law of equality in China also made a more comprehensive expression. The Constitution has recognized the equality right from different aspects. Other laws such as criminal law, civil law and procedural law have also made a lot of specific provisions on the implementation of the equality right, especially some laws protecting the disadvantaged

groups such as the old, Regulations have been promulgated and implemented, and gradually make China the establishment and protection of equal rights onto the legal track.

In practice, some equal rights have been achieved in China, such as equality between men and women, equality among ethnic groups, and even international comparative advantages. The right to existence and development is the prerequisite and basis for the existence and development of equal rights. The Chinese government is committed to safeguarding the people's right to exist and improving their living conditions, thus laying a sound foundation for the development of equal rights. In recent years, the government poverty alleviation and development, new rural construction and other measures that effectively promote the development of equal rights. China has equal pay for equal work for men and women. Women have special labor protection. Women's employment scale, labor remuneration and education level are basically equal to those of men. The rate of women's status is higher in the world than in the long history of discrimination against women. Ethnic equality has also been impressive. Minority citizens enjoy equal rights with citizens of the Han nationality, and enjoy the unique rights of ethnic minorities according to law. The state has promoted the unity, cooperation and common prosperity of the various ethnic groups and promoted the equality of all nationalities from the political, economic, cultural, educational and other aspects of the ethnic areas to implement preferential policies and fostering.

3. Issues of inequality in China

Although China's Constitution and the law made equal representation of equal rights, the practice of equality rights has also achieved certain achievements, but this does not mean that China has fully reflected the human rights legislation, not to mention the realization of this human rights. The rights of equal rights are not as clear and explicit as other rights. Their rights are mainly embodied in the process of exercising or realizing other rights, that is, through the equality of political, economic and cultural rights. Therefore, the

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degree of equality in the implementation of various specific rights becomes a measure of the degree of realization of equal rights. Comparing the requirements of international human rights conventions and international human rights practice, we can find that the legislation and practice of human rights in many respects, especially the right of equality, are lagging and even conflicts with the international community.

3.1 Political rights are not equal

China is still to some extent identity society, not equal society, the most prominent manifestation is the existence of urban and rural dual structure, most farmers are still in the social low-level. The Regulations of the People's Republic of China on the Registration of Household Registration is one of the main legal bases of the current household registration system. It recognizes and protects this dual structure. This legal system divides citizens into "agricultural registered permanent residence" and "non-agricultural registered permanent residence", and implements the dual structure of urban and rural household registration management, which makes the identity of peasantry a lifelong and hereditary system. Inequality between people. The current household registration system has attached too many administrative, economic and welfare management behaviors to the peasants, so that the peasants cannot enjoy the preferential rights such as the political, economic, cultural and educational benefits that the urban residents can enjoy. Differences and inequities. This system also limits the freedom of movement of citizens, hindering the optimal allocation of human resources and reasonable flow between regions. The abolition of the unequal household registration system should be imperative. There are also many inequalities in concrete political rights. The right to vote is unequal: the constitution provides that the right to vote is equal, but in fact different classes, occupations, ethnicity and other voting rights are unequal. There has been a serious imbalance between urban and rural electoral rights. For a long time, the ratio of deputies to deputies in rural and urban areas has been 4: 1, and even though this provision has been abolished by law, the proportion of peasants who are the majority of the population is very small among the deputies to the National People's Congress, and the minimum number of peasants in the first session of the National People's Congress is 63, accounting for only 5.14% of the total number of deputies. If the number of representatives of ethnic minorities is tilted in order to take care of the weak, to achieve practical significance of equality, then the city and officials to tilt and reflect what values? Inequality of the right to be elected: lack of equality, open competition mechanism, candidates are often designated rather than equal election campaign. Unequal management of state and society: the choice of national managers has too many qualifications, especially political qualifications, is far from being achieved under equal conditions, job positions open to all basic justice requirements.

3.2 Inequality in economic rights

Economic status of the main inequality. Market economy requires the main body of pluralism and equality, equal rights and

obligations, are treated equally and protected. However, the legal status of various forms of ownership in China is unequal. In the existing economic system, there are all kinds of power monopolies and policy inclines. Between different regions, between industries and between economic entities, they cannot compete equally on the same starting line. Farmers have long been unfairly treated, and the external environment for the survival and development of individual and private economies is far more unfair than the state-owned economy.

Unequal labor rights. The Constitution stipulates that citizens have the right to labor, but the labor of peasants and self-employed persons is not regulated and protected by the Labor Law. They can not enjoy the right to employment, unemployment insurance and labor protection on an equal footing. Farmers or unemployed status of their limited in many areas and many organs, enterprises, institutions of the employment eligibility.

Unequal economic benefits. Income inequality in different sectors, regional and industry income gap. State-owned assets are owned by the whole people, and their benefits should be shared by the whole people, but in fact a large part of them are occupied by state-owned monopoly departments. Migrant workers, non-agricultural non-workers, is the edge of the law people, benefits are low, far from enjoying equal rights with the workers, but cannot enjoy unemployment benefits of urban workers. Inequality in income distribution, inequality in investment, preferential areas and industries, and inequality in China are exacerbated by the inequality of fiscal revenue, which is in contradiction with the support of vulnerable groups as required by the right to equality.

Material assistance is not equal. The Constitution provides that workers have the right to material assistance in old age, illness or incapacity to work. However, the breadth and depth of protection in different regions and industries are greatly different. The level of protection of state staff and urban workers is difficult to reach for vulnerable groups such as farmers. Although the national poverty-stricken population on the implementation of poverty alleviation and development programs, but its efforts are far from enough. The gap between the rich and the poor in China has aroused wide attention in the world.

3.3 Cultural and educational rights are not equal

Inequality in primary education. In practice, the education rights of rural areas, especially those in backward areas, are far from equal protection. For example, the allocation of education resources, urban and rural differences, the focus of primary and secondary schools and the difference between ordinary primary and secondary schools in rural and backward areas of education, national investment is low, weak faculty, teaching facilities seriously affect the quality of teaching, and even rely on some areas Like the "Project Hope" like the folk behavior to school student. Another example is that China's compulsory education is not in line with the world in nominal terms, but in fact all kinds of miscellaneous fees, make-up fees are still seriously restricting the poor people's right to

education, can not afford to learn the phenomenon is not uncommon.

Inequality in higher education. Article 13 of the International Covenant on Economic, Social and Cultural Rights, one of the United Nations human rights conventions to which China is a party, provides that "Higher education shall be open to all persons on an equal footing with all appropriate means, in particular progressive, ". However, in China, the difference between the different regions of the admission criteria and admission scores, so that the right to education in higher education to a strong regional tilt, serious inequality in access opportunities. Higher fees in universities also smash the dreams of many poor people. More seriously, not only are there no progressive fees that are required by the human rights conventions, but there is also a trend of rising tuition fees. The stratification of modern society is closely related to the level of education. The level of education determines the position of the individual in the future society. The inequality of education in our country exacerbates the polarization of society.

4. The reasons for interpersonal inequality in China

The factors that cause interpersonal inequality are complex, subjective and objective. This paper mainly discusses the reasons of subjective cognition.

4.1 Lack of human rights concepts

China's conception of human rights is inherently inadequate and has not been fundamentally revised since the reform and opening up. Mainly in the following aspects with the international community there is a deviation:

Right source. The international community emphasizes the human rights inherent in human rights. Human rights are inherent in human life. They are the minimum qualifications of human beings. Human rights precede the state, the state cannot grant human rights, and cannot arbitrarily restrict and deprive human rights. China has always denied natural rights, that human rights are given by the state and the law. In this kind of theoretical system, since the rights are given by the state and the law, it can also be deprived by the state and the law, which provides the legal basis for denying the equal rights of the people.

The scope of rights. The international community that the state power is legal, administrative rights must have a legal basis, "the law does not authorize cannot be", without the law expressly authorized administrative act is invalid; and citizenship can be presumed, "the law is not prohibited or free" The rights are broad and the rights not provided for by the law are presumed to be owned by citizens. In China, the civil rights are legalized, and the law adopts the law of enumeration to stipulate civil rights. The rights that are not expressly provided are not guaranteed. The law was trampled.

The core of human rights protection. The protection of human rights in the international community is individual-centered and emphasizes the protection of the legitimate rights and interests of individuals. China advocates the spirit of collectivism and emphasizes the protection of state and collective rights. The interests

of the individual are subordinate to the state and collective interests, and the interests of the individual can be sacrificed in the interests of the state and the collective. Although collectivism is regarded as the manifestation of the superiority of socialism and public ownership, it is easy to produce the phenomenon of harming the legitimate rights and interests of the individual in the name of state and collective interests, while over-expanding the concept of collectivism and neglecting respect for individual interests. For the unlawful damage to the equal rights of citizens to provide some high-sounding reasons.

The Relationship between Human Rights and State Power. The international community emphasizes the confrontation between individual rights and state power. It is concerned that the exercise of state power may damage individual rights, and therefore attach importance to the relief of individual rights and restrictions on state power, that there is no right without relief. China emphasizes the unanimity of national, social and personal interests, and does not pay enough attention to their contradictions and confrontations. When they conflict, they insist on individual interests obeying national and social interests, focusing on the expansion of state power and individual Restrictions on Rights. Because of the emphasis on the consistency of state power and individual rights and neglect of their confrontation, the rights relief does not improve to its due position, so often make the rights stay at the text level of the law and difficult to be truly implemented and safeguarded. So that the infringement of individual rights of administrative acts is difficult to be effectively curbed.

Rights and obligations. The international community is more concerned with rights, with particular emphasis on the protection of the rights of vulnerable groups, and the obligation to give more strong groups to narrow the interpersonal gap. China is more concerned about obligations, emphasizing the citizen's obedience to state management, the lack of citizens, especially vulnerable groups, the protection of the rights of consciousness, the weak bear the same obligations, so that the same rights or even more rights, resulting in rights and obligations Of the imbalance, leading to and expand the inequality of different groups.

4.2 Lack of awareness of equality

On the Universality of Equal Rights. International human rights conventions emphasize the universality of human rights and emphasize any distinction, without distinction as to race, sex, language, religion, political or other opinion, national or social origin, property, birth or other status. This universality essentially embodies the right to equality, the fight against discrimination, and the fight against discrimination. Especially for vulnerable groups, in the legislation more emphasis and priority to protect the realization of their rights. China has long maintained the class struggle view and class analysis methods, that in the class society, different classes of members cannot be equal. Stressed that the same cannot be equal with the reactionary class, cannot speak to the class enemies of human rights. Even in the Constitution of 1975 and the Constitution

of 1978, the rule of equality before the law was abolished. Now, although the class concept has watered down a lot, the social class difference is still obvious. Long-term over-emphasis on the class will of the law, that "equality before the law" mainly refers to the equality of law, and in the more important level of legislation can establish the rights of different identity differences, resulting in equal rights are just identities. Between equal rights, there is no equal rights between different identities, leading to incomplete right to incomplete, incomplete.

The Differential Treatment of Equal Rights. Equality can only be relative, and equal rights are not egalitarian. Equality emphasizes the equality of human spirit, such as human dignity. It does not deny the inequality of human's natural state, such as human's difference in intelligence and physical strength and its consequence, and does not exclude the difference of law. But on the one hand, this kind of "different treatment" for specific people or people must conform to the standards of equality and justice, which can only be based on human intelligence, physical strength, achievement and so on, but not identity, race, political beliefs and other factors. On the other hand, the purpose of discrimination is to narrow the gap and to minimize natural inequality, "to give priority to the disadvantaged and to the inferior to preferential treatment, so that the competencies of different competitors to obtain the same opportunity". China has not paid much attention to differentiated treatment, neglecting the protection of vulnerable groups, and even the development of the law is conducive to the expansion of strong groups, which inevitably lead to widening interpersonal gap, resulting in equality rights reality and reality, such as equality the sharp contradictions between the desire and the wide variety of privileges, the craving for common prosperity and the growing contrast between the rich and the poor.

The problem of equality right. modern rule of law in the country not only at the constitutional level to recognize and protect the right to equality, more emphasis on the right to equality of the concrete, that is, in various laws will be equal rights and other rights combine the right to equalize civil rights in all aspects, The content of citizens' rights permeates the spirit of equality, so that citizens truly enjoy equal rights and opportunities, equality of personality and dignity, so that society has an equal environment. "Equality, which we are entitled to as human beings, is equality of the environment,

not of the individual." They are equal conditions-status, treatment, equality of opportunity ". The slogan of equal rights, which is not combined with the specific rights of citizens, can only be a hollow cry. This requires the national system construction on the follow-up and improvement, the need for legal norms support. At present, China urgently needs to formulate a "Equality of Rights Law" which embodies the equal rights stipulated in the Constitution. Through the form of legislation, it clarifies the scope of equal rights, the standard of equal rights, the minimum requirement of equal rights protection, and remedies, and so on, the constitutional rights granted to the citizens of equal rights can be refined into real rights can be fulfilled. On this basis, committed to the protection of civil rights, so that vulnerable groups will not because of identity, poverty, disease and other factors have been discriminated against or excluded from the mainstream society. Only through the construction of these specific systems can we abandon the discrimination against citizens and truly establish a harmonious society that is people-centered, human rights first and equality for all.

5. Conclusion

In conclusion, there is a need to committed to the protection of civil rights in China, so that vulnerable groups will not because of identity, poverty, disease and other factors have been discriminated against or excluded from the mainstream society. Only through the construction of these specific systems can we abandon the discrimination against citizens and truly establish a harmonious society that is people-centered, human rights first and equality for all in China.

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On Cultivation of Ability of Law Undergraduates and Reform of Practical Teaching of Law

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Abstract: Legal theory belongs to an inner part of legal practice and displays its meaning in legal practice. Practical teaching links are of great significance to the cultivation of law undergraduates' ability. Although the universities pay more attention to practical teaching, and in law practice teaching level has achieved some results, at this stage China's legal undergraduate education in practical teaching links there are still issues relating to teaching content, teaching arrangements, teaching conditions. This paper puts forward suggestions to strengthen practical teaching, optimize practical teaching content and reform practical teaching method of jurisprudence.

Key words: Legal undergraduate education, professional skill training, teaching reform, practical teaching

Introduction

Law is a very practical subject, and its practical teaching has become the direction of China's legal education reform. Practical teaching is a basic link of legal education. The practical teaching of law plays an important role in cultivating the comprehensive vocational skills and innovative spirit of legal professionals, which is of great significance to the quality education of undergraduate course of contemporary Chinese law. Therefore, how to improve the practical ability of students in the teaching, so that students learn, learn and will use the legal professional knowledge, with the corresponding job requirements of professional competence, which is law students need to think about the problem. Based on the present situation of the practical teaching of undergraduate law, this paper analyzes the existing problems, and puts forward some suggestions on reforming the practice teaching of law, with a view to providing some theoretical references for the cultivation of law undergraduates.

Law is a very practical subject, in the legal education for practical teaching has become the direction of China's legal education reform. Practical teaching is a basic link of legal education. The practical teaching of law plays an important role in cultivating the comprehensive vocational skills and innovation spirit of legal professionals, which is of great significance to the quality education of undergraduate course of law in contemporary China^[1]. Therefore, how to improve the practical ability of students in the teaching, so that students learn, learn and will use the legal professional knowledge, with the corresponding job requirements of professional competence, which is law students need to think about the problem. Based on the present situation of the practical teaching of undergraduate law, this paper analyzes the existing problems, and puts forward some suggestions on reforming the practice teaching of law, with a view to providing some theoretical references for the

cultivation of law undergraduates.

1. The position and function of practical teaching in the cultivation of legal undergraduates' ability

1.1 Requirements of law students' ability cultivation

(1) the professional ethics of cognitive and practical ability; (2) in the cultural quality of the layer of knowledge and interpersonal communication skills; (3) in the professional quality skills level of legal thinking and legal expression: argumentative ability and writing (4) Ability of legal practice: ability of case reading skills, search skills, ability to investigate and collect evidence, ability to apply law, adaptability, negotiation and reconciliation, litigation skills and abilities^[1].

1.2 The Role of Practical Teaching in Cultivating the Ability of Law Undergraduates^[2]

(1) Practical teaching can be more specific, vivid, and use the image way to strengthen the students' mastering the theoretical knowledge;

(2) Practical teaching can broaden students' horizons and cultivate students' knowledge and understanding ability. Such as through forensic observation can make students understand more medical knowledge and forensic knowledge; through evidence experiments in addition to enabling students to strengthen the understanding of the knowledge of evidence, but also know more experimental techniques and methods^[3];

(3) Practical teaching can develop students' interpersonal communication skills and professional quality skills. In practical teaching, students' interpersonal communication ability can be exercised through the reception of the training of the parties. They are trained by mock court, legal clinic, legal consultation and legal aid. Can comprehensively develop and enhance students' legal thinking ability, legal expression ability and legal practice ability.

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(4) Practical teaching can cultivate students' awareness and practical ability of professional ethics. In the professional internship, professional practice in the process. Students can observe the reality of the legal practitioners is how to understand and practice of professional ethics. In such a process, students can learn from their own emotional tendencies to distinguish right from wrong, profound experience of professional ethics.

(5) Practical teaching is conducive to cultivating students' scientific research ability. The need to solve practical problems can stimulate students to actively explore the subjective initiative. Actively analyze the problem, study the solution. In access to information, analysis, problem solving process can be the training of students of instrumental skills, develop students' scientific research ability.

2. Problems Existing in the Cultivation of Legal Undergraduates and the Practical Teaching of Law

First, in the educational philosophy, China's legal education is basically a kind of academic education, rather than quality education. Academic education emphasizes exam scores, emphasis on teaching in the system of knowledge, theoretical lectures, students rarely concerned about the strength of practical ability. In practice, the practical teaching, professional ethics education, what kind of teaching methods and assessment methods, there is still no universal answer to the question^[4].

Second, the lack of systematic teaching content, teaching arrangement is not reasonable enough, the teaching process is not enough refined. The opening of legal courses is mainly based on the division of departmental laws or the main laws promulgated by the state as the standard, while the courses with the main purpose of training and training students' practical ability are very few. In the case of limited internship resources, a variety of important practical teaching methods in the current legal undergraduate education is still fragmented, and not systematic, leading to direct participation in practical teaching is not an effective link between the internal and system of^[5]. In addition, the domestic legal undergraduate education there is no system of practical teaching materials, which also reflects from another aspect of practical teaching content of the lack of systematic and normative.

Third, the teaching process is not refined enough. On the one hand, the school to allow students to contact their internship units, internship sites and institutions are relatively scattered, unable to effectively monitor the real practice process, the school is difficult to provide targeted guidance to students; the other hand, practice in practice Sexual education is not enough attention to the extent, as now a lot of moot court activities has become a lively to the layman's dramatic performances^[5]; At the same time, in the practical teaching link, the activities of the stage and independence of strong, and after the end of the event, in most cases there is no formal and systematic exchanges between teachers and students and experience.

Fourth, the teaching methods and the use of teaching materials, the lack of advancing with the times. Many college teachers in the teaching is still using the traditional blackboard teaching, even if the use of multimedia, but also the production of a few simple PPT, replacing the blackboard carrier, can be said to change. The teaching materials used in teaching are mostly emphasis on theory, the lack of practical content, which is not suitable for the cultivation of students' practical ability.

Fifth, there are still many constraints on the objective conditions. The first is to assume the constraints of the teacher's own conditions in the teaching of law courses^[6]. First, most of the law faculty teachers are basically the traditional legal education products, theoretical knowledge, professional knowledge, in the teaching process, naturally will own the original instructor that knowledge and delegated to the Their own students; Second, a number of law teachers and teachers of their own lack of practical experience has also affected its enthusiasm for practical teaching. Followed by the lack of performance in the system. In recent years, most law schools / departments have set up mock court and legal training room, but their equipment and facilities are unreasonable, the hardware is not enough and the setting is not up to the standard. Second, there are problems in management, management system is not perfect, arbitrariness, the use of inefficient, etc.^[2].

3 Reform of practical teaching of law

3.1 Strengthen the practice of teaching

The school should adjust the teaching plan appropriately, deal with the relation between theory teaching and practice teaching scientifically. ① the school should be adapted to local conditions, as many as possible to open a variety of practical courses and various elective courses to expand the elective courses and practical skills courses in the proportion of the entire teaching plan; ② increase the professional teaching time requirements; To strengthen the practice of professional practice model, reasonable arrangements for professional internship time, for example, as far as possible directly to the participation of practical teaching arrangements for the holidays; ④ strengthen the law undergraduate teaching, and to strengthen the teaching of law and the construction of teaching material of practical.

3.2 Optimization of practical teaching content

3.2.1 Emphasis on the cultivation of students' legal ethics and legal beliefs

(1) Schools may require law students to enter the law school before the swearing-in ceremony for the training of students of professional ethics and professionalism of great significance;

(2) In the daily teaching of professional courses should pay attention to the guidance of the values of students in the teaching of professional ethics courses should be as much as possible so that the classroom is full of sense of knowledge and realism, attention to teachers' words and deeds;

(3) reform of professional ethics curriculum assessment methods. In the practical teaching part of the assessment to a certain percentage of professional ethics score.

3.2.2 In view of the requirement of undergraduate students' ability cultivation, the emphasis is put on the construction of practical teaching link systematization.

(1) the gradual arrangement of various types of practical teaching, so that various types of practical teaching methods between the systematization. For example, observation and simulation of practical teaching in the lower grades, and direct participation in the practical teaching can be arranged from beginning to end. So that the whole process of the formation of an effective transfer, help, with the process, so that effective observation and simulation of practical teaching^[5].

(2) all kinds of practical teaching internal practice model should also be system, students should start from the beginning of the students writing and research ability training. The ability of students to master the research dynamic, the ability to write a literature review; through the academic year papers and Seminar form of student problem investigation and analysis of research capacity to enable students to organize and analyze the problem of self-analysis, Published and exchange views, by the teacher to give guidance; the final thesis writing through the students' scientific research ability to test.

3.3 Reforming the practical teaching method of jurisprudence

3.3.1 Establishing a long - term extra - curricular reading practice mechanism

Schools can be different grades of students each semester to open a different self-learning law books, organize various forms of reading and communication activities, such as reading reports, etc.^[7], to mobilize the enthusiasm of students outside the law; encourage students to read books in different disciplines, As well as the law edge of the subject books, enhance students' understanding of knowledge; At the same time in the final examination of the course content of the relevant content of the study should account for a certain proportion of reading.

3.3.2 Seminar Course on Integrating Case Teaching Methodology

At present, some domestic scholars have proposed that China's legal undergraduate education stage can be set up three different levels of Seminar courses: freshman year to open the primary Seminar curriculum, focusing on discussion and research disciplines important literature, study the author's ideas and ideas; Three Seminar courses with research focus, and the Seminar course for

senior and advanced issues. While the case into the case of teaching methods into the Seminar curriculum, training students in the legal thinking and mastery of the law methodology^[8].

3.3.3 Reform of examination methods

(1) The main courses of theory-based lectures, the school can take the total score = practical hours of achievement (60%) + theoretical class hours (40%) way to assess the results. Practical class hours should focus on the ability of case structure analysis, the ability to support the law and the ability of legal expression in the discussion and legal thinking ability and comprehensive evaluation.

(2) On the application of strong technical courses, in the mock court and direct participation in practical teaching links directly on-site assessment results are given. Such as legal writing courses, can be in the moot court and legal clinics, legal aid to study, or the use of practical teaching in these areas as a typical case material for the drawing of material assessment^[7].

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Innovation Research on English Teaching of Accounting Course and management for Foreign Students in China

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Abstract: With the comprehensive national strength and the strong international influence, there are an increasing number of foreign students coming to China for higher education. The education and management of the overseas students have become an important part to promote the internationalization of Chinese education. Considering their differences and similarities, it is necessary to improve the teaching and management of international students from the following aspects: respecting cultural tradition and focusing on cultural differences; encouraging pre-class and after-school learning along with promoting team work; the establishment of diversification teaching methods and the emphasis on practical teaching links; improving the overseas students' management system as well as strengthening the supervision and feedback mechanism.

Key words: International students, accounting course, English teaching, management

Introduction

The rapid development of economy and education attracts more and more international students choosing China for studying which has also accelerated the process of the internationalization of Chinese higher education. The education and management of the international students plays an important role in developing and promoting our friendly relations with other countries as well as enhancing international exchanges. Therefore, universities need to make the cultivation model explicit, while improving the quality of teaching, innovating management system and carrying out targeted teaching activities. The English teaching of accounting course is to cultivate the foreign students for a international perspective and consciousness of innovation who is also able to engage in accounting, financial management and other aspects of the work. This paper analyzes the existing problems in the English teaching of accounting and management for international students in China, makes research on the methods of accounting teaching and management for foreign students to meet the requirements of overseas students.

1. The existing problems in the English teaching of accounting course and management for international students in China

Compared the international students with Chinese students, there are many differences such as the society, the culture and the background of previous education. Adding to the distinction among foreign students themselves, their characteristics of nationalities,

cultural and religious custom and so on make it difficult to adopt the traditional management of Chinese students. These factors determine the particularity of the education of foreign students. At present, the training target and position of the international students is very vague for many colleges and universities. Neither do they have a clear thought of how to teaching the international students. With one-sided emphasis on economies of scale, the pursuit of volume increase at the same time does not improve the quality.

1.1 Single teaching method and lack of practicality in teaching content

The teaching and management of the international student in most of the universities is similar with that of the Chinese students. It is common for teachers to be scripted instead of giving a heuristic and exploratory way, which is still a problem to be solved. The international students are more active and they feel difficult to adapt to teacher-led and indoctrination-style teaching. Their enthusiasm of thinking will be suppressed. They will lose their interest and the passion of the class over time, which is contrary to the original intention of training. In the terms of teaching content, most of the colleges in China emphasize the width and thickness of public and professional foundations, and weaken cultivation of professional skills and practical ability. If the international students just master the basic accounting knowledge and mechanized accounting operation, ignore the study of the aspect of practice and the application. they will gradually feel boring and their thought could not be broaden.

1.2 Cultural differences leading to the difficulties in teaching and management

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The international students in China come from different countries and regions whose national culture has made a long and profound influence on them in their ways of thinking and behavior. Different nations have their own characteristics, which result in different language, culture and values, so when the international students encounter problems, they will use their usual way of thinking and understanding. Because of these diverse ethnic customs in different nations, some unnecessary misunderstanding may incur, especially in understanding and implementing the rules and regulations of the school. Without patient explanation and careful persuasion, the international students will be dissatisfied with the existing management system. What's more, they may simply ignore the regulations, which will barrier the implement of teaching and management.

1.3 Inadequate supervision of teaching quality, lack of the monitoring system

Most colleges in our country have a perfect supervision system of teaching quality for the Chinese students, but they don't have a same one for the international students. The vague rules and regulations, lack of organized teaching methods and short of pertinence methods for specific problems causes loopholes in the teaching management of overseas students. Without building up a specific management organization for teaching international students, the curriculum setting, enrollment management, implementation of teaching plan, supervision of teaching process, academic record management and many other affairs of the international students are managed by the teaching staff of every school which is easy to have omissions in management because of the lack of the staff. International exchange and cooperation division, the college and faculty and the administration office of school are all involved in the management of international students. However, the less communication and cooperation and vague operating duty may lead the buck-passing, which will make against to implementing the work of international students' teaching and management.

2. Discussion about the English teaching of accounting course and management for international students in China

2.1 Teaching and management of international students should be carried out by "Win people by virtue"

The international students have different nationalities, backgrounds, status and ages. Owing to cultural differences, it is inevitable for them to have different cognitions and understandings. In the teaching and management, the teacher should summarize the experience, find out the root of the problems and solve out these problem pertinently. Not only should the management staff focus on the point, the teachers are also supposed to pay attention to this. Ensuring the implementing the work of international students, the management staff are required to try their best shortening the cultural distance, strengthening the communication with the

international students and avoiding the unnecessary misunderstanding, in the end, making the cross-culture teaching and management run smoothly.

2.2 Encouraging pre-class and after-school learning and promoting team work

There are many professional terms in Accounting. The definitions of these phrases can be memorized by reading many times, such as assets, income, and so on. It is easier for overseas students to master accounting knowledge by pre-class learning. Reciting the definition before class, listening carefully to the teacher analyzing its meaning and matching with after-school review is beneficial to the early formation of a good knowledge system. In the existing teaching model, the team learning can often better stimulate the spirit of cooperation and coordination of students, and sometimes even able to cultivate students' leadership. In the process of student development, they are grouped into a learning team. They complete homework and a long-term accounting project together. Their homework includes classroom content and student self-learning. There are discussion questions, calculation exercises and case studies. Through group learning, students are able to form brainstorming, so that they can have comprehensive development.

2.3 The establishment of diversification teaching methods and the emphasis on practical teaching links

In view of the characteristics of international students, the universities are supposed to change perfusion teaching for heuristic, exploratory teaching and change the traditional teacher-based teaching mode for the student-based mode. In this way, it will take advantage of students and increase the interaction between teachers and students. Adopting a variety of teaching content and form, such as discussion-based teaching, problem-centered teaching and case-based teaching will strengthen the self-learning ability, practical ability and innovation ability of overseas students. Because of the particular background of western accounting textbooks, when it comes to the economic situation of China, foreign students will confuse or compare the two. At this time, teachers should play a role of guiding them and help students familiar with the case, further understand our national conditions, master and apply the accounting knowledge to meet the training objectives. In addition, various forms of teaching activities should be carried out to stimulate interest of students, for example, regular academic seminars, reading salons and scholar's lectures.

2.4 Improving the overseas students' management system, strengthening the supervision and feedback mechanism

In order to establish a perfect teaching management of international students, there should be a scientific and rational management system for supporting. When dealing with the various problems existing in the teaching management of the overseas students, it is necessary to follow rules according to the system so as to improve the teaching management regulations. The information

feedback is an indispensable link in the monitoring of teaching quality. It is also a way to build the interaction between teachers and students. Otherwise, the quality of teaching will be hard to reflect. We should make full use of teaching evaluation system, so that students can quantify evaluation, reflect their opinions and demands from the aspects of class content, teaching methods, teaching attitude and teaching effect. At the same time, the measure will allow teachers to assess and find their own problems and deficiencies. With the establishment of student-oriented curriculum assessment system, forming the group as a unit to complete homework, class discussion and long-term projects will lead to the enhancement of students' teamwork which is suggested above. For an individual, testing the study of each chapter for 10 minutes will reflect his learning efficiency on class with the results 30-40% included in the usual results and the final exam results included 50-60% in the total score.

Conclusion

Nowadays, the global economic integration, economic globalization and the internationalization of higher education makes great progress. Focusing on the education and management of international students is a significant subject. For the sustainable development strategy of foreign students education, there are several suggestions which improve the internationalization of higher education: respecting cultural tradition and focusing on cultural differences; encouraging pre-class and after-school learning along with promoting team work; the establishment of diversification teaching methods and the emphasis on practical teaching links; improving the overseas students' management system as well as strengthening the supervision and feedback mechanism. Due to the particularity of the foreign students, their teaching mode and the cultivation goal must be different from the traditional university

running concept. The domestic teaching institutions should carry out targeted teaching management activities to meet the training requirements of the overseas students.

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Research on the Strategy of Preschool English “Flipped Classroom” Teaching Resource Development in the Era of Big Data

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Abstract: With the speeding up of globalization and the advent of the era of big data, preschool English education has been thriving in recent years. Though preschool English teaching resource continues to develop, there are still some defects and space for its improvements. The analysis of the significance of preschool English “flipped classroom” development combined with its present situation in the era of big data and the corresponding strategies put forward in this article aim to promote the vigorous development of preschool English education.

Key words: The era of big data, preschool English, flipped classroom, teaching resource development

Introduction

In the era of big data, its thinking provides a new train of thought for the development of preschool English teaching resources thanks to its technology breakthrough, which plays a great role in promoting preschool education. With the deepening of the new educational reform, the reform of teaching resources is also increasing. Preschool education teaching resources, as an important aspect of modern education resources, enjoys a continuous rapid development owing to the era of big data. And the development of the “flipped classroom” teaching mode not only provides new opportunities for preschool English teaching resources development, but also contributes to its introduction of new ideas. Generally speaking, there is huge space for the development of English preschool education teaching resources. But for now, there are a lot of shortcomings. People are still largely conditioned by the old way of thinking about preschool education, and some adjustments and changes are also needed to be made for the teaching resources. With the aid of the era of big data, we must dare to break through the original framework to seek the teaching resources that are more adaptable to the development of era combined with the “flipped classroom” teaching mode and develop new areas of preschool English teaching resources.

1. The morphology changes of preschool English teaching resources in the era of big data

Teaching resources provide various available conditions for the effective development of teaching activities from the teaching

material, the teachers, to the infrastructure. In terms of the types of teaching resources, they can be divided into static default classroom teaching resources including both in and out the class, inside and outside the classroom, dominant and recessive teaching resources and dynamically generated classroom teaching resources with students, teachers together with the texts included. However, since the 1980s, preschool education began to rise in the country. Since then, the preschool English enlightenment education in our country develops continuously to a great extent with the development of technology and the change of the thoughts and thinking modes of the parents and its form has also changed a lot.

In the early stage of English preschool education, people only use textbooks, and most are imported materials, while not a set of teaching material all of its own is available for special preschool children in domestic. The single using of the textbooks greatly limited the extension of the preschool English resources since its resources inside and outside the classroom is limited. Later, with the progress of technology, multimedia and English teaching resources are combined together. CD, for example, as a good carrier of large data storage, is widely used in preschool English teaching resource development. Considering its durability, convenience and high ratio of performance, people use it to archive and transfer term English education related data. All kinds of graphic resources began to appear widely. Audio and video constantly increased to preschool education teaching resources. And later, with emphasis on teachers' main body status, the public classes of the preschool education related topics have also been unceasingly. Not only do the students participate in the classes, but the teachers also communicate more.

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Its distinction and pertinence contribute to the improvement of teachers’ professional level and also play positive roles in promoting preschool education resources development. To now, in the era of big data, large-scale open online resources are known for people. According to the 37th Chinese Internet network development state statistic report released by CNNIC recently, it shows that up to December 2015, the number of online education users in our country has reached 110 million, of which users about children early education account for 10.7%. Thus it can be seen that large-scale preschool English open courses have also become the most important part of preschool English teaching resources. In the future, the form of preschool English teaching resources can be more diversified with social development, scientific and technological progress and changing perceptions.

2. The significance of preschool English “flipped classroom” teaching resource development in the era of big data

“Flipped classroom”, also called “inverted classroom”, refers to the reasonable allocation of the teaching time inside and outside the classroom, the teacher’s giving priority to develop capacity rather than impart knowledge and the changing from classroom study to a variety of learning styles in order to give the students rather than teachers learning initiative and make up for the shortcomings in the traditional teaching. Flipped classroom teaching resources refers to the import materials provided for the students to study before class including micro-videos, course wares and tests etc. When making preparations before class, students use teaching resources like videos to understand and absorb knowledge on their own and then deepen the impression and internalize the knowledge^[1] so as to achieve better teaching effect through the classroom interaction between teachers and students. In the era of big data, the preschool English “flipped classroom” teaching resource development is of great significance.

2.1 Help to train children’s communication skills and motivate their creativity and imagination

The objects of the preschool education are children from 0 to 6 years old. According to Piaget’s theory of cognitive development, children need to experience the sensor motor stage from 0-2 years old and the preoperational stage from 2 to 6 years old. In the process of preschool English education, the students’ getting rid of the situation being controlled by the teachers in class, reading, watching videos, discussing the problems in the preparation and study, putting the subjective initiative into full play and learning autonomously contribute to their growth and development in these two stages. To develop the corresponding learning materials according to the understanding of the students is advantageous to the school to create a better learning environment for students. And in this process, children’s interest in English learning becomes more aroused, their burden gets eased and they devote themselves into English learning to feel the charm of English learning. This also helps to improve children’s information exchange and processing ability, letting them

learn to express and communicate better as well as think more independently, which is beneficial to exercise its attention and cultivate their imagination and creativity.

2.2 Broke the limits of previous English preschool education to promote the further development of education

In the past, teachers are dominant in the classroom in preschool education, while students play the role of passive to accept knowledge. In class, the traditional teaching just completed the transmission of information, especially for preschool children without a sense of independent choice who become the information infusion objects without real implementation for the absorption and internalization of knowledge in the classroom. The purpose of learning and initiative being not strong, and the limitations of teacher’s role, curriculum model together with management mode greatly limit the development of students. Combined with flipped classroom teaching idea, the preschool English teaching resources designed which take the students as the main bodies are advantageous to realize the transformation of identity between teachers and students, the redistribution of the class time and the increasing of the interaction in the process of learning. In the era of big data, to analyze the data of course selection, online learning, interaction and feedback can help to understand young children’s behavior and develop and research on the teaching resources pointedly so as to give full play to the initiative for students. Under the scientific teaching mode of flipped classroom, teacher’s education ideas, teaching ideas and teaching methods have great changes. Besides, the development of the teaching resources become more directive and the student’s learning effect is more obvious.

2.3 Help to develop creative thinking and reserve talents for the country

The strong personalized feature of the way of thinking in the era of big data is of great practical significance in the field of education. At the same time, the forward-looking characteristics of the way of thinking in the era of big data^[2] are also instructive for preschool English “flipped classroom” teaching resource development. Creative thinking is a feature of big data era thinking mode. Giving play to creative thinking for preschool English teaching resources development is not only a try to use big data thinking to personalized preschool education practice, but also the basis of meeting the needs of informationization, the development of knowledge-based society, and the cultivating talents of individuality and independence of thought for the country.

3. The current situation of preschool English “flipped classroom” teaching resource development in the era of big data

In the era of big data, though the preschool English “flipped classroom” teaching resource development is booming, there are also many problems, such as the high external dependency of teaching resources, the single structure of teaching resources, the teaching resource system being not established, the popularization of co-construction and sharing ideas and etc.

3.1 The needs of the students' parents dominate which neglects the needs of students

At present, students' parents are blind toward the children's English preschool education, which leads to many parents' choosing to arrange their children to attend many after-school classes. Since some institutions are not qualified for preschool English education institutions and their choice of teaching resources are based on profits, different levels of preschool English education co-exist on the market. And the emergence of the problem is largely due to the defects of preschool English "flipped classroom" teaching resources development, which thus leads to the confusion of the market. To recruit more students and to meet the needs of the parents, they are keen to open English teaching activities. But most of the teaching resources are developed in the perspective of parents who want their children to learn, rather than to meet the needs of children's development. The existing teaching materials are too hard, which fail to develop the teaching materials suitable for children's development in different stages. This does not make much sense for students' learning. On the contrary, many students' enthusiasm of learning English is killed early in the bud.

3.2 The quantity and quality of the teaching resources are uneven, which do not have sound standards and auditing mechanism

For most basic English teaching materials, there are not a lot of resources on the market that can meet the demand of most children and there exist many problems. Some are manufactured in a rough way, which can't stimulate students' interest in learning English. Some are of high adult degree with their emphasis on grammar and word memorization, which could not meet the demand of the development of students indeed. Take the Cambridge Children's English and "New Concept Children's English" for example. These textbooks enjoy a high market share, which occupied a large part of preschool English education resources. However, preschool English education teaching material, unlike other teaching materials, isn't booming like flowers. Therefore, no matter in terms of quantity or quality, there are a lot of shortcomings in preschool English teaching resources development.

3.3 Few related researches can be used for references and the coexistence of challenges and opportunities

Up to August 9, 2016, searching from CNKI, hundreds of thousands of research literature on English teaching resources development can be found. The literature about "English preschool education resource development" is very few, and insufficient information is available for people to understand and learn. Thus, people have researched very few on this, and the development of preschool English "flipped classroom" teaching resources is not enough. On the one hand, the new study content brings us pressure and challenge; On the other hand, the great rise and development space also provide us with opportunity.

3.4 The teachers are weak and unbalanced in gender and profession

The single structure of preschool teachers has been a challenging problem. Although the colleges and universities opening English preschool education majors are increasing, there is still a big gap for the training of specialists in the field of preschool children's English learning. For now, the total quantity of the preschool teachers is few, which cannot meet the demand of the national English teachers. Besides, the teachers engaged in preschool education haven't got an enough high education and professional level and their comprehensive quality is not enough comprehensive developed. Apart from these, most teachers engaged in preschool English teaching are women teachers, and the proportion of male and female teachers is extremely unbalanced.

4. The strategies of preschool English "flipped classroom" teaching resource development in the era of big data

4.1 Determine the standard of static teaching resources, and improve the auditing mechanism of teaching resources

There is no doubt that teaching material is the most basic curriculum resource in the preschool English "flipped classroom" teaching resources development. In front of the current situation of its development, the first step in the era of big data is to standardize the process of making the teaching material and improve its making and application mechanism. According to the experience of the flipped classroom teaching resources development and design, it is necessary to deepen the investigation of the types of students' interest as well as the modes and means of their activities. Determine the corresponding teaching materials according to their existing development rather than the teachers' or parents' demand, which are close to the children, maintain the continuity of the teaching material and provide the language model of high quality^[3], to achieve autonomous learning goals adapted to the development of personality. At the same time, carry out the corresponding auditing mechanism for the issuance and usage of new teaching materials to guarantee the professionalism of the teaching resources on the market and resolutely put an end to the phenomenon of good and bad teaching resources being mixed up.

4.2 Pay more attention to the faculty to improve the overall teaching level

To use the flipped classroom teaching mode for reference, we need to review teachers' status in the teaching activity. But what is undeniable is that the teacher is still the most important curriculum resource in the preschool education teaching resources. But so far, there is still a large part of people think that teachers engaged in preschool education don't need to have a high degree, holding that children's education can be emphasized again from primary school, which shows little recognition for preschool education teachers. To develop preschool education teaching resources better, more importance is needed to be attached to this problem to change people's rigid ideas and improve the recognition of teachers' identity. From some of the policies of supporting education reform and development introduced by the country in recent years, it can be seen

that the country has introduced a lot of corresponding policies for the integration and sharing of teaching resources, which contributes to the deepening of the education reform and its better development. While for the preschool English teachers, some policies are also needed to be introduced to change some problems at present slowly. We need to strengthen the training of preschool English teachers and improve their professional quality not only by establishing the preschool education major in higher vocational colleges, but also popularizing this major in colleges and universities so as to establish a complete training and reward mechanism, which is the necessary step in the process of teachers’ professionalization development^[4].

4.3 Implement the linkage of four elements: the platform, teachers, learners and learning resources with Multi-participation^[5]

In addition to what mentioned above, that is, the cooperation among parents, teachers and platform, the learners also need to be involved. As far as we know, the children in the kindergarten just remember and repeat what the teachers said. And some parents may also have shortcomings to communicate with their children in English, which makes preschool English study hard to achieve its expected results. Besides, teachers’ teaching content tends to lose a lot in the process of such information transmission, which leads to the unsatisfactory teaching effect. In the process of the communicating between teachers and parents, children’s ideas also need to be taken into account. Only by realizing the three-way interaction system including teachers, parents and children to guide the parents to set up correct concepts of preschool education and use the network teaching resources reasonably to lead the children into the English learning, and promote the transformation of teacher identity to let the children play a certain autonomy can we really achieve multi-win.

4.4 Establish preschool English network teaching resources to promote the popularity and sharing of high quality teaching resources

In the era of big data, the development of preschool English teaching resources needs to play the role of network resources. We need to integrate existing resources, and pay more attention to the construction of resources, technology and talents. In the era of big data, we should make full use of resources with high quality and advanced technology. For some operations on preschool education and teaching, we can be bold in learning and absorbing foreign teaching mode. Adjust measures to local conditions and receive the good while discard the dregs to construct high efficient and practical preschool English education infrastructure, to build safe, civilized

and green information resource integration mechanism, to innovate the operation mechanism and the management pattern, to establish open education resources public service platform to be shared among teachers so as to promote the common progress of the preschool education professional teachers.

Conclusion

As Schon Berg puts it, “the era of big data opened an important transition and changed our way of life and understanding the world.” In the era of big data, we should change the way of thinking in the ways and tactics during the development of preschool English teaching resources, to adopt new methods, new technology and new media for further study of the development of preschool English “flipped classroom” teaching resources^[6], to make students better involved, to let parents play a bigger role, to make teachers take on different roles, and to follow the law of the development of children’s English education^[7] so that the Chinese preschool English classroom teaching resources that can meet the demand of the development of Chinese students can be developed and the preschool English teaching resources can develop more comprehensively and systematically.

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Non-language Process in Utterance Communication

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Abstract: Utterance is used to communicate with each other. Partners in communication always send out constantly information to expect listeners to give some response. This effect of utterance has greatly enlarged the scope of utterance analysis, so we should explore, in utterance analysis, how utterance keep indirect (even contradictory) relationship with language itself.

Key words: Non-language communication, semantic information, contextualized cues

1. Introduction

Utterance is used to communicate with each other. Communication is an interaction between the speaker and listener involving two or more than two communicators. People use words to convey information, partners in communication always try to influence each other to guide and explain their own meaning and intention. Each partner is both a sender and receiver, sending out constantly information to expect listeners to give some response.

Many disciplines have studied utterance with different research purpose, focus and method. From the perspective of the comparison between English and Chinese, this paper discusses non-language process in utterance communication.

2. Non-language process in utterance communication

Human communication behavior can be divided into verbal and nonverbal communication. To explore utterance communication, we must pay attention to non-language process in utterance. Although linguists often tend to see language as the primary means of communication media, many scholars still think that, as a communication channel, verbal and nonverbal communication (such as gestures, flushing, sweating, staring, etc.) should be taken seriously. Even those who focus on the utterance communication, different scholars hold different opinions on how to deliver information. Most people think information can be encoded by grammatical means by projecting the meaning into a sentence through a series of voice. But both sides can often reason depending on context and context assumptions to supplement inadequate meaning expressed by grammar. In addition, utterance may be the main channel to convey semantic messages, but you can't think it is essentially used to convey semantic information. When used in interpersonal relationships, verbal and non-verbal means can make people's attitude become blurred and flexible. Look at the following

conversation:

2.1 Scene: (at the entrance of a highway in a gas station of the United States, John ran across his friend Buddy who do the same business)

John : Hello , Buddy.

Buddy: Hi, John.

John : Beautiful weather, isn't it?

Buddy: Yes, not bad for this time of year.

John : Are you going far?

Buddy: To Los Angeles

John : Oh, I also go there.

Buddy: I'll get some screw ,spanners and pincer pliers, how about you?

John : I'll go to the airport to send my sister to take plane.

Buddy: All right, it is filled, I'll go first, I can't run faster than you.

John : Ok. see you later.

Buddy: See you later.

The tone of above conversation is friendly which involves many interpersonal attitude signals. The first sentence is a greeting, the second is a phatic communication which is not really talking about the weather itself, but to find a topic which does not need to answer. While the second friend answers and extends the topic. The first friend asks the situation of the second friend, and then reveals his information when gets the answer. The public way of talking often indicates that the close or friendly relationship can promote the communication of both sides. The second friend also reveals his information as expected. The first friend talks the purpose of this trip. When the car is filled with oil, the second friend wants to leave early, mainly because the second friend's car run slower, (not because the second friend runs slower than the first friend). There is high possibility that the second friend's car is worse. Both sides express the friendly attitude and know some information of each other. In

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specific situations, there may be nonverbal behavior which confirms the interpersonal attitude. Thus, the past view of verbal communication conveys semantic information and nonverbal communication reflects social factors is one-sided. Language is a very subtle communication media, it can transfer semantic and social information at the same time. And, of course, means of nonverbal communication often can supplement or assist speech communication.

In addition, the approach of nonverbal communication is also crucial in the success or failure of the interpersonal communication. For example:

2.2 Girlfriend: Our relationship's falling apart. You've become totally detached from me.

Boyfriend: How can you say that? Give me just one example.

Girlfriend: I'll give you several. You don't talk to me when we go out to eat together. You spend more time with your friends than you do with me. You don't look at me when we do talk, and you never hold my hand anymore.

Boyfriend: You're just imagining things. I've got a lot on my mind between school and my Job, but I've not changed how I behave towards you.

In the above example, the girlfriend thinks one of reasons why the boyfriend detaches from her is her boyfriend doesn't give her enough eye communication, as well as their disproportionate interpersonal distance.

So, what's the means of communication? According to Ellis & Beattie (1986)^[1], it basically has the following five systems.

① Language system. Language consists of words, clauses and sentences, which then form a greater level of the unit. The word is made up of the smallest morpheme which is the voice semantic combination.

② Rhythm system. Rhythm consists of intonation, pace and pauses. The location of the pause affects the meaning of the sentence. Pause may account for 40% to 50% in the whole conversation.

③ Paralanguage system. When we speak, we not only use language and rhythm system, we articulate "ah" and "oh" and other sounds, we may cry, laugh, even sigh or yawning. These are paralanguage behavior with voices.

④ Non-verbal communication system. The main ways of non-verbal communication are face, head and body movements, body postures and gestures.

⑤ The inherent characteristics of communication. It includes interpersonal contact, body distance, the direction, eye contact, appearance of communicators and the degree of cooperation and communication. In addition to communicator's appearance, other features change frequently in the process of communication.

2.3 Contextualized cues

When people use utterance communication, they slowly use contextualized cues^[2]. Stress, intonation patterns, paralanguage features such as rhythm, laughter, choice of code, fixed expressions, body distance and communication degree of cooperation can be act as contextualized cues. It may be the core or edge character of language, or may also be non-linguistic^[3], such as facial expression, body posture, etc. But it is important to note that it is different from social norms, what they express are intent and significant. People can consciously use these signals to increase or change the meaning of the word in utterance communication.

Contextualized cues occupy an important position in the interpersonal communication. First, utterance can be carried without language code. For example:

3. A. Did you have breakfast?

B. [Take two eggs and a cup of milk out of her bag and shows them to A.]

In this dialogue, B says nothing but answers A's question, and A understands the meaning of B without language code.

Second, contextualized cues reflect communication cooperation. In addition to the monologue, most language appears in conversation. One of the most obvious characteristics of conversation is the cooperative forms. As George Miller (1981, p121)^[4] said: "the utterance participants must agree on a topic in the form of turn-talking, the content must be understandable, relevant and reliable." People may have different opinions about whether conversation must be authentic, but Miller's view is generally correct.

The end of the conversation also can reflect the cooperation degree. It doesn't work if one side says "goodbye" to remain silent or leave. Because the other side may don't want to end the conversation at this time. To end the conversation, at the very least, the other side also needs to say "goodbye". The advantage is the second person can show he/she understands the intention of the first person and whether he/she agrees. Thus utterance participants must end the conversation in a clear way, both sides must have pre-closing, such as saying 'well...', 'referring....', 'So... , etc. with falling tone. The pre-closing is about to end the conversation, it also allows the other side to introduce a new topic as his/her wish (oh, I want to say something). The conversation will end if a new topic is not introduced. In a high degree of collaboration, utterance reflects communication behavior of social norms. In the acquisition of language, we slowly learn norms and values in the process of socialization by various education ways such as family education, school education, the influence of internal social group and the mass media. Natural person gains social person's qualification and cultivates communicative competence in this process.

From the view of the comparison between English and Chinese, differences between two languages are non-language process and inherent characteristics in utterance communication. Compared with traditional English culture, Chinese culture is implicative, courteous, lack of aggression, thus less eye contact, exaggerated facial expressions and body movements are used in the utterance. In addition, inherent characteristics of utterance in Chinese culture such as personal space also have big differences compared with English culture. For example, personal space among the same sex is too small, or even bend their arms around the shoulder. Personal space between the opposite sex such as friend or lover is too big, which feels like a stranger. Differences between English and Chinese culture are likely to cause misunderstandings in intercultural communication. There was such a scenario: when a boy who majors English crosses the road with a male foreign teacher, he holds the teacher's arms out of kindness. Such intimate body contact distance makes a scholar from the western culture particularly feel embarrassing, which leads to a funny scene that one tries to break away, the other clutches tighter.

4. Conclusion

From the perspective of English and Chinese comparison, we briefly analyze and summarize the non-language process in utterance communication, aiming to trigger the macroscopic peer thinking about the problems of discourse research.

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Simulation as a method of studying in social sciences: A Case of studying legislation

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Abstract: New methods of studying are mainly focused on a more simple, better and faster way of gaining knowledge and skills of pupils. A simple test in a class shows that it's easy to conclude that a practical way of making these methodological strategies work is suitable for most of the pupils. The simulations of natural social processes are one of those methods which are basically not used in the process of teaching very often, especially in social subjects. This is not very used method but has a huge potential and my goal in this article is to give an example of its possible usage and to outline the most important parts of simulation as a method of learning in schools.

Key words: Simulation, methods of studying social science, social skills, legal process, state institution, the Parliament

Oxford dictionary gives a lexical definition of simulation as a) Imitation of a situation or process: „*simulation of blood flowing through arteries and veins*“ then as b) The action of pretending; deception: „*clever simulation that's good enough to trick you*“ and lastly as c) The production of a computer model of something, especially for the purpose of study: „*the method was tested by computer simulation*“ or „*simulation models will allow researchers to test different strategies*“

This definition of the term simulation mostly covers the usage which will be appropriate to show the goals of this article, but to make it more specific we should add that simulation is „*something that is made to look, feel, or behave like something else especially so that it can be studied or used to train people*“

In Handbook of Simulation: Principles, Methodology, Advances, Applications, and Practice editing by Jerry Banks (Georgia Institute of Technology) says that „simulation imitation of the operation of a real-world process or system over time. Simulation involves generation of the artificial history of the system and the observation of the artificial history to draw inferences concerning the operating characteristics of the real system that is represented. Simulation is an indispensable problem-solving methodology for the solution of the many real-world problems. Simulation is used to describe and analyze the behavior of a system, ask what-if questions about the real system, and aid in the design of real system. Both existing and conceptual systems can be modeled with simulation.“ The imitation of realistic processes in the world has a goal to make them available to the observer who will gather the relevant facts about him and make conclusions but his observation shouldn't depend on the spontaneity of those processes. For example, the path of some heavenly body which the observer sees from the Earth can be simulated when the observer is interested to observe that phenomenon. And it's much safer to study the simulated path especially if that path can endanger the planet that pilots. In the

simulator of flying can prepare for risky simulations which may appear in real flights. There are some processes which never happen in natural surroundings or have happened only once. The birth of one solar system isn't something that can be seen with standard telescope so its simulation could show that process to the wide auditorium. The Big Bang and the stadium of early universe can well be shown through the computer simulation. The behavior of certain systems in different situations can give some useful information. For example, exertion and wearing out some part of a machine when working in different conditions, brake system in a train, in a plane etc. There is a well known anecdote that the ingenious engineer Nikola Tesla, the inventor of alternating current, “thoughtful experiment simulated the operation of his generator for weeks and then made some changes of his construction according to the knowledge he gained that way” Apart from engineering, building, astronomy, safety, probability and statistics, simulation can be used in social systems to enable better knowledge on human behavior in certain situations. Those situations are useful in economy, political science, sociology, social psychology, etc.

But this broad usage is not the subjects of this article. For its humble needs, I will focus on the usage in education. Of course, this field is also broad and we should make the problem more concrete. That's why I choose case study. An example is the project which was jointly made by the Munich Institute for Applied politics (CAP), The Ministry of education of the Serbian Republic and the Serbian Parliament. The beginning was the numerous courses for teachers to use the process of simulation with their students. The object of simulation should have been the legal process in the Parliament. This theme was met by two unwanted reactions of pupils. One was a complete ambivalence and the other was a slight resistance to this subject. Besides this, a teacher had few strategic possibilities so he most frequently used verbal teaching. In this way two very important themes such as parliamentarianism and the rule

of law-very important for political culture , have unsuccessfully been presented to young people in Serbia.

For these reasons, the following are the goals of this project:

- * a higher level of knowledge and understanding of legal processes and procedures in Serbia;
- * a better understanding of positions, role and importance of Parliament in everyday life of citizens;
- * improvement of political thinking and action among high school population as future voters”.

These goals should young people what they should expect and ask from their representatives in real life. On the other hand, they should show to the present and future members of Parliament and participants in political life that voters have thorough knowledge of the process which is unknown to them.

Some secondary goals have also developed from these basic goals. One of the most important is developing the skills like strategic thinking, debating and defining a clear attitude, as well as enabling a “safe environment for their practicing”. These skills should prove themselves to be very useful and important in political intercommunication on all levels and they should be applied in everyday life. All these goals couldn't be achieved by verbal teaching but not with some other method of didactics either. The teachers almost gave up the subject, choosing only those which were “interesting” to pupils. But what proved to be useless with other methods, proved useful with simulation.

Simulation was to be shown to the students and pupils in Serbia older than 14 years old. It was written in the way that the themes discussed during session assembly of the simulated Parliament were adopted to various ages and intellectual and political abilities of participants. Frequent themes for younger participants were from the field of ecology, politics for the young, public health, etc. Older participants had the possibility to discuss much more demanding questions ordered by legislation. The number of participants of simulation varies depending on the number of parliamentary board needed to enrich certain law.

The scenario of simulation

This is one possible scenario with the following themes:

- the legislation on regulation the field of ecology;
- the protection of young people from aromatized alcoholic drinks (energetic drinks with a percentage of alcohol in them).

The participants should pay attention to the fact that certain themes are neutral from everyday, political context and they are advised to the develop the debate in the direction which leads to a better legal solution. The important fact is also that “every participant of simulation, no matter of political position should give his contribution to the process of negotiating when making political decisions and a better legal solution for that theme”. When choosing the subject, the attractiveness of it should be taken into consideration,

so that the participants would take part in the debate more. The scenario of the simulation was written in a way that most part of the materials, blank forms, etc., could be used independently of the theme.

The preparation phase of the simulation

For the simulation the participants do not need to have any previous knowledge .It is a means of acquiring knowledge and skills. In this preparatory phase the participants can get to know with:

- the simulation and the role of the Parliament, how it functions and why we use simulation as a means of learning;
- what Parliament is and how to pass a law.

This introduction should last about 15 min and can be just before simulation.

The teacher can use some of the forms of presentation as an introduction which can cover the following:

- the role of constitution of the Parliament and the importance of legislation for everyday life;
- the structure of the Parliament and why there are different forums for example plenary sessions and boards and the way political parties organize their forces in the Parliament.
- the importance of different roles in the Parliament for example the chairman role.

It is necessary to understand two basic things before simulation. “The presentation should be brief and informative and the teacher should not give too many details because the simulation will clarify them” In this phase the teacher becomes the instructor. In the preparatory phase he has to prepare all the documents needed for simulation 8 the profiles of roles, the content of the themes as the scenario and similar things, the blank forms for the work of the board and ministry clubs ,the protocol read by the chairman that is the president of the Parliament, the scheme of the legislation process, inscriptions for the rooms, etc. All this material needs to be put according to the order of usage at the simulation on some desk in the room the simulation takes place.

As far as the place is concerned, any room which is large enough for the simulation with the number of participants which is enough to present the political atmosphere of one Parliament(30-50 participants). Besides the plenary room, there should be some other smaller rooms for work of ministry clubs and parliamentary boards. the most efficient simulation would be in authentic parliamentary place(state or city hall).

Its very important to explain before simulation that participants cannot do anything “wrong” during the simulation but that it will be entertaining and they will learn something new. Although teacher/instructor will encourage more pupils to take part in simulation (even though the assignments will make them be more or less active participants) they should be told that it will be enough that only a part of them participates. Pupils often say they know

nothing about the work of the Parliament and passing the law. In that case they should be told that “ the simulation is very similar to a game and in a game the most important thing is to accept to play it.” The pupils can also see simulation as a theatre play especially when they get the profiles of the roles. Then they ask the teacher to practice simulation before they play it efficiently. The teacher should explain to them that by practicing cannot study as well as in simulation. Even a “bed” simulation is a good one because from every situation they can acquire some valuable knowledge. The instructor also explains that it will be only for one day and they will act according the “scenario”-imagining situation and in this case we have some proposed draft of the law and ministers in the Parliament to debate and to decide on the propositions. The participants should be informed that the work of the Parliament is regulated by the by-law but the result is completely open. It means that there is neither ideal solution referring to the bill nor does the Parliament need to make a decision by all means at the end. Not adopting some bill means status quo which is also an important outcome which can be discussed. So, from the moment giving the roles to the final voting, the result depends on the participants! It should be clear that no one can insult anybody personally no matter how the debate is fierce. The discussion has to be in the boundaries of decency and mutual respect. The instructor than keeps explaining the roles/parts of the participants and in which parliamentary groups they will work. The work of the Parliament is not bounded only on plenary sessions broadcast on TV but it consists of many aspects:

“The ministers work together:

1. in ministry clubs where they talk about the attitudes of their party on political questions;
2. in parliamentary boards where they meet with ministers of other parties which consider certain topics. Here the minister must try to understand other people’s attitudes and to present the attitudes of his ministry clubs. The aim of the work of the boards is to try to find mutual interest and to try to convince others about certain interest and to allow to be convinced. The aim is cooperation.
3. They work together on plenary meetings where all ministers meet to discussed directly the bills and amendment and where they have the last chance to change their minds about their votes.”

Work in parliament is presented to participants by a simplified diagram of the legislative way that should be in a visible place in a plenary hall. On the diagram are, step by step, described the stages through which law passes in the process of its formation, the list of functions that the participants have and the documents that appear in a simulated process. Participants can also be provided with information about what role profiles they will get before the start of the simulation. What is scenario simulation? Which forms are applied? But also where are the rooms are in which the simulation is in progress?

The final phase of preparation or the first phase simulation

An instructor assigns the role profiles. He should first look for interested participants who would have the role of journalists. In addition to assigning such roles, he must also highlight the importance of independent media in the work of parliament. Journalists in a way present the very citizens.

Then the roles of representatives are assumed. There are two ways to do this: participants themselves choose the party which they want to represent or it can be done randomly. Participants, perhaps it should be noted, do not matter what role they play, and it is even more useful to represent the party with whose opinion they disagree. It is important to enforce pupils to take the roles they don't want (such students can be offered the roles of journalists).

Each participant receives, at the same time with the role profile, a set of paper that contains scripts, posture /position of the parties and the bill. In addition, they also get forms and "protocol" which is read by the president of parliament and which appear in certain stages of the simulation. It is important to give the forms just before the beginning of certain stages so that the participants would not be confused by the amount of material.

The room (if the stimulation is not running in an authentic atmosphere of parliament) must be prepared in advance. Labels with the activities performed must be put on the doors.

This means that in addition to the plenary hall, smaller rooms should be prepared in which parliamentarian clubs, committees, and journalists work.

Cards on which the participants write their names are also prepared. After that, the instructor (s) announces the beginning of the simulation and leaves the participants to read the material and identifies with their roles.

SIMULATION

The first parliamentary meeting

- determine the positions (presidents) and who is in which board
- a brief meeting — 30 min.
- material requirements/forms:
 - ü meeting agenda
 - ü list of positions (speaker, vice presidents, and presidents of the boards)
 - ü list of party members
 - ü list of board members

Participants who are now the newly elected lawmakers — meet for the first time members of their parties. They choose the head of the parliamentary group. They determine who will get the functions according to the list of positions that was given by a scenario simulation. Participants are given instructions on how to behave in a certain position. Those positions may be on a board or in a plenary session.

Constituent session of parliament

- introducing Bill

- short but ceremonially — 20 minutes
- material requirements/forms:

 ü speech by the temporary parliamentary speaker
(it can be the oldest member of parliament per profile)

 ü speech by a selected speaker of parliament

Members of parliament are introduced in the plenary session. One of the instructors gives instructions as a head of protocol. Parliament speaker is elected. This part of the simulation is of a protocol character to a greater extent and for the purposes of simulation, it should be shortened to an acceptable length. It is important for pupils to realize the importance of formal procedures but they must remain secondary compared to the motivating of pupils to take part in a creative discussion.

The parliament speaker introduces the bill. This bill, which we mentioned earlier refers to two areas which pupils can be interested in – ecology and spirits circulation, must be adapted to participants in this sense to be reduced to three or four points. A large number of points of law would confuse users of stimulation and make the discussion difficult. Emphasis should be placed on the essence of the law and not on its literal representation. In addition, the proposal should be put together and in that way to give participants a chance to make them be their own amendments and discussion.

President of parliament after that reminds "deputies" to seriously take into consideration the proposal of the law and to contribute to a creative solution that will take into account the benefit of the citizens and the state. After that, he gives pause and participants are referred to a meeting within the parliamentary clubs.

The second meeting of parliamentary clubs

- working meeting — the party line, amendments
- material requirements/forms:

 ü agenda of the meeting

 ü forms for amendments

At this meeting, participants are suggested that they should determine their party line in relation to the proposed laws, but decide to which limits, solutions of other policy options can be accepted. It should be pointed out that on some important issues for the general good of the citizen it is important to be guided by the non-party way of thinking. At this stage, the participants practice to formulate their point of view, but also to be open to discussion by which is possible to change partly or in greater part their attitude if the arguments are on the side of the other speaker,

Session of the board

- Forming opinion about the proposal and amendments
- Material requirements

 ü agenda meeting with the instructions of the president about the formal conduct of board work (book of rules simplified)

 ü form for the opinion of the committee

Constitution of the committee — according to the list of items received earlier with the material and which is defined by the

scenario. The task of the president to organize the work of the committee and to take care that each party gets equal time for presentation of their views. After expressing the opinions and giving amendments of the parties, the board

is stimulated to have a unique opinion. The instructor helps the president, and reminds him that the work of the committee has to be efficient and to take account of the time limit. In this way participants learn to work under pressure and to be efficient. In the end, the committee's conclusions are handed to the president of parliament.

The third meeting of the parliamentary clubs

- the party lines about the opinions and amendments
- Preparation of speeches
- material requirements/forms:

 ü meeting agenda

 ü photocopies of committee opinion and proposed amendments for all

parliamentary clubs

 ü paper for revised views of parties after meeting of the board

(to support legislation in general and which amendments should be supported, and which not)

Press Conference

It is necessary to plan one to two conferences to include students who have expressed such a desire, or who didn't want to play the role of representatives. These conferences can be planned in the phase when the parties have already formed their opinion (simulates gaining public opinion for the position of some parties). Another moment for the conference can be just before the voting at the plenary session. Then journalists prepare tough questions that they want to present to the public, such as whether someone's party position prevents the adoption of better solutions for citizens ... Parliamentary clubs determine who of the members of parliament should answer journalists' questions. This activity should last not more than 10 minutes.

Plenary session

This is one of the most important stages in the legislative process of simulation. It can be organized in two parts with a break of 10 minutes. The result is the enacting the law or its not adoption. The law, too, can be adopted with modifications -amendments. Participants here take part in a debate with a time limit of two minutes per presentation.

Debriefing and evaluation

The purpose of debriefing is to bring participants out of their role and to define and revise learned lessons. The personal and shared knowledge as well as experience are summarized. "A political implication is important – observation of changes of behavior of participants of the simulation and current politicians after the findings from the simulation."

Phases after the simulation: feedback and evaluation

This phase should be implemented immediately after the "official" end of the simulation. It has three objectives:

- a) reflection
- b) realization
- c) applying

The ultimate goal is to make the participants of stimulation accept and extend the newly acquired knowledge and experience.

These objectives should be used in three steps:

- 1) emotionally and personal thinking about the simulation itself
- 2) acquiring political knowledge which is shown through simulation
- 3) understanding the real political context

These steps can be taken with adequate evaluation sheets. In addition to statistical data on participants, the following issues should be included:

- ü The general opinion about simulation.

Expectations, impressions, parts which were

inadequately comprehensible etc.

- ü Opinion on instructions during

simulation and before it

- ü Material simulation

- ü Timetable and scenario simulation

- ü The role of participants during

simulation

- ü Results

- ü Simulation as a learning instrument

- ü If students would again take part in

another simulation

- ü Additional comments and suggestions

One possible model for simulation of the legislative process that is realized according to the model of the real process in my country is suggested. Open option for its modification to different

procedures in different countries is possible because the essence is the same in all countries with democratic parliamentary system.

Apart from the legislative process, it is possible to simulate other political processes (elections, work of institutions, and so on), case law, international economic relations (stock exchange, banking, markets, auctions etc.)

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On the Construction of Students Self-Managed Practice Teaching Management Platform

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Abstract: To improve the utilization of laboratory resources, our research team emphasis the students as the principal part in nursing practice teaching. To improve students' learning initiative and the effect of nursing practice teaching, based on the campus network, members of our research team developed a network-based student self-management of nursing practice teaching management platform. This paper is focused on the development of the students self-managed practice teaching management platform and its applications.

Key words: Nursing teaching; practice; platform; students; self-management

Introduction

Nursing is a very practical subject, with intuitive, practical, strong normative characteristics. Therefore, how to strengthen and improve the effectiveness of experimental teaching, how to improve the practical ability of students, how to lay the foundation for future clinical nursing work, has become the hot topics of the nursing schools. However, with the rapid increase in the size of nursing students, the serious shortage of teaching resources such as teachers, laboratories, facilities and the shortage of teaching hospitals has become an urgent problem. Many domestic nursing institutions through the acquisition, update the experimental facilities and equipment, create a simulated clinical nursing environment and other methods of reform to achieve some results^[1]. However, there are still some problems such as large investment, insufficient teaching staff, limited time for experiment teaching, limited time for students, low practical ability and insufficient interaction between teachers and students. Therefore, how to fully and effectively utilize limited teaching resources and improve students' practical ability, they also become the focus of nursing experimental teaching reform. Based on the specific situation of our school, based on the campus network, we created a self-managed nursing practice teaching management platform based on the network in the nursing laboratory, aiming at improving the utilization of laboratory resources and learning initiative of the students in order to achieve the effect of improving the practice of teaching, to carry out nursing practice teaching skills to provide a reference for teaching reform.

1. Research Design

The general idea: it is to build a teaching management

platform based on campus network, student-centered self-management and open nursing practice skills, to expand the time and space of experimental teaching, to broaden the channels of self-study after school, to alleviate the limited time, limited practice opportunities and other issues.

Design: With the existing campus network system, in nursing college at the specialist nursing laboratory we constructed the student-centered open nursing practice teaching management platform, its content includes teaching resource management, skill drill booking, video on demand system, online resources live, teacher-student exchanges.

2. Methods

2.1 Preparation

Course Objectives: According to the teaching plan and teaching arrangements, we undertook pilot study at first in the specialist nursing laboratory to obstetrics and gynecology nursing, pediatric nursing. And then we arranged experimental teaching arrangements in accordance with obstetrics and gynecology nursing, pediatric nursing experimental syllabus and nursing skills, norms, and the characteristics of the course.

Laboratory hardware construction: we purchase nearly 20 kinds of obstetrics and gynecology nursing and pediatric nursing experimental teaching equipment: such as four palpation model for pregnant women, children scalp vein puncture and other equipment to ensure the advanced training equipment, simulation and durability, which is conducive to student practice.

Preparation of teaching resources: In order to ensure that students can independently operate skills learning, to ensure the teaching process and clinical quality control center of the same

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standard, we purchased the obstetric nursing, pediatric nursing normalized experimental teaching CD; and we organize the teachers to record the experimental course for students to watch the learning practice.

2.2. Design of Network Management Platform

We hired outside the professional company according to design ideas for the design of functional areas, such as depending on the pre-broadcast, booking functions, such as teacher-student exchanges.

3. Students management

According to the obstetrics and gynecology nursing, pediatric nursing course experimental teaching content schedule and arrangements, after teachers' completing the teaching, students can practice in the laboratory after the class, and the laboratory is opened 8 hours a day to the students. The procedure is as follows: students make an appointment for training time online - The laboratory teacher prepares the corresponding experimental supplies according to the contents of the experimental teaching, the bed used for the operation training, etc. - The students watch the video and video on the platform and then practice - according to the requirements of the sort of laboratory items sorted.

4. Discussion

Nursing professional education aims to create an excellent nursing talents with strong operational skills, independent clinical care decision-making, and skilled use of nursing procedures to carry out the overall care of the new nursing talent^[2]. Students in their

spare time and space, by themselves to allocate time, select the experimental project to operate. In the learning atmosphere, we can feel that they are the masters of learning, with inspire enthusiasm and enthusiasm of active participation, changing passive learning to active learning, which give full play to students' main role, and cultivate students' self-learning and self-management^[3].

The construction of the practice of teaching management platform is based on the analysis of their existing conditions, based on the teaching concepts, teaching resources, network technology and other aspects of reform, established the construction of self-management as the center of open nursing practice skills teaching Management platform, build the network of students' autonomous learning, expand the time and space of experimental teaching, and clarify the direction of practice teaching reform, aiming at improving teaching quality.

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Study on Effect of Extended Care Pattern of Systematic Discharge Instruction on the Post-discharge Stroke Patients

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Abstract: The objective of this study is to discuss the effect of extended care pattern of systematic discharge instruction on the self-care ability, skin and nutrition, compliance with rehabilitation and readmission rate of stroke patients. The method: 150 cases of stroke patient were randomly divided into study group and control group with 75 cases for each group, both groups of patient received the same routine care and discharge instruction during hospitalization, the patients in study group were administered with a systematic discharge instruction and formulation of extended care measure for intervention 3 days before discharge, which lasted for 6 months. Result: the difference in Barthel scoring and Braden index scoring, percentage of patients with a risk of malnutrition and care satisfaction on day 2 after admission and before discharge between two groups of patient was not statistically significant ($P > 0.05$), according to the comparison done at two time points: month 1 and 6 after discharge, the patients in study group were significantly higher than the ones in control group in terms of Barthel scoring and compliance with rehabilitation scoring, while in terms of Braden index scoring, percentage of patients with a risk of malnutrition and readmission rate, the patients in study group were significantly lower than the ones in control group, the inter-group comparative difference was statistically significant ($P < 0.05$); It is found that the intervention based on extended care pattern of systematic discharge instruction can improve the self-care ability, compliance with rehabilitation of stroke patients, and reduce the incidence rate of pressure sores, risk of malnutrition and readmission rate.

Key words: Stroke, extended care, systematic discharge instruction

Introduction

Stroke is a chronic disease affected by many risk factors, due to the limitation posed by many factors like mental state, family situation, hospitalization cost, length of stay and so on, most patients chose to be discharged and transferred to community or family for rehabilitation after the clinical symptoms of stroke were improved, an effective medical care may reduce the patient's fatality rate and disability rate to a great extent and can be very effective to improve the patient's life quality and prevent recurrence^[1].

Most patients and main family caregivers are relatively ignorant of the knowledge about treatment and care for stroke, and have a poor understanding of the severity of this disease, it has been a common phenomenon that the patients don't take medicine on time, or even don't take it, and cannot obtain a timely and effective rehabilitation exercise after discharge, as a result, the patients are readmitted to hospital due to a recurrence, which is a waste of social medical resource and aggravation of family financial burden^[2]. This study took the 150 cases of patient hospitalized in the inpatient area of neurology department as an object of study, who were randomly divided into study group and control group with 75 cases for each group, the patients in study group were intervened by an extended care from a systematic discharge instruction and its influencing effect was observed, which is to be reported as follows:

1. Object of study

150 cases of stroke patient hospitalized and treated in inpatient area of neurology department of Xingtai People's Hospital from Jun, 2015 to Jun, 2016 were taken as an object of study, with an inclusion criterion: 1) according to the criteria established in the diagnosis and treatment guideline (2014) about stroke in Journal of Chinese neurology, all the patients included into the study range accorded with the diagnosis of diagnosis and treatment specification for stroke and were diagnosed as stroke definitely. 2) Barthel scoring < 95 . 3) the patients have been confirmed by imageological examinations like Computed tomography (CT) or Nuclear Magnetic Resonance Imaging (NMRI). 4) The patients were aged between 45 and 82 years-old, with a paralyzed-side muscle force ranging from level 2 to 4. 5) both the patients and main family caregivers have a conscious mind, and can cooperate with this survey for data collection; meanwhile, all of them are voluntary for this study, and have signed an informed consent and agreed with a followup visit. 6) the patients chose to rehabilitate at home after discharge and resided in the urban area of Xingtai city permanently, in order for a convenient extended care intervention. Exclusion criterion: 1) the patients who had a previous history of mental illness, along with those who had insufficiency of heart, kidney, liver and lung as well as serious circulation system diseases. 2) The patients who had a previous

history of cognitive disorder or mental disorder as well as a family history. 3) The patients who failed to finish the intervention and data collection due to various reasons.

2. Research method

2.1 The patient's self-care ability, skin and nutrition had been assessed, and their baseline data had been collected, 150 cases of subject included in the study range had been randomly divided into study group and control group with 75 cases for each group on the basis of method of random number table.

2.2 Oral Enjoin about discharge precautions were implemented by nurse to the patients in control group before discharge. The patients in study group were given a written health instruction based on the disease condition, educational level and family support within 3 to 4 days before discharge, and a systematic discharge instruction was given to the patients according to their condition, each patient to be discharged was instructed and educated with a health guidance and given a *health education handbook for knowledge about stroke* (self-made).

2.3 The patients received a telephone follow-up visit once a week after discharge, reinforcing the care instruction specific to individual problem and tracking the situation of recovery of patients. The patient's self-care ability, skin and nutrition and compliance with rehabilitation were assessed on month 1 and 6 after discharge.

2.4 The statistical software SPSS19.0 was used to analyze and process the data, the measurement data was represented by mean \pm standard deviation ($\bar{x} \pm s$), the variance analysis and pair t-test of data of patients were repeatedly measured on day 2 after admission, before discharge, on month 1 and 6 after discharge, enumeration data was represented by percentage, the inter-group comparison was tested with χ^2 , the difference was believed to be statistically significant when P is less than 0.05.

3. Research result

3.1 Effectiveness index

3.1.1 Modified Barthel index scale has been designed and established by the American Dorothea Barthel and Florence Mahney in 1965, it is a commonly used ADL assessment method by American rehabilitation institutions. It is mainly used to detect the change in independent living ability of old people, and it reflects the degree of need of care by old people, it is applicable for the old people who is diseased with neural, muscular and skeletal disorder. Thereinto, 0-20 points equal to extremely severe dysfunction; 25-45

points equal to severe dysfunction; 50-70 points equal to moderate dysfunction; 75-95 points equal to mild dysfunction; 100 points equal to ADL self-care.

3.1.2 Braden scale is the most widely used scale by the clinical care in China by now, it assesses the risk of onset of pressure sores in the perspective of etiology, and is widely used for clinical care, with 23 points as a maximum and 6 points as a minimum, the patients who score between 15 and 18 points are considered as at a mild risk; 13-14 points as at a moderate risk; 10-12 points as at a high risk; less than 9 points as at an extremely high risk.

3.1.3 Nutritional risk screening table (NRS2002) is a tool for screening the nutritional risk recommended by European Society of Parenteral Enteral Nutrition (ESPEN) in 2002, and it is a simple and convenient method for screening nutritional risk that is relatively objective. It divides the condition into four grades in proper order according to the severity of disease and nutritional condition: none, mild, moderate and severe, signified by 0, 1, 2 and 3 points respectively, more than 3 points indicates a risk of malnutrition.

3.1.4 The questionnaire of patient compliance is made in light of the questionnaire of "patient compliance with discharge instruction" established by Qian Chunrong et al, the survey regarding the compliance of stroke patients was conducted in terms of five aspects including rehabilitation exercise, balanced diet, daily work and rest, regular medication and regular reexamination, each item was divided into four levels, namely, completely, mostly, little and hardly, which was signified by 3, 2, 1 and 0 point respectively, with a total points of 15.

3.2 Result

3.2.1 It was shown by the result of comparison of modified Barthel index that, the difference in Barthel index at different time before and after the intervention by this extended care pattern between two groups of patient was statistically significant ($F_{time}=29.868$, $P<0.01$), therein, the difference in scoring on day 2 after admission and before discharge between two groups of patient was not statistically significant ($P>0.05$), the difference on month 1 and 6 after discharge was statistically significant ($F_{time}=12.546$, $P<0.05$), the difference in inter-group comparison was statistically significant ($P<0.05$), indicating that, there is an interaction between the intervention result and time ($F_{time}=4.283$, $P<0.05$), indicating that, the extended care pattern of systematic discharge instruction can improve the daily living ability of stroke patients. See table 1 for detail.

Table .1 Comparison of modified Barthel index between two groups of patient(point, $\bar{x} \pm s$)

Group	Case quantity	On day 2 after admission	Before discharge	On month 1 after discharge	On month 6 after discharge
Study group	75	45.29 \pm 9.74	51.76 \pm 7.83	63.86 \pm 11.83	74.29 \pm 12.49
Control group	75	46.98 \pm 10.02	52.90 \pm 7.39	56.09 \pm 9.57	74.55 \pm 12.11

<i>t</i>	-	0.826	1.121	3.621	4.928
<i>P</i>	-	0.432	0.272	0.018	0.003

3.2.2 It was shown by the result of comparison of Braden scale that, the difference in Barthel index scoring at different time between two groups of patient was statistically significant ($F_{time}=4.235$, $P<0.05$), among which, the difference in scoring on day 2 after admission and before discharge between two groups was not statistically significant ($P>0.05$), the difference on month 1 and 6

after discharge between two groups was statistically significant ($P<0.05$), indicating that, there is an interaction between the intervention result and time ($F_{time}=3.682$, $P<0.05$), indicating that, the extended care pattern of systematic discharge instruction can reduce the probability of occurrence of pressure sores of stroke patients. See table 2 for detail.

Table .2 comparison of Braden scale between two groups of patient

Group	Case quantity	On day 2 after admission	Before discharge	On month 1 after discharge	On month 1 after discharge
Study group	75	19.23±1.56	18.44±1.21	17.68±1.33	18.21±1.18
Control group	75	19.21±1.60	18.47±1.25	16.07±1.29	16.25±1.26
<i>t</i>	-	0.635	0.268	3.269	4.491
<i>P</i>	-	0.369	0.891	0.046	0.037

3.2.3 It was shown by the result of comparison of nutritional risk scoring that, on day 2 after admission and before discharge, the percentage of patients in study group whose NRS-2002 scoring was more than or equal to 3 points was higher than that of the ones in control group, the inter-group comparative difference was not significant ($P>0.05$), on month 1 after discharge, the percentage of patients in study group whose NRS scoring was at a risk of malnutrition was lower than that of the ones in control group, the inter-group comparative difference was not significant ($P>0.05$), on month 6 after discharge, the percentage of patients in study group who were at a risk of malnutrition was 5.33%, which was clearly lower than that of the ones in control group, which was 13.33%, the inter-group comparative difference was statistically significant ($P<0.05$).

3.2.4 It was shown by the result of comparison of patient compliance that, the total points scored by patients in study group in terms of rehabilitation exercise on month 6 after discharge, balanced nutrition, daily rest and work, regular medication and compliance were significantly higher than that of the ones in control group ($P<0.05$), the difference between both was statistically significant, the difference in scoring of regular reexamination between both groups was not significant ($P>0.05$).

3.2.5 It was shown by the result of comparison of rehospitalization rate of patients that, the rehospitalization rate of patients in study group on month 6 after discharge was 5.33%(4/75), which was significantly lower than that of control group, which was 12.00%(9/75), the inter-group comparative difference was statistically significant ($P,0.05$). see table 3 for detail.

Table .3 comparison of rehospitalization rate on month 6 after discharge between two groups of patient

Group	Case quantity	rehospitalized		Not rehospitalized	
		Case quantity	percentage (%)	Case quantity	percentage (%)
Study group	75	4	5.33	71	94.67
Control group	75	9	12.00	66	88.00
χ^2	-		5.124		6.335
<i>P</i>	-		<0.05		<0.05

4. Discussion

4.1. Effect of Extended care pattern of systematic discharge instruction on the self-care ability of stroke patients

The patients in study group were given a systematic discharge instruction in this study, the patients were provided with a relevant functional exercise instruction by the extended care pattern after returning to family, the relatives can help and facilitate the rehabilitation exercise of patients after understanding the

rehabilitation knowledge^[3], the research results showed that, the Barthel index points scored by the patients in study group on month 1 and 6 after discharge were significantly higher than that of the ones in control group, indicating that, the patient's self-care ability can be improved by the intervention through administration of extended care measure to the stroke patients, and the longer the interventional time, the better the recovery of patient's self-care ability.

Through analysis, it is believed that the reason for this situation might be that the extended care could allow the patients and relatives

to have a relatively comprehensive and systematic understanding of the condition, treatment and rehabilitation of stroke, making the patients more confident for the rehabilitation of disease; secondly, the stroke patients and main family caregivers can master the daily ability and skill through a systematic discharge instruction, helping the patients to establish a correct, healthy and positive attitude for exercise; thirdly, the performance of family caregiver can be fully exerted, the care staff instructs the family caregiver as to how to effectively assist the patients to do the household rehabilitation exercise during discharge instruction, especially that the completion of daily activity by patients should not be excessively substituted by relatives, which shall be avoided as much as possible, the patients should be encouraged to do what can be done by the them independently to the greatest extent in order to give a full play to the self-care^[4,5].

4.2 Effect of extended care pattern of systematic discharge instruction on the skin condition of stroke patients

Stroke is a disease having a high morbidity, disability rate and mortality to the stroke patients, who would usually develop clinical symptoms like dyskinesia after the onset, as to the bedrid stroke patients, they are disabled of self-care ability, thus, pressure sores are a serious problem emerging in the process of clinical care for this kind of patients. This study adopted the modified Braden scale to assess the skin condition of both groups of patient during rehabilitation stage and treatment stage, which contributes to the discovery of risk factor of occurrence of pressure sores for patients by care staff, and to a timely provision of care intervention to the patients so as to avoid the occurrence of pressure sores.

Research results showed that, the difference in Braden scoring after admission and before discharge between both groups of patient was not significant, the scoring of patients in both groups was equally lowered to different extent on month 1 after discharge, wherein, the patients in study group had a higher scoring than the ones in control group did, on month 6 after discharge, the Braden scoring of patients in study group was clearly higher than that of ones in control group, indicating that, extended care intervention could intervene and adjust the patients in an individualized manner, and reduce the high risk factors of pressure sores to the minimal degree, effectively ensuring the quality of out-of-hospital care^[6].

4.3 Effect of extended care pattern of systematic discharge instruction on nutrition of stroke patients

Stroke patients usually have an acute onset, leading to a stress state of organism, thus, both the requirement of nutrition and metabolic rate will be increased, while the senile patient's organism will be complicated with underlying diseases, quite a part of patients already have had a problem of malnutrition when admitted and about to be treated in hospital, it is very necessary to conduct a nutritional

risk screening and assess the nutriture of stroke patients, this study showed that, the percentage of patients in study group who were at a risk of nutrition would be reduced gradually with the time extension of extended care, while the counterpart in control group had a significantly less reduction, it is thus clear that, the systematic discharge instruction and extended care has a positive effect on the reduction of risk of malnutrition of stroke patients.

4.4 Effect of extended care pattern of systematic discharge instruction on stroke patient's compliance with rehabilitation

It was shown by the result of a compliance survey for both groups of patient on month 6 after discharge that, the patients in study group were significantly superior to the ones in control group in terms of rehabilitation exercise, balanced diet, daily rest and work, regular medication and total points, the difference between both was statistically significant ($P < 0.05$), indicating that, extended care pattern can effectively improve the patient's compliance. Research result showed that, the difference in regular reexamination scoring between both groups was not significant, which might be due to the fact that the patients were all reminded by the telephone from researchers during each reexamination^[7], the post-discharge compliance of patients is a powerful guarantee for the effective improvement of prognosis, the patients in study group had their bad life style improved by the extended care, and had their risk factor of stroke reduced, a persistent and regular rehabilitation exercise enhances and improves the motor function, the improvement of daily activity ability also contributes to the improvement of unhealthy mental state of patients, and contributes more to the recovery of disease^[8,9].

4.5 Effect of extended care pattern of systematic discharge instruction on readmission rate of stroke patients

As for stroke patients, the optimum convalescence is the recovery stage, however, in China, most patients seldom choose to receive a hospitalized treatment for 6 months after onset due to hospitalization cost, treatment condition and many other factors, moreover, the patients and relatives lack of a professional knowledge and care method to prevent and treat diseases, thus, missing the optimal rehabilitation opportunity, or making the patient's condition worse, which raises the recurrence rate significantly. As far as the stroke patients are concerned, the risk factors of readmission rate include a great functional damage upon discharge, advanced age, absence of effective social support and so on, the condition of those patients is aggravated and they are forced to be readmitted to hospital due to interruption of regular care and a changed care site^[10]. It has been shown by the findings of this study that, the difference in readmission rate on month 6 after discharge between two groups of patient was significant, the readmission rate of patients in study group had been reduced significantly by the

intervention through extended care.

5. Conclusion

Extended care pattern of systematic discharge instruction can improve the self-care ability of stroke patients, and reduce the occurrence rate of pressure sores and risk of malnutrition, improve the care satisfaction and compliance with rehabilitation and reduce the readmission rate of stroke patients. This study is limited in the quantity of sample collected, which can be increased further in order to reduce the influence of sample quantity on the data obtained, extended care intervention on stroke patients in Xingtai is still in its initial stage, extended care service still needs to be developed and perfected energetically in medical establishments. This extended care program is not studied to a further extent, thus, the long-term effect of extended care intervention on patients remains uncertain, which is in need of a further study.

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MOOCs and Management Education: Modular Teaching Based on COP Theory

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Abstract: Management is the fundamental core course of the economic management major, but the existing classroom teaching model is unable to meet the teaching goals in terms of theory and practice. With the development of internet, big data and other new technologies and educational theories, new education platform MOOCs occurs, which integrates law of psychological behavior and education science. Featured by the "large-scale" learner quantity, "diversified" status and "humanized" teaching model, it is different from the classroom teaching, which is a useful complement to the traditional teaching methods. Hereby the characteristics of MOOCs teaching mode are analyzed and summarized, combined with the study of COP theory, focusing on the knowledge creation in the management course teaching process, to explore individualized and modular interactive T-L model design.

Key words: MOOCs, COP theory, management teaching, T-L model

1. Introduction

Massive Open Online Courses (MOOCs) is an open teaching platform based on the emerging network technology, humanized teaching ideas and also a new education mode based on science study, combining the law of psychological behavior with educational science. MOOCs are different from traditional classroom teaching methods in terms of the "large-scale" of learner quantity, "diversified" status and humanized" teaching model, which make it possible to lay a foundation of providing comprehensive network courses for college education in the future. With the promotion of MOOCs in China, many key institutions have been involved in the construction of MOOCs. The design of subjects and specialized courses of MOOCs has become a hotspot in higher education and online education research. Management is a general education course of higher education, as well as the core professional course of economic management major. In order to meet the demands of learners at all levels and make full use of the advantages of the MOOCs teaching platform, it is necessary to redesign the management curriculum according to the characteristics of management courses.

2. Technical Characteristics of MOOCs and COP Theory

2.1 Analysis of technical characteristics of MOOCs

MOOCs were originated from an open course sponsored by professor David Wiley of The University of Utah, which can be shared by all the internet users around the world. After that professor Alec Couros from the University of Regina invited relevant experts

from around the world to participate in the distance education of the web-based course "Social Media and Open Education" in 2008. These network courses reflected the idea of human-based participation based on a technology platform for remote sharing. In 2008, Canadian scholars Dave Cormier and Bryan Alexander proposed the term MOOCs formally according to theoretical knowledge and practical development and defined it as massive, online open courses. Compared with the traditional teaching methods, MOOCs platform has remarkable modular, interactive, flexible features:

2.1.1 Modular teaching structure design

MOOCs teaching platform is born with the attributes of "large-scale" learner quantity and "diversified" status. Learners are greatly different in terms of ability, knowledge reserve and professional knowledge background, with different motivations for learning as well. Therefore, to make the diversified students learn the MOOCs curriculum more effectively, MOOCs should not use the same teaching contents and structural designs for all the students, but to make modular analysis and design of the course contents accordingly, so as to combine different demands of different students with the learning module further.

2.1.2 T-S-S interactive teaching model

The MOOCs teaching platform provides a functional design that enables the teacher-student and the student-student to communicate and discuss in time. On the one hand, learners can propose their own views of the course according to their own understandings and knowledge background knowledge; on the other hand, teachers will participate in the discussion, and make sufficient communication about problems during the study of students, to form

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TSS (Teacher-Student-Student) interactive teaching model.

2.1.3 OE / OD flexible teaching methods

MOOCs provides abundant teaching means, covering the traditional blackboard writing, and video and other multimedia files, thus providing additional background information for learners. In addition, learners can receive timely feedback through flexible teaching methods of OE (online exercises) and OC (online discussion) to help learners to accomplish the retrieval task, so as to make the teaching assistant and learners make progress together, to achieve the teaching objectives.

2.2 the deconstruction of COP theory

Wenger and Snyder (2000) first proposed the "Community of Practice" (COP) theory of study, which means that in the practice process of study, a group of people are interconnected informally due to common learning interests and shared capabilities, by sharing their knowledge and experience through informal and innovative learning style, so as to promote team members to review the problems arisen in study from a unique perspective with actual personal experience, and give original solutions to the problem. Hedberg (2006) further pointed out that COP was a model of knowledge creation based on sharing and creation, and team members studied by sharing experience and creating new knowledge.

COP theory emphasizes that each learner in the learning team should be fully involved, respond positively and study autonomously, which includes both knowledge sharing and deep-level interaction among learners, and requiring learners to study cooperatively and also independently, thus achieving creative study. Different from the traditional teaching theory, COP is not limited to the design and management of traditional course contents, but pays more attention to the process design and interactive management of learning activities, the essential concept of which is "Design for Learning".

Through analysis, it can be seen that the COP process supported by the COP theory is a learning community for sharing and creating new knowledge, where optional knowledge creation is made, with the core of knowledge sharing, deep interaction, autonomous learning and dynamic participation.

COP provides dynamic thinking and technology to study designers, which is an effective pattern for work, teaching and management. Moreover, the focus of COP process changes from knowledge and skills acquisition, to learners' personal growth, making learning a thing of the entire growing process. In the COP process, learners interact with the instructor, where a flexible learning mechanism is established through the COP design-based teaching process to encourage learners to make exchange and cooperation; it helps learners to establish connections among resources, information and other learners; it supports learners' individualized learning goals, paths and methods, so as to construct a personalized knowledge system.

3. Management Courses and The Limitations of the Existing Teaching Model

3.1 the characteristics of management courses

As an important basic course of economic management in higher education, management has its own characteristics. According to the requirements of higher education teaching, the main teaching goal of the course is to make students master the basic theoretical knowledge of management, and cultivate students' application ability to meet the needs for employment and further study. Through analysis from the perspective of the professional teaching objectives of higher education and the cultivation of inter-disciplinary applied talent, the management course is mainly featured by abstraction, concreteness, flexibility and high involvement of characteristic.

3.1.1 The abstraction and concreteness of management theory

Management is a science comes from the practice, which is theoretical knowledge based on management practice, such as the concept of management, the basic functions of management et., namely the foundation for applying management to reality. At the same time, students should be fully aware of the actual management, such as business management, production management and financial management, which converts abstract knowledge into the concrete operation ability, and applies it to management practice flexibly. This proposes a higher demand on the teaching process and teaching methods of management.

3.1.2 The flexibility of management courses

There are many schools of management theory, which evolve along with the development of management practice, with more than a hundred types of corresponding textbooks at home and abroad. It is up to the teachers to decide what school to be based on, what textbooks to use, how to teach according to their own knowledge and teaching experience. The flexibility of curriculum design provides the foundation for the reform of management courses.

3.1.3 High involvement of management courses

Due to the abstract, concrete and flexible features of the management course, high requirements are made on the teachers and students. On the one hand, teachers need to have abundant knowledge reserves and flexible teaching methods, on the other hand, students are required to participate in the course discussion completely. That is the main reason why management course teaching lays particular stress on cases teaching and panel discussion mode.

3.2 The limitations of existing teaching model of management

With the increasingly rich teaching methods such as multimedia, and the progress of teaching ideas, management teaching has also made development correspondingly. However, due to the characteristics of management courses, there are still some problems in the current teaching process, which may affect the quality and effect of the course teaching and hinder the cultivation of theoretical basis and practical ability.

3.2.1 Relatively backward teaching idea

The knowledge of management comes from the development and practice, and it is applied to the practical application finally. Some of the teachers focus on the abstract theoretical knowledge in the textbook, while ignoring its application in practice.

3.2.2 Relatively obsolete teaching contents

Management courses have many classic materials, but most of which are wrote by the Western scholars, without connecting the real management condition of China. Some teachers rely too much on the teaching materials, rather than update them with the development of the times, so that the teaching contents are relatively obsolete. In the meanwhile, due to the limitations of some teachers' knowledge and ability, they are unable to teach by introducing appropriate cases, thus making the teaching contents boring.

3.2.3 Relatively dull teaching methods

Management lies in the combination of practice and ability; the teacher-dominant teaching model is too simple. If learners are just imparted knowledge in this learning process, without participating in the teaching process, they will not have a good understanding of abstract knowledge, and the teaching effect would be bad.

4. Personalized T-L Model Design of Management Course

Management is an important course of economic management, having higher requirements on the development and utilization of curriculum resources, teaching organization and teaching mode with

Tab. 1 Comparison of the Traditional Teaching Mode and MOOCs Teaching Mode

	Traditional Teaching Mode (Network)	MOOCs Mode
Learning Target	made by teachers	choose by learners
Course Content	designed by teachers	discussed by learners
Course Resource	choose by teachers	learners participation
“T-L” Subject	teachers	learners
Study Mode	a one-way process from teaching to learning	a interactive process of “teaching and learning”

4.1.1 Course elements and their internal relations

In the MOOCs teaching system, MOOCs resource sharing platform, teachers, learners and curriculum resources are the main elements of the MOOCs curriculum. In the traditional teaching, with the teachers as the curriculum designers, the teaching resources are relatively "stable", which lacks the interaction between teaching and learning [13]. The courses in the MOOCs platform are accomplished by teachers and learners together, allowing sufficient interaction of online testing, interactive forums, simulation experiments and so on.

4.1.2 The ways of participation during the study

In the teaching process of traditional courses, the learning contents are relatively fixed, and the learning mode is single, forming a one-way process between teaching and learning. Due to the technical characteristics, MOOCs platform provides a "teaching-learning" model with full interactive ability. In addition, the learners form personalized learning paths based on their different learning experience, learning goals and personal abilities around the established learning objectives.

4.1.3 Course content design module

Traditional teaching contents are designed around the learning objectives by the teacher, which allowing no real-time interaction and feedback, nor personalized guidance for each learner. The MOOCs course is a network system composed of teaching topics, classroom tests, interactive tools and online forums, where different learners will choose different contents for autonomous learning, and

practicality, application and comprehensiveness. However, there are still a lot of problems in the existing management teaching, and it is necessary to develop teaching model matched with the characteristics of management to meet the teaching needs of management. Aiming at the characteristics of management teaching course and the limitations of the existing teaching modes, this study made analysis of the personalized T-L (Teaching - Learning) process, combined with the technical characteristics of MOOCs platform and COP theory, to make the corresponding personalized model design.

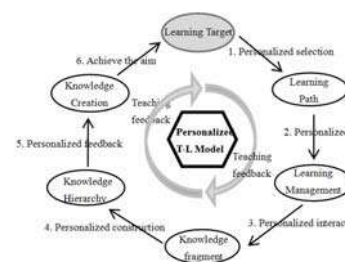
4.1 Element analysis of the personalized T-L process

MOOCs learners 'learning model is constructed based on the platform's interactive learning environment, technical functions specially owned by MOOC, and learners' feedback on learning processes and learning outcomes. The learner's personalized learning process is the core of the entire learning model. Based on the analysis of MOOCs and COP theory, through comparison of the traditional (network) teaching model and MOOCs platform (see Tab. 1), this study extracted on the three elements of curriculum elements, study engagement methods and course content design to analyze the personalized TL process.

the course itself is enriched and improved in the learning process of the learners.

4.2 Construction of personalized T-L process model

Based on the above characteristics of the MOOCs teaching model and the theory of COP, the T-L teaching process of MOOCs learning can be designed based on learners' learning motivation and individual background, which mainly include the learning path, learning management, interaction of knowledge, the construction of knowledge system and knowledge creation and so on (see Fig. 1):



Tab. 1 The Personalized T-L Process Model

4.2.1 Development of Learning Objectives

First, the teachers design the curriculum outline, issued on the MOOCs platform, and these courses constitute a complete learning system. Learners set learning objective on their own according to their own purposes and learning experience, to achieve personalized choice of learning path.

4.2.2 Personalized design of the learning path

Based on the personalized formulation of learning goals, the learners make their own decisions on what activities to participate in and what level of study to carry on, and give feedback to the instructors based through the MOOCs platform.

4.2.3 Personalized Interaction of Learning Management

The teachers give lessons, and the learners can make choice according to personalized learning objectives and paths, and make corresponding management plan of the study activities through the teaching-learning interaction.

4.2.4 Individualized construction of knowledge

Through the interactive learning environment on the MOOCs platform, such as participating in online discussions, classroom forums and other forms, the learners acquire knowledge and study, what's more, the learners can connect the original knowledge reserve of learners and new information acquired, to process the information and make personalized construction of knowledge.

4.2.5 Personalized Feedback of Knowledge System

The learners are further involved in the discussion and interaction of the learners, and the learners can also reconstruct the knowledge frame based on the personalized learning objectives and the learning system, through exchanges with the teacher and other learners, and give personalized feedback on the knowledge system.

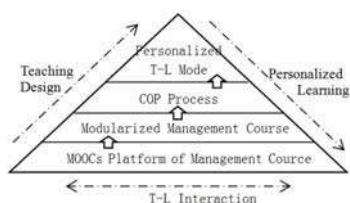
4.2.6 Achieves learning objective through knowledge creation

Based on the personalized feedback of the knowledge system, according to the personal growth experience and interaction with other learners, the learners analyze, evaluate and summarize the learning process, knowledge system construction and learning results, to integrate the knowledge system further, create personalized knowledge frame, and achieve learning objectives.

The personalized T-L model designed based on the MOOCs platform and COP theory reflects the learners' learning objectives and experience background, making personalized learning process available. In this learning situation, the creation of knowledge is a dynamic process achieved by teachers and learners based on the technology platform through mutual communication and cooperation.

4.3 personalized T-L model design

On the basis of the construction of personalized T-L model, combined with the contents and characteristics of management course, it analyzed how to design personalized T-L dynamic mode. The design is based on the physical basis of MOOCs teaching platform, on which basis, the content of modular management is modularized, and the COP course is realized, to make personalized T-L mode design (see Fig.2).



Tab. 2 Design Logical of Personalized T - L model of

Management Course Based on MOOCs Platform

4.3.1 modular courses based on MOOCs platform

In order to cultivate the compound talents of higher education, on the one hand, the management course can be regarded as the core curriculum of economic management major, on the other hand, it can be used as subsidiary course of other specialties, such as engineering, humanity and art and so on. This tends to meet the professional and diversified demands, the keys of the teaching content of different majors differ. Therefore, modularized design should be made for the teaching objectives and teaching contents of the management courses. Based on the shared course interface, different modules meet the different teaching objectives of different professions with different combinations. Even the teaching contents of core curriculum can be realized modular design for personalized teaching according to the different abilities, experience and personal knowledge background of students teaching. If the basic concepts of management and basic theories of management is taken as the teaching module A, and the strategic management design as the module B, the financial management design as the module C, reasonable combination is made according to different specialties and the learning objectives of different learners (see Fig. 3). Modular course content and structure design is one of the technical characteristics of MOOCs platform, therefore modularized design of management courses can be made based on the MOOCs platform.

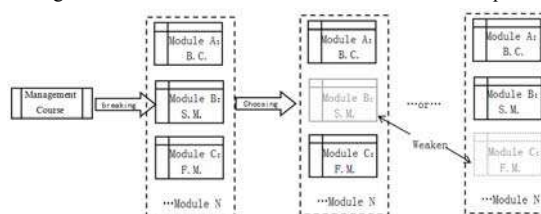


Fig. 3 Concept of Modular Design on Management Course

4.3.2 from modular courses to COP process

On the basis of the modularization of the management courses according to different teaching objectives, the dynamic learning process design of COP is made. According to the core of knowledge share, in-depth interaction, independent study and dynamic participation of COP theory, lairized curriculum content, firstly, based on the MOOCs platform, combined with modular course contents, through OE, OD and other flexible teaching methods in the management course, it realizes the knowledge share and exchange and mutual assistance at T-S-S level, in the meanwhile, through driving learners to study independently with flexible learning objectives, it achieves dynamic participation and builds COP learning process.

4.3.3 Integrated personalized T-L model design

On the basis of the COP learning process, the integrated personalized T-L model design can be made. First of all, develop multiple learning objectives of the management course according to the curriculum outline; then get feedbacks from learners on the MOOCs platform, and make personalized design of the learning path; achieve personalized interaction during the COP study course; make students realize individualized construction of knowledge, and form

personalized feedback, to achieve learning objectives during the interaction between the teachers and learners finally.

5. Conclusions and Outlook

Based on the characteristics of MOOCs and based on the theory of COP, this study designed personalized T-L mode of management course according to the content and characteristics of management courses. The model is mainly composed of three core parts: first, it made modular separation of the management courses, and then it built COP course according to the open teaching ideas, finally, it integrated the personalized T-L mode. The study is a useful complement to existing studies on the combination of MOOCs and management, in addition, it made personalized T-L mode design combined with COP theory. This mod can be used again according to the characteristics of other subjects, which enriches electrical teaching theory, as well as promotes electrical teaching.

This study also has many deficiencies. First, the MOOCs platform itself. At present, there are a lot of analysis about MOOCs platform, but there is no consensus on whether MOOCs can replace traditional teaching completely or just makes effective complements to traditional teaching methods. This research started from the advantages of MOOCs platform to make analysis, while ignoring the potential disadvantages on the teaching effects; and then it made analysis of the management course. Management courses require "teaching - learning" mode to realize the maximum instant feedback. Although the MOOCs platform can provide a platform for sufficient exchanges, and the teaching methods are more abundant, it is undeniable that the existing management of higher education still uses classroom teaching as the main means. So, it is waiting to be verified further as to how the MOOCs substitute the traditional classroom. Finally, the personalized T-L mode design is not precise and in-depth enough. This study only set up the main frame from the theoretical level, but didn't design the operable details, which is the direction of future researches.

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Network Organization: Connection of the Bureaucratic Organization and the Cooperation Organizations

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Abstract: With the advent of the post-industrial era, the ecological environment of the bureaucratic organization has undergone tremendous and profound changes, and the cooperation organization is expected to become the future direction of organizational transformation. But the transformation process from bureaucratic organization to cooperation organization remains a critical connection point, and because of the multi-center network, equality, openness, etc., the network organization has become an effective connection of the bureaucratic organization and the cooperation organizations.

Key words: Network organization, bureaucratic organization, cooperation organization, connection

Introduction

Current development of the economic society is increasingly rapid and complex after entering the post-industrial era. The running problems of Bureaucratic Organization have been increasing due to humanity of the organizational development, information transmission without hierarchy as well as the organizational flatten. To facing future challenges, the win-win organizational method which is presented by scholars has become the trend of the organizational development. However, there are barriers must be overcome which transform the Bureaucratic Organization into the Cooperation Organization. Accompanied with Information Technology, Network Organization has appeared and become obviously crucial. The Network Organization is significance to bridging Bureaucratic Organization and Cooperation Organization.

1. The Dilemma Faced by Bureaucratic Organization in the Post-industrial Society

Bureaucratic Organization is the production of the rationalized Social Organization which is the combination of modern economy and industrial development. It plays an important role in applying to the industrialized society and promoting the current development. But Bureaucratic Organization has been becoming incompatible in both content and form when entered the post-industrial society. Inner conflicts within Bureaucratic Organization has been gradually apparent with the coming of Information Age.

In the industrialized society of one machine production, which is pointed out by Web that it must be the form of Bureaucratic Organization if one organization manages to complete aims rationally and efficiently. Bureaucratic Organization has characteristics of professionalized rational division of labor, clear hierarchy of authority, regularization of authority, personalization of organization management as well as professionalization of

organizational personnel. According to Web's point of view, Bureaucratic Organization has the following features, 1. Hierarchy. Each member has a clearly defined authority and is accountable to his or her superior when performing his / her duties in a hierarchical labor market. 2. Continuity. By providing regular opportunities for promotion of occupational structure, the public employment has become a full-time job receives fixed compensation. 3. Specialization. Staff are selected based on actual performance, trained according to their responsibilities and controlled through archived information. Nevertheless, Web indicated as well that once hierarchy established, it becomes the most unbreakable social organizational structure. However, with the continuous development of economic society, bureaucratic organizations face many difficulties in operation.

1.1 The Dilemma of "Impersonalization" in Bureaucratic Organization

The "rationality" of the Bureaucratic Organization requires the "impersonal" rule to deal with affairs. Members of the organization must be strictly in accordance with the Act and regulations towards work and business contacts under the planning and control of the organizational system. Individual emotions shall not affect the rational decision-making by the organization. System, rules and duties rather than personality, creativity and emotion are important factors to the organization. The members of the organization become instruments of the legal system. Not only are their personalities suppressed, but creativity, work motivation and learning ability are greatly limited. 'On the one hand, it makes people focusing functions and efficiency, while gradually disregard the pursuit of value ideals and ideology. On the other hand, it mercilessly exploits the human freedom of personality, so that the modern society suffer from a process that means replace the purposes.' This impersonalization shows all kinds of incompatibility with the overall economic social development and progress. Human values highlighted in the

Information Age. People tend to pursuing their own personality freedom and satisfaction of diversified needs. Individuals' quest for rights and individuality has led them to demand participation in the management process and to seek opportunities for innovation. The advent of the information society, making the organization members pay more attention to psychological experience and development environment of the work.

1.2 The Dilemma of Specialization Principle in Bureaucratic Organization

The Industrial Society offers a historical condition which had limited competency, information resources and equipment. At the expense of overall personal development in exchange for the efficiency to forming specialized labor division. Specialized labor division makes a single presentation of knowledge structure and professional skills. The knowledge and ability of organization members is difficult to adapt to the requirements of the new situation once the workplace and the environment changes. Their knowledge and skills become obsolete and inefficient. Friction and competition among members of the organization increased due to homogenization development caused by the specialization. So that the organization "internal friction" has been increased. Long-term specialization gradually breeds the bureaucratic habits of the organization staff, selfishness and so on. Organization and management systems are rigid and unresponsive. Organizations increasingly require versatile talents during the development of Modern Information Society. As there are complementary advantages between members, only building learning organizations can continue to innovate and develop.

1.3 Dilemma of Closed Structure of Bureaucratic Organization

Bureaucratic Organization emphasizes the pursue of 'Rationalization'. In order to achieve aims which are set by the Organization, it adopts means of severe plan and control. It is of certainty that a closed organizational system would be produced to minimize interference of external factors. This kind of system tries to lower the environmental effects. Thus, departments are functional clear but mutual isolated. The sensitivity of environmental changes is deprived, thus the adaptability to surrounding is lost. The main two characteristics are unpredictability and uncertainty in the Information Age. Because of the closeness, Bureaucratic Organization has gradually difficult to fit the changing conditions, and it can hardly meet the multi-requirement of swiftly various service objects.

1.4 Dilemma of Authority Hierarchy of Bureaucratic Organization

The Bureaucratic Organization combines hierarchy and totalitarian tendencies. The Organization has been unitedly divided into management levels and range. There is a pyramid-shaped divisional. This hierarchical level acts strictly according to the power

chain. Orders have to be transmitted from the top to the bottom, whereas information transferred conversely. However, information cannot be transmitted rapidly and efficiently among different levels due to hierarchy and hatred of Informal Organization. Not only does orders and information transformation cost more human resources, but lead to information distortion and misrepresentation. Meanwhile, the pyramid-shaped hierarchy making members psychologically 'worship the top'. Most of them are foreclosed from management level. They can only get promotion through a confined method. Therefore, in time and valid decisions are difficult to arrive and administration is hard to implement.

During the period with rapid developing science and swiftly advanced Information Technology, the social environment has been changed profoundly. It is time to replace the stubborn Bureaucratic Organization by a new form of Organization. Kennis Clock pointed out that the Organizational Value which bases on humanity and democracy is required to take the place of dehumanized and stereotyped Basic Value. A new Power Value which is basis on cooperation and ration would come along to substitute the old one which was basis on coercion.

2. The Advantages of Cooperation Organization in Post-industrial Society and the Current Limitation

2.1 The Advantages of Cooperation Organization in Post-industrial Society

"Cooperation" as a product of the post-industrial era. Organizational philosophy is conceived in specific social and historical conditions. With the advent of the post-industrial era, globalization continues to evolve. Humans need to face environmental change and social problems from around the world. Humans today become a destiny community. The common interests of mankind determine its behavior. This means that 'we must seek collective action in the sense of humanity as a whole. As a result, cooperation rather than competition has become the theme of the times. It is this emergence of social or historical context, the concept of cooperative organization has become a realistic theoretical activity.'[i] This makes the 'cooperation first and foremost a social lifestyle, the second is interpersonal relationships and actions that become part of this life form. As a result, cooperation will inevitably lead the parties to the mutual benefit and the interests of society as a whole.'[ii] Thus, partner organizations become a major trend.

Through trust framework, the cooperation achieves the integration of the entire organization. It makes the relationship between members of the organization is no longer a subjection and domination, but the main body of equal mutual cooperation. Each member of the organization is integrated by cooperation. The whole society began to become an organic union. This system is an open network structure that members are free to move and mix up. Cooperative organizations connect and interact through negotiation.

For the common need to select the goals and programs of collective action by rational consultation. In the form of division of labor to take joint action. The characteristics of the cooperative organization make it able to effectively resolve the dilemma of Bureaucratic Organizations.

(1) The Cooperative Organization's pursuit of organizational value is not 'rational' planning and control, but 'human nature' cooperation and participation. Bureaucratic Organization 's Pursuit of 'Rationalization' pay too much attention on 'norms' that external control. Organizations' different turn into the 'norms rather than the normative carrier. Depressing the creation and participation of people to a large extent. Making the development of personal aspirations and organizational objectives separated. Leading to all sorts of "free riders" and other acts of sabotage and negative in the work. The 'norm' of a Cooperative Organization is not intended to control. The purpose of the organization is to give members a self-control and management platform. Cooperative Organizations attach importance to human nature and its value. Therefore, the relationship between the members of the organization is equal. Conducting management activities with trust to determine common guidelines and goals. As the cooperative Organization takes individual development and organizational goals to achieve as a unified, positive correlation process, so members of the organization will put his solidarity with the organization as a whole. As Kangzhi Zhang pointed out, 'Cooperative Organizations to comply with the rules to carry out the initiative in the process of cooperation. Through the cooperative consultation approach to amend and improve the rules in the cooperative action if it is not conducive to the smooth development.' [iii] Cooperative Organizations will have a fully harmonious interpersonal relationship when the control of external demand is eliminated. Trust equality, collective participation, consultation and cooperation allowing members of the organization can actively and effectively play their own intelligence.

(2) Members of the Organization are not required to have homogenous internal competitions which were brought by specialization, but the heterogeneity of mutual cooperation. The tendency of specialization inside of Bureaucratic Organization has brought about a lot of problems. The homogeneity of the competition, exacerbated organizational friction. But the characteristics of the cooperative organization are to let the members of the group work in a team to achieve collective goals. This process requires a mix of different competencies and professional membership. It emphasizes the heterogeneity and complementarity between organizational members. Because each member has a different specialty and role, thus, the competition and internal friction between the homogenized members of the organization are avoided. Moreover, due to the coherence of collective goals and the development of membership. Members of the organization will also help each other to improve the efficiency of cooperation between each other. To promote the

development of learning organization and continue to carry out a virtuous circle.

(3) Cooperative Organizations can break through the closed structure of Bureaucratic Organizations to effectively adapt to rapidly changing external environment. Although the closed system formed by Bureaucratic Organizations can reduce the adverse effects of external factors, but limit the function of an organization. It is difficult to assume more complexity and uncertainty of a strong mandate. However, the Cooperative Organization is an open-ended organizational structure. 'At any given time, environmental control will not be used as a prerequisite for undertaking tasks and achieving mission objectives. It does not create a requirement to control the environment, but the interaction with the environment as its own cooperation mechanism of extroversion.' [i] It relies on no central network system operation. Members of the organization exist as a network 'nodes' and free to combine. According to the complex and volatile tasks to promote rapid changes in organizational members and condensed into a whole. They are conscientiously carry out cooperation to meet challenges. At the same time, when the members of the organization disagree on organizational objectives, a fully open cooperative organization can ensure that irreconcilable organization members will be out of the organization because of differences, while new co-operative members who identify with the common goal flow into the organization. It can effectively unite members of consensus, and quickly converted to organizational collective action.

(4) Cooperation can change the hierarchical organizational level controlled power system. Bureaucratic criticisms include hierarchical complexity, slow decision-making, implementation lag, cost increases, inefficiency, etc. Cooperative network structure is "decentralization, sharing, co-governance", which enable to make the organization and members in the network structure. The interaction between members to achieve the overall efficiency of the organization. The information flow of the cooperating organization can transcend the hierarchical organization's top-down or bottom-up vertical chain by relying on the network structure. Organization members can avoid intermediate links and achieve non-distance communication through the network structure into a multi-directional flow. It can enable all members of the organization to effectively share information, so that the "decision-making - feedback" the activities of this process is greatly compressed. Coordination costs are greatly reduced, thereby improving organizational efficiency. The power of the organization does not depend on hierarchical positions, but rather on the acquisition of information. Each member shares information and other resources equally. Through collective consultation and cooperation to achieve common goals. This allows each member to become the main body of the organization, and then stimulate its creativity and initiative to create a higher performance.

2.2 The Realistic Limitations of Current Cooperation Forward

At present, China's industrialization has not yet been completed, and information technology is just getting started. This economic and social development of reality makes the Bureaucratic form is still able to meet the needs of most organizations to effectively complete the goal. So, Bureaucratic Organizations will still exist in a certain period of time. Therefore, its transition to the Cooperative Organization is a long historical process. At the same time, Partner Organizations as a new phenomenon, which itself also has some limitations.

(1) Cooperative establishment issues in Cooperative Organizations. Since the industrial society, Bureaucratic Organizations in society has been deep-rooted, forming a deep sense of hierarchy. Attendant control, rank, authority and other organizational culture deeply rooted. The biggest problem with current cooperative organizations is that they have not yet cultivated their sense of cooperation. The trust mechanism in the cooperative organization is difficult to establish in a short time. There is currently no effective mechanism for rational allocation and compromise between countries, inter-organizational and inter-personal interests. Therefore, the basis for the establishment of cooperative organizations still need to be further strengthened.

(2) Internal Coordination problems of Cooperative Organizations. Cooperative organization is a network structure, its members are free to flow. Collaborative networks are based on the sharing power and sharing the responsibility among the members of the organization. But if the lack of good communication and coordination platform, information, directives, resources, and sharing cannot be synchronized in time, the coordination between the members of the organization is also difficult to achieve harmony and efficiency. It will bring shuffle between each other, shift responsibility and other issues, and ultimately impede the growth and development of cooperative organizations.

(3) The Problems of Complex Environment in the Development of Cooperative Organizations. Cooperative organizations must embrace the complexity and uncertainty of the environment in an open manner. In the open circumstance to seek cooperation with other organizations and social systems, and then conduct and develop in the cooperation. But highly complex and uncertainty of the information age asks the organization a higher capacity requirements. If the problem of external factors led to the failure of cooperative organizations, it would make the transformation of cooperative organizations have a sense of frustration, and return to the Bureaucratic Organization.

2.3 Network Organizations Play a Connecting Role in the Transition from Bureaucratic Organizations to Cooperative Organizations

Cooperative organizations have proposed the goal of replacing

Bureaucratic Organizations. But the transition from Bureaucracy to Partner Organizations requires overcoming many problems of the Cooperative Organization itself. This period requires an effective organizational form to link Bureaucratic and Cooperative organizations. Harald said, 'The industrial age has given rise to ruthless conflicts because material resources are limited, thereby promoting a 'zero sum game'. However, if it is to share the dominant social information technology, the value will increase. A cooperative problem-solving 'both sum competition' can be formed.'^[i] Network organization as a new way of organization, as an effective link between Bureaucratic Organizations and Cooperative Organizations.

'Network organization' means a group of 'equal' nodes that rely on a common goal or interest to form spontaneously together. The network here is not only referring to the Internet, but also the structure of the shape without the existence of central nodes. Network organizations rely on the information generated by the Internet platform to drive the operation of the organization. The organizational agreement ensures the normal operation of network organizations. The open architecture is constantly looking for and replacing by more appropriate members. Achieving the goal of network organization is through the network member innovation. In a network organization, members are made up of heterogeneous firms or departments with different capabilities and expertise, which does not exist the authoritative power. The process of accomplishing the goal is not the traditional 'command-and-execute' model, but participates in the exchange of information. It is the process of negotiating resources and objectives. Network Organization and Cooperative Organizations have similarities. But the network organizations pay more attention on the Internet platform for coordination, real-time information sharing and contractual agreement to cooperate. To a certain extent make up for the lack of Cooperation Organizations.

2.3.1 Network Organization Cultivating Cooperative Culture

The network organization helps to form the organization member cooperation consciousness and the trust mechanism. With the development of the information society, the general trend of history is the development of knowledge, science and high quality of the whole society. Most of the members of the network organization are highly educated intellectuals. According to the super-Y theory of human nature assumptions, 'They pursue the realization of self-worth, and desire to play their talents. They willing to pay their own creativity and enthusiasm.'^[ii] They attach importance to the realization of 'human value' in the organizational operation. So they are more eager to the organization model is equal consultation plus mutual cooperation. Network organization contains the equality, sharing, decentralization and other characteristics. Members are promoted to deal with business affairs by consultation in the organizational operation. Enhancing the trust between members of

the organization as well as improving the 'social capital'. And constantly create and consolidate the 'mutual cooperation' of the organizational culture. This kind of culture is projected into the society, which can bring the whole society to establish the cooperation consciousness and trust mechanism. Thus, laying the foundation for the development of cooperative organization.

2.3.2 Network Organization Information Sharing Effectively coordinate the Collective Action

Network organization with its advanced technology application form information superiority. It can make every node in the network organizational structure become the center of information centralization and exchange. Eliminating the possibility of information monopoly and breaking the bottleneck of information overload. To solve the problem of information asymmetry coordination. 'The information technology base provides the means for data sharing and integration. The collective decision support series further organizational coherence strengthens.' [i] Network technology greatly enhance the timely processing of information summary. The process from the decision to the implementation to be shortened to the greatest extent. The coordination costs of collaboration among organizational members are maximized. With the transparency and information sharing in the Network Organization, the members can cooperate with each other based on the information transparency.

2.3 Network Organization is More Adaptable in Changing Society

The flexibility of the Network Organizational structural features improves the environmental adaptability of the Network Organization. Network structure to freely combine 'nodes' to seek a better way of coping after Network Organizations are aware of changes in the external environment. Many 'nodes' seek a more perfect combination through the modular design to complete the gradual adaptation to the environment. By constantly changing the modules which are composed of 'node', Network Organization can form a large-scale organizational update and complete the rapid adaptation to the environment. In the face of great uncertainty, the traditional plan and control stretched.

2.4 The Network Organization Also Has the Good Work Efficiency

The Network Organization is the cooperative product among organizations under the open structure. A group of specialized

companies or departments are united by mission objectives. It focuses on horizontal communication and linkages and reduces the power vertical level. Greatly reducing the organization's coordination costs and internal losses. If a department or company in the Network Organization system is dragging down the efficiency of the entire network, it would naturally be removed from the network system. New partner members are always available to assure the completion of organizational goals. Moreover, the Network Organizational structure integrates resources 'borderless' and 'seamlessly'. Search costs have been significantly lowered by the global Internet platform. This not only enables network organizations to seek better resources and staffing on a larger scale than the bureaucratic boundaries, but creates the foundation for finding the right partner.

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A Review of Dunhuang Medical Documents

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Abstract: Dunhuang documents have a history of more than one hundred year since they were discovered. This paper has made a overview for the research findings of Dunhuang documents with respect to medical literatures since the discovery of Dunhuang documents, and meanwhile pointed out the defects of as well as made a prospect of studies on Dunhuang medical documents.

Key words: Dunhuang documents, medicine, overview

1. Research findings

Various Dunhuang documents have been considerably studied as the Dunhuang treasure was found one hundred year ago. The Dunhuang medical documents served as the technology literatures have enjoyed a widespread attention of scholars who devote themselves to the study on Dunhuang medical documents. Domestically, a distinct line for collation and research of Dunhuang medical documents is 1980s. Before 1980s, the collation of Dunhuang medical documents was at early stage with a small number of individual studies. Dunhuang medical documents are scattered around the world as they had been looted by a few foreign explorers soon after discovered. A few studies on Dunhuang medical documents were made mainly by copying, editing and printing, and inscription due to their small amount publicly available. Scholars have followed and studied on the Dunhuang medical documents out of the sensitivity of academic cognition as soon as a bit Dunhuang medical documents were publicized. The important individual studies on Dunhuang medical documents at this stage are illustrated as follows: *The Inscription of Remains of Meteria Medica for Dietotherapy*, written by Tang Lan, (Appendix of Dunhuang Shi Shi Sui Jin, 1924), *Remains of Meteria Medica for Dietotherapy*, written by Wang Guowei, (Appendix of Dunhuang Shi Shi Sui Jin, 1924), *The collation of Remains of Ben Cao Ji Zhu Xu Lu of the Dunhuang Shi Shi Liu Chao Xie Ben*, written by Fan Xingzhun (Fan Xingzhun, 1937), *Remains of Shang Han Lun • Bian Mai Fa Related to the Dunhuang Shi Shi Jiu Cang*, written by Chen Keji (*Ren Min Bao Jian*, 1960), *Investigation of Remains of existing Tang Ben Cao*, written by Shang Zhijun (*Harbin traditional Chinese medicine*, 1960) and *Studies of the Remains of Jiu Fa Tu of Writed and Drew by people of Tang Dynasty*, written by Ma Jixing (*Wen Wu*, 1964).

It is after the 1980s that Dunhuang medical documents have entered a stage of systematic collation and all-around research. Studies on Dunhuang medical documents are in a time of boom with the increasingly growing number of monographies which have been

systematically edited and organized as well as studied with Dunhuang medical documents considered as the theme and various corresponding research literatures publicized. All these contribute to a profound study of Dunhuang medical documents. Scholars have created a new prospect of the systematical research of Dunhuang medical documents by following upon the heels of such seniors as Ma Jixing. Two aspects of Dunhuang medical documents have been studied on the academic circle. The one is the study of literature itself, and the second is intended to explore the phenomena of language and character reflected by Dunhuang medical documents. The next section is to briefly introduce these aspects respectively.

1.1 It is the introduction of the study on Dunhuang medical documents themselves

The fruits of this field are manifested in the searching of Dunhuang medical documents and the corresponding introduction and transcription as well as simple notes.

Ma Jixing is the first person who has collected and organized as well as studied Dunhuang medical documents in a systematical manner. He wrote a book, *Check and Interpretation of Dunhuang Ancient Medical Books* (published by Jiangxi Science and Technology Publishing House), in 1998. This is the first academic monograph that has systematically organized and studied Dunhuang ancient medical books in an all-round way in our Chinese medicine literature, which serves as the pioneer for the systematical and comprehensive study of Dunhuang medical documents. Six aspects have been introduced and described in detail and at length, including source, preservation, organization and study of Dunhuang medical manuscripts, and the features of bibliography of, historical investigation and academic value of manuscripts. 83 types of ancient Dunhuang medical manuscripts have been sorted out into such 11 categories as medical classics and five internal organs and the full content of every paper transcribed by means of definition, annotation, transcription and addition of feeds and notes. A brief explanation and description to language and character used in the Dunhuang medical documents has also been made. It is commented that this book boasts

for its extensive contents and abundant materials and precise and detailed verification and that it is an excellent reference book for the researchers who are engaged in ancient medical literatures (China News of Traditional Chinese Medicine, 1987).

Edition and Proofreading of Dunhuang Medical Documents, written by Ma Jixing et al. (publicized by Jiangsu Classics Publishing house) has recorded more than 80 books of existing Dunhuang medical documents both at home and abroad. The preface of book consists of such five aspects as organization and study of Dunhuang medical documents, bibliographic characteristics, historical investigation and academic value of Dunhuang medical documents. It has divided all types of medical literatures into four categories such as classics of medical diagnostic method, classics of medicine and medical books, classics of acupuncture therapy and other classics of medicines (with medical historical resources attached). Each chapter of books is composed of explanation to the title, article and annotation. As to the explanation to title, it has investigated the existing situations of manuscripts, the source of version, main content and the times for the first appearance of books and copies. The explanation to article has written with modern prevailing traditional Chinese and punctuation mark with vertical columns. But more valuable is that it has taken the word arrangement of the original into consideration for the first time compared with similar research.

Ma Jixin's *Research on Unearthed Lost Ancient Medical Books* (publicized by Publishing House of Ancient Chinese Medical Books) has extensively collected national medical literatures and cultural relics unearthed and scattered before Qin and Han Dynasty with Dunhuang medical documents included. It has also introduced the situations of unearthed literatures and cultural relics and described their contents and scattered conditions, literature value and their meanings for Chinese medicine treasure house.

Check and Interpretation of Chines Unearthed Ancient Medical Books (published by Shanghai Science and Technology Press, 2015), the latest book of Ma Jixin, consists of three volumes including Vol. 1, Vol. 2 and Vol. 3. The first volume is the summary of the source, research, collection, literature feature and academic value of unearthed ancient medical books. The Vol. 2 and Vol. 3 have respectively transcribed and studied the Dunhuang ancient medical books, Wuwei medical bamboo literature in Han dynasty and medical books unearthed in Han tomb at Mawangdui. The printed unearthed literature shadowgraphs have been attached in corresponding parts of Vol. 2 and Vol. 3 for transcription and research. The contents are composed of such four parts as the summary and demonstration of academic achievements, the repair and restoration of historical literatures, the annotation and explanation of general ideas of literatures and the supplement and

correction of rare classics (details can be referred to the preface of this book). 111 types of Dunhuang medical documents have been recorded in "Check and Interpretation of Dunhuang Ancient Medical Books" (some individual remains of medical books and two types of documents of drug price unearthed in Turpan are included). It can be considered as the supplement or the second edition of the *Check and Interpretation of Dunhuang Ancient Medical Books*, as their classification, layout and contents of this book are similar with each other.

The *Quintessence of Dunhuang Medicine---Proofreading and Interpretation of Dunhuang Reminds of Medical Anthology*, compiled by Zhao Jianxiong, publicized by Guizhou People's Publishing House in 1988, is constituted by 17 volumes with 7 volumes of medical manuscripts selected from Dunhuang medical documents, 4 volumes of Compendium of Materia Medica and 4 volumes of Medical Prescription. The layout of book is divided into four parts including the original, annotations, corrections and notes. It mainly consists of Dunhuang medical documents and handed down medical books with a few annotations. It is noticeable that the records in the book tend to be isolated with the original or have some errors or are similar with handed down literatures by and large.

Cong Chunyu's *Dunhuang Complete Works of Chinese Medicine and Pharmacology* (publicized by Publishing House of Ancient Chinese Medical Books in 1994) has recorded 88 volumes of Dunhuang ancient medical books which have been organized to be compiled into 102 volumes of independent ancient medical books according to the contents of the medical manuscripts. All new independent books have been described from 7 parts including label, title, outline, the original, determination, annotation and note. It emphasizes both on existing research fruits and investigation combined with clinical practices.

Wang Shumin wrote the *Shadowgraphs, notes and Commentaries of British Collected Dunhuang Medical literature* published by people's Medical Publishing House in 2012, where the word "Zhu" refers to the notes and the word "Shu" means commentaries. This book is comprised of such two parts as chapters of shadowgraphs and commentaries. It has four features that it is the first one which includes 150 color high definition copies, that it makes composition for 11 remains of Dunhuang medical documents, that it has transcribed and corrected the written manuscripts again and that it has added commentaries for medical literatures (all details can be referred to the Preface). 29 types of British collection of Dunhuang medical documents have been recorded in the chapter of commentaries and have been divided into five categories including classics of medical diagnostic methods, Chinese herbal, moxibustion methods and medical methods. The combination of color high definition picture with annotation of British collection of Dunhuang

medical documents is a significant originality that reminds scholars of Dunhuang medical documents of trying to make use of original color pictures when making research so that some unnecessary errors can be avoided through reading original color photos. The correction quality of book has further improved and is loyal to the original compared with those of other books as it is corrected and recorded in accordance with the original color photos of Dunhuang documents. The author also has brought out new thinking of difficult questions in the Dunhuang medical documents.

Chen Zengyue's *Revision and Demonstration of Dunhuang Ancient Medical Books* published by Guangdong Science and Technology Press in 2008 has focused on two aspects based on the previous research. Firstly it has rechecked and reexamined the original and made up some deficiencies and corrected some errors. Secondly, the use of convergence and annotation methods makes various versions and different opinions be reflected as they are (all these can be referred to the reference). The emphasis of book is on the organization and annotation of language and character compared with those of other books, contributing to the innovation and harvest now and then. However, the shortage of correction with reference to the original Dunhuang medical documents is one of deficiencies for this book as the so-called recheck and reexamination of the original has in fact only make a comparison among several records of organized books.

Explanations of Russian Collection of Dunhuang Medical Documents, written by Li Yingcun, Li Jingang and Shi Zhenggang, (Published by Technology of Gan Su Publishing Press in 2008), is the first book which has systematically collected and organized Russian collection of Dunhuang medical documents. It consists of eight chapters. The first is the introduction of the source and preservation and study status as well as academic values of Russian collection of Dunhuang medical documents. The rest of chapters have recorded 31 types of explanations of literatures related to the medicine, consisting of medical theories, diagnostic methods, medical prescriptions, acupuncture, medical knowledge obtained from the remains of books and penmanship of Chinese private school, Confucian medicine and remained books concerned and the divination books related to diseases respectively.

Yuan Renzhi's doctoral dissertation of *Collation of Dunhuang Turban Medical Scrolls and A Documental Research on it* (Nanjing University of Traditional Chinese Medicine, 2010) has re-corrected for parts of Dunhuang Turban Medical Scrolls and made the first corrections and records for parts of Russia and Japanese collection of medical manuscript. It also has illustrated the errors made by previous personnels during the correction of Dunhuang medical volumes. Such issues related to literatures as the advert and spread as well as constitution of Dunhuang medical volumes in Turban and the

definition, exploration and combination of these manuscripts have studied in it and five new types of combination relationship between Dunhuang medical manuscripts have also been published in this article.

Ma Anya has searched and checked the information about Dunhuang documents by himself by taking advantage of his language and identity. As a result, in his master thesis (Nanjing University of Traditional Chinese Medicine, 2010), *Collected Studies on the Dunhuang Medical Manuscripts*, it has not only corrected many a error related to the basic information of Dunhuang documents in the existing studies, including such aspects as volume number, relationships among fragments of literatures and forms and formulation of literatures but also explored the nature of Dunhuang manuscripts recorded in previous studies.

1.2 Studies on the language and character in the Dunhuang medical documents

Recently years, there are a great number of mater thesis which have taken Dunhuang medical documents as materials for their thesis to study the language and character of these literatures, including Qiao Xin's *The Study of Medical Terms in Dunhuang Medical Volumes* (Southwestern University, 2011), Qian Tingting's *A Study of Difficult Characters in the French Collection of Dunhuang Medical Manuscripts* (Nanjing University of Chinese Medicine, 2012), Sun Zhaojie's *The Study of Common Chinese Character in Dunhuang Chinese Medical Literature* (Guangzhou University of Chinese Medicine, 2012), Zhu Ruoling's *The Study on difficult understanding Characters in British Collection of Dunhuang Medical Manuscripts* (Nanjing University of Chinese Medicine, 2014). Shen Pengnong's *A Research into Character Usage in Ancient Classics on Traditional Chinese Medicine* (Academy Press, 2007) has included various terms related to Dunhuang medical documents although it is not a book designed to make a research on the Dunhuang medical documents. The author has made a profound exploration to the character usage in ancient classics with Dunhuang medical documents included by means of language and character methods based on his many years of experience, intensive academic knowledge. It is a high-level monograph with excellent insights and a wide range of innovations.

Apart from these publications, there are many individual research manuscripts that have studied Dunhuang medical documents from various perspectives. They won't covered in here.

2. Shortages and expectations

Although academic circle has made great achievements on the organization and research of Dunhuang medical documents, a great deal of problems related to the correction of and character research on Dunhuang medical documents remain to be solved. It is as a

result of the unique nature of Dunhuang medical documents. Dunhuang medical documents, which belongs to the technology literature, has professional and industrial features. As a result, scholars studying language and character have hardly devoted themselves to it. Most scholars committed to the organization and study of Dunhuang medical documents are those with Chinese medical literatures or Chinese medical history background since a phase of systematical organization of and well-round research on Dunhuang medical documents was developed in 1980s. Therefore, scholars of Chinese traditional specialties endowed with advantaged conditions have made great achievements in the study on Dunhuang medical documents from the perspective of their profession. However, on the other hand, "specialty" is a double-edged sword. As scholars have already worked on certain a specialty, it means these scholars are of little chance to have a profound understanding of other specialties. It is well known that scholars have been shocked by the fact that Dunhuang medical documents are the sink of Chinese common character and full of the corruption of common character. The deficiency of correction of the original of Dunhuang

medical documents of scholars are reflected as the following two aspects. The one is that scholars have made relatively many errors when correcting the Dunhuang medical documents due to some reasons. The other is that scholars have no enough competence to address difficult understanding characters which are spread over Dunhuang documents, making these complicated problems unsolved as yet.

The rapid development of discipline of Chinese common characters enjoyed in recent 30 years has witnessed a fruit of academic achievements with high quality. Scholars have summarized a wide range of effective methods for the research of difficult understanding common characters. As a result, the study on texts of Dunhuang medical documents will be further developed if scholars are able to make a profound study on difficult understanding characters and correction of Dunhuang medical documents by making use of new achievements and methods of discipline of language and character based on the full absorption of existing findings made by Chinese medical scholars.

Risk Assessment: The Influence of Emotion and Distraction

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Abstract: To investigate if emotion influences risk assessment, and to determine if this effect depends on the opportunity and time available for deliberation, we replicated an experiment of Finucane and colleagues by offering participants two kinds of affective information (low benefit vs. high benefit) and two different judgment conditions (immediate judgment vs. deliberation prior to judgment). We also included a distraction judgment condition to test how the passage of time affects emotion's influence on risk assessment. The hypothesis tested here was that individuals' risk assessment would be influenced by the high and low benefit affective conditions, and that this influence would change per whether participants made these judgments immediately, after time for deliberation, or after a period of distraction. The results showed that neither the main effects of affective information and judgment condition nor the interaction between these two factors were significant, with all F 's < 1 , all p 's $> .394$. Thus, the findings of Finucane et al. we're not replicated in the current study. Exploratory analyses suggested that a possible reason for this replication failure may be that the items we used were not novel, and therefore less likely to show an effect of the information we provided about them.

Key words: Risk assessment, affective conditions, judgment conditions

The Influence of Emotion and Distraction in Risk Assessment

Decisions under uncertainty always involve risks, which refer to the possibility of injury, harm, or other adverse and unwanted effects (Baron, 2000). Risks are commonplace in our daily life, from industrial explosions, workplace injuries, injury or death from diseases, natural causes, lifestyles, and voluntarily pursued activities to the impacts of economic development on ecosystems (Borouh & Garant, 1998). The fact is that when making judgments of risk, there seem to be some biases such that people often think some items are more risky than others. To improve public understanding of risks, facilitate public participation in risk-related decision making, and improve the management and regulation of risks, it is important and necessary to understand how risk assessment works.

Real Risk and Perceived Risk

Across the academic field of risk assessment, based on the idea that risk is the collection of things that could happen, and how likely each will happen, technical and economical approaches hold that risk is an objective quantity that can be expressed as: Risk = \sum (Probability * Damage) (Kane, 1992). The approaches assume that individuals' risk assessments should be as rational as can be achieved (Cameron, 2003). However, psychological research into risk assessment has shown that risk behavior follows from risk perception even if the perception is not necessarily based upon rational assessments (e.g. Slovic, 1999; Morrow, 2009). For example, According to the World Health Organization (2013), road traffic injuries caused an estimated 1.3 million deaths worldwide per year, while there are statistics showing that only about 4,900 people died

as a result of nuclear power between 1971 and 2009, mostly from workplace accidents and radiation fallout (Kharecha & Hansen, 2013). Based on these data, it is obvious that driving cars is more risky than living near a nuclear power plant. However, the fact is that people drive cars every day but are extremely fearful of living near a nuclear power plant. This example shows the difference between real and perceived risk. Perceived risk reflects a more intricate understanding of the world which could be influenced by a lot of factors.

Factors which influence people's perception of risk can be mainly divided into two categories. One is connected with the actual properties of corresponding items, such as voluntariness, catastrophic potential and novelty. To be specific, there are studies that suggest that people's risk perception is influenced by voluntariness, such that people were found to be more willing to accept voluntary risks (e.g. smoking, driving a car) than involuntary risks (e.g. a nuclear disaster) (Starr, 1969). As to novelty of risks, Slovic (1987) noted that compared to known risks, people tend to be more worried about unknown risks, which indicate that if the risk occurs as part of familiar or well-known system (e.g. traffic accident), respondents would show little concern about it compared to a poorly understood risk (e.g. nuclear reactor, genetically modified food). Furthermore, previous research also showed that people would judge items to be more risky if they perceived potential for disaster of the item, as well as when they perceive less controllability over the item.

The second category of factors that could influence individuals' risk perception and behavior can be described as subjective feeling, which pertains to the influence of emotion in risk perception and risk taking. Except for these two categories, many research have shown

that factors such as gender difference (e.g. Gustafsson, 1998; Byrnes, Miller, & Schafer, 1999; Slovic, 1999; Harris, Jenkins, & Glaser, 2006; Fetschner, Anderson, & Cullen, 2010), and personality (e.g. Fenton-O’Creevy, Soane, & Willman, 2001; Nicholson, Soane, Fenton-O’Creevy, & Willman, 2005; Soane, Dewberry, & Narendran, 2010) also have influence on individuals’ judgment of risks.

The Role of Emotion in Risk Assessment

Nowadays it is widely believed that emotion plays an important role in risk assessments. However, prior to the early studies by Fischhoff and colleagues (Fischhoff, Slovic, Lichtenstein, Read, & Combs, 1978) which revealed that people’s risk assessments are influenced by dread, emotion was assumed to be just a consequence of cognitive evaluation which has no direct input into decision making (Hardman & Hardman, 2009).

More recent studies placed emotion on an equal footing with cognitive evaluation, suggesting both emotion and cognitive evaluation can directly influence people’s judgments without the mediation of the other. According to the “affect-as-information” theory (Schwarz & Clore, 1983), when making judgments, people’s evaluative reactions to the objects of judgment are directly influenced by their feelings toward the objects such that people like what they feel good about and dislike what they feel bad about (Clore & Storbeck, 2006; Storbeck & Clore, 2008; Clore & Palmer, 2009). More directly relevant to the influence of emotion on the judgment of risk, the dual-process theory of information processing (Chaiken & Trope, 1999) holds that risk is perceived and acted on in two fundamental ways: the analytic system brings logic, reason, and scientific deliberation to bear on risk assessment (Slovic, Finucane, Peters & MacGregor, 2004; Slovic & Peters, 2006), whereas the experiential system refers to individuals’ fast, instinctive, and intuitive reaction to risks. A more important role of emotion in risk assessment was highlighted by risk as feeling hypothesis proposed by Loewenstein and colleagues (Loewenstein, Weber, Hsee, & Welch, 2001). This theory holds that people’s emotional reactions to risks may diverge from their cognitive evaluation of these risks, and when such divergence occurs, emotion could often drive people’s judgments. Specifically, according to risk as feeling hypothesis, when people are asked to assess the risk of some activity or technology, their judgment will be based on their emotional response to the item being judged such as worry, fear, dread or anxiety (Loewenstein et al., 2001; Slovic et al., 2004).

The notion that risk assessment may be influenced by emotion led some researchers to propose that people make use of a so-called affect heuristic in judging risk. The idea is that when people need to make their decisions they experience a feeling state demarcating a positive or negative quality of the stimulus, which was characterized as the affect heuristic. People’ risk assessments are influenced by the feelings that they associate with a stimulus (e.g., liking or disliking)

and this is a subconscious process that shortens the decision-making process and allows an individual to function without having to complete an extensive search for information (Alhakami & Slovic, 1994; Finucane et al., 2000; Slovic et al., 2004; Slovic, Peters, Finucane, & MacGregor, 2005). To be specific, the research of Finucane and colleagues (Finucane et al., 2000) found that peoples’ judgment of risk can be influenced by their emotional response to the item being judged: Positive emotions can lead people to judge an item as less risky or more beneficial, whereas negative emotions can lead people to judge the item as more risky or less beneficial.

Outline of the Current Study

The purpose of the current study was to replicate and extend an earlier study by Finucane and colleagues (Finucane et al., 2000) who found that peoples’ judgment of risk can be influenced by their emotional response to the item being judged. Specifically, this study found that if people first read a description that presents many benefits of a certain technology or activity, then they will judge this technology or activity as less risky than when they first read a description of the same item that presents the disadvantages of the item. The interpretation of this result is that the descriptions lead to an emotional response to the item, which then in turn influences the judgment of risk, with more positive emotions leading people to judge an item as less risky (e.g., someone who enjoys riding a motorcycle will judge this activity as being less risky than someone who does not enjoy riding a motorcycle). To replicate this effect, we offer participants two kinds of affective information (low benefit vs. high benefit). We predict that high benefit information would arouse positive affect which will lead the participants to make low risk judgments. In contrast, negative affect caused by low benefit information would be expected to lead to higher risk judgments.

A large number of previous studies on risk assessment suggest that emotions have a stronger impact on risk assessment when the opportunity for analytical thought is reduced, for instance by putting people under time pressure (Finucane et al., 2000). In the current study, we created three different judgment conditions such that participants had to judge the risk of an item immediately after reading the description, after a period of deliberation, or after performing another unrelated task (the word-search puzzle task).

Aside from including the exact same conditions (immediate and deliberation judgment conditions) used by Finucane and colleagues (Finucane et al., 2000), in our experiment, we thus also included a third condition in which participants had to do a word-search puzzle before indicating their judgment. The reason for including this condition is to determine if the effect of emotion becomes stronger or weaker with the passage of time, when there is no chance to deliberate due to the requirement to do the word-search puzzle. According to the theory of unconscious thought (Dijksterhuis, 2004; Dijksterhuis & Nordgren, 2006), a brief period of distraction can

lead to better, more rational judgments in case of a difficult choice, thus suggesting that the influence of emotion would be reduced when the judgment is made after a secondary, distracting task (Calvillo & Penalzoza, 2009). Specifically, the unconscious thought theory (UTT) holds that the processing capacity of consciousness is limited, which would prevent participants from taking all information into consideration when dealing with complex decisions, while the processing capacity of unconscious thinking is believed to be enormous. Thus decisions about simple issues can be better tackled by conscious thought, whereas decisions about complex matters can be better approached with unconscious thought (Dijksterhuis, 2004), an effect referred to as the unconscious thought advantage (UTA) (Dijksterhuis & Nordgren, 2006).

All in all, in the present study we replicated the experiment of Finucane and colleagues (Finucane et al., 2000) by offering participants two kinds of affective information (low benefit vs. high benefit) and two different judgment conditions (immediate judgment vs. deliberation prior to judgment). Moreover, we included a distraction judgment condition to test how the passage of time affects emotion's influence on risk assessment. The primary hypothesis tested here was whether individuals' risk assessment was influenced by the high and low benefit affective conditions, and to what extent the influence would change according to whether participants made these judgments immediately, after time for deliberation, or after a period of distraction.

Method

Participants

Thirty-six undergraduate Psychology students from the University of Groningen voluntarily participated in the study in return for course credit. The participants included 17 males and they had a mean age of 20.5 years ($SD = 1.5$, age range: 18-24 years).

Materials

The experiment was conducted on a computer using a program written in E-prime 2.0. The stimulus materials included 48 vignettes that described information about twenty-four items. These items included products, activities and technologies (e.g. alcoholic beverages, natural gas, and online shopping). For each item, we created two vignettes of which one described a large number of benefits for the item (high-benefit condition), whereas the other described disadvantages of the item (low-benefit condition; see Appendix for the vignettes). The vignettes consisted of a definition of the item, and a specification of its advantages or disadvantages. For the vignettes in the low-benefit condition, we either described disadvantages of the item itself, or we described the advantages that other alternatives would have over this item, thus two kinds of low-benefit structure were created (describe disadvantages vs. compare to alternatives). The vignettes differed in terms of their length, with the number of words ranging from 79 to 208 (mean = 119.06 words).

In the distraction condition, a word search puzzle was used to distract participants prior to assessing the risk of an item. The puzzle consisted of the presentation of a 10 by 10 array of letters that were indexed by the numbers from 1 to 100. Below the array, a word was shown, and the task for the participants was to find this target word in the array. The words used as targets denoted the names of countries and vegetables and they could be written in any direction along the horizontal, vertical and diagonal axes of the array.

Aside from the vignettes and word search puzzle, the stimulus materials included the Cognitive Reflection Test (CRT) (Frederick, 2005). This test consists of three mathematical puzzles that each strongly suggests an incorrect intuitive answer. To reach the correct answer, participants need to move beyond this intuitively appealing answer and to apply analytical thinking using appropriate mathematical formulation. For example, the first item of the CRT states: "A bat and a ball cost \$1.10. The bat costs \$1.00 more than the ball. How much does the ball cost?" Here, the incorrect intuitive answer is 10 cents, while the correct answer is 5 cents. The CRT was administered as a paper and pencil test.

Design

The experiment consisted of a 3×2 within-subjects design, including as factors the nature of the vignette (low vs. high benefit), and the condition under which a risk judgment had to be made (immediate judgment, distraction prior to judgment, or deliberation prior to judgment). The two different types of vignettes were used equally often across the three judgment conditions. Specifically, we first randomized the set of 24 items and then created six different versions of the task in which each item would occur once in a particular judgment condition, in either the high or low benefit condition (see Table 1). This ensured that any difference across the judgment and affect conditions could not be ascribed to the usage of different items in these conditions.

The order in which the conditions and vignettes were presented was fixed for each of the six versions of the task. The judgment condition was blocked, with the order of the three judgments conditions being counterbalanced across participants. Within each judgment condition, half the participants first received high-benefit vignettes for four items and then received low benefit vignettes for the next four items whereas the order of these two types of vignettes was reversed for the remaining participants. By presenting the high and low benefit vignettes in a blocked fashion, we replicated Finucane and colleagues (Finucane et al., 2000) design.

Procedure

At the beginning of the experiment, participants were instructed that they would first be asked to read a short description about a certain item and that they would then later be asked to assess the risk of this item using a 7-point scale which ranged from "not at all risky" to "very risky". Then participants were informed that the experiment included three judgment conditions that differed in

whether the risk judgment had to be indicated as quickly as possible after reading the vignette (the immediate judgment condition), after unlimited time for deliberation (the deliberation condition), or after first doing the word search puzzle for a period of one minute. Participants were instructed to read the vignettes carefully, and only once, before continuing to next phase of the task.

After this instruction, participants performed one example trial for each of the three judgment conditions and they then continued with the risk assessment task. Upon completing the risk assessment task, participants performed the CRT. In total, the study took about 45 minutes.

Method of Analysis

Given the 3×2 within-subjects design of this study, the plan for data analysis was to examine whether risk assessment was influenced by affective information (as manipulated by the low vs. high benefit vignettes), judgment condition (immediate judgment, distraction prior to judgment, or deliberation prior to judgment), and the interaction between these two factors. To analyze these effects, we used a repeated-measure ANOVA (RM-ANOVA) as the data were found to meet the assumptions of this type of analysis. Specifically, the risk assessment ratings were found to be normally distributed for all cells in the design using descriptive statistics (explore), except for the deliberation condition with high-benefit information ($p = .036$, all other p 's > 1.2). According to Steven (2009), such a singular violation of the assumption of normally distributed outcomes does not pose a significant threat to the power of the analysis of variance, and therefore we chose to use an RM-ANOVA for examining the effects of judgment conditions and benefit information.

Aside from examining the hypothesis that risk assessment would be influenced by affect to different degrees in the different judgment conditions, we also conducted a number of exploratory analyses to examine potential individual differences related to gender and performance on the CRT score, and to examine potential differences between the items used for the risk assessment task. For the CRT analyses, two groups of participants were created based their responses to the three items. Specifically, participants received a score of 1 if they gave the correct answer for an item, they received a score of -1 if they gave the incorrect intuitive answer, and they received a score of 0 in case their answer was incorrect, but not intuitive. Participants for whom the summed score across the three items were lower than 0 were considered to be intuitive thinkers, whereas participants for whom with a summed score above 2 were considered to be analytical thinkers.

Results

Theory-driven Analyses

The primary question of interest was whether the extent to which risk assessment was influenced by the high and low benefit conditions differed depending on whether participants made these

judgments immediately, after time for deliberation, or after a period of distraction. To address these matters, we conducted a 3×2 (Affective information [low benefit, high benefit] × Judgment condition [immediate judgment, distraction prior to judgment, deliberation prior to judgment] repeated-measures ANOVA (RM-ANOVA). The results showed that neither the main effects of affective information and judgment condition nor the interaction between these two factors were significant (all F 's < 1 , all p 's $> .394$). Taken together, these results show that judgments of risk were not influenced by the high and low benefit information regardless of whether participants had time to deliberate about this information, thus indicating that the earlier findings of Finucane and colleagues (Finucane et al., 2000) were not replicated successfully in this study.

Exploratory Analyses

To determine the possible reasons for why we failed to replicate the findings of Finucane et al. (2000), we conducted a series of exploratory follow-up analyses to examine potential effects of gender, analytical vs. intuitive thinking, and the different structures of the vignettes we created for the items.

Effects of Gender. In order to examine if risk assessment differed between male and female participants, we conducted a RM-ANOVA with judgment condition and affective information as within-subject factors and gender as a between-subject factor. Consistent with previous results of theory-driven analyses, this analysis yielded no significant main effects or interaction of judgment condition and affective information (all F 's < 1 , all p 's $> .05$). Interestingly, however, the analysis did reveal a significant main effect of gender, $F(1, 34) = 14.406$, $p = .001$. Furthermore, the interaction between affective information, judgment condition and gender was marginally significant, $F(2, 68) = 2.686$, $p = .075$, suggesting that the influence of affect differed across judgment conditions for male and female participants. To further characterize this interaction effect, we chose to contrast the two conditions that were also included in the study of Finucane and colleagues (Finucane et al., 2000), namely the deliberation and immediate judgment conditions, for male and female participants separately. The results for the male participants showed a marginally significant interaction between affective information and judgment condition, $F(2, 16) = 3.972$, $p = .064$. As can be seen in Figure 1, this interaction appeared to be due to the fact that the low and high benefit information only led to different risk assessments in the deliberation condition and not in the immediate judgment condition. Indeed, follow-up tests showed that there was a significant effect of affective information in the deliberation condition, $F(1, 16) = 4.707$, $p = .045$. In contrast, there was no significant effect of affective information in the immediate judgment condition, $F(1, 16) = .009$, $p = .928$. As can be seen in Figure 2, the results for female participants differed from those of the male participants in that the difference between the low and high benefit conditions was small and

non-significant ($F(1, 18) = .094, p = .763$) in both the deliberation judgment condition and immediate judgment condition. Indeed, the results for female participants did not show any significant effects (all p 's $> .304$).

Taken together, these results suggest that males and females think in different ways when judging risks about technologies or activities. Specifically, male participants tend to judge risks as smaller than the female participants. Furthermore, the influence of different judgment condition (immediate judgment, distraction prior to judgment, deliberation prior to judgment) differs in gender, indicating a different effect of conscious and unconscious thinking (manipulated by the time for thinking) on risk assessment between males and females. Lastly, emotion's effect on risk assessment under different judgment condition differs between males and females. To be specific, the influence of the affective information took a bit of time to accrue in the male participants, as the opportunity to deliberate appeared to increase the effect of affective information on males' risk judgment. In contrast, the affective information had no influence on risk assessment in female participants, regardless of judgment condition.

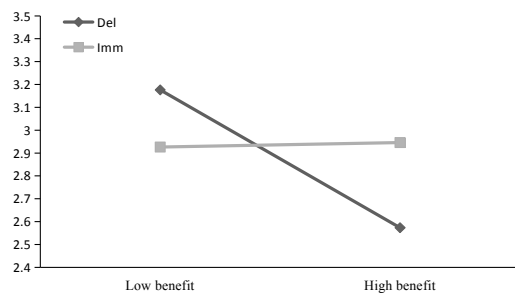


Figure 1. Mean risk assessment ratings for male participants in the deliberation and immediate judgment conditions, shown separately for the low and high benefit conditions.

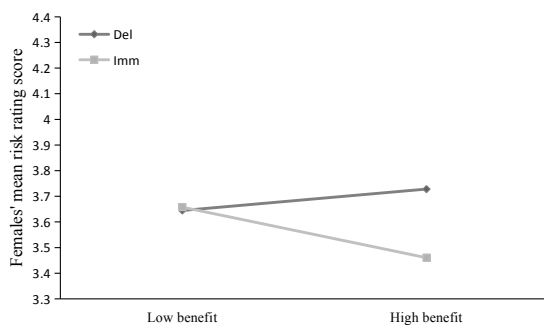


Figure 2. Mean risk assessment ratings for female participants in the deliberation and immediate judgment conditions, shown separately for the low and high benefit conditions.

Effects of Intuitive vs. Analytical Thinking Style. To contrast the results for intuitive and analytical thinkers, two groups of participants were created based on their performance on the CRT.

The results for these two groups were contrasted using an RM-ANOVA with judgment condition and affective information as within-subject factors, and the CRT group as a between-subject factor. The results showed that the main effects were insignificant (all F 's < 1 , all p 's $> .18$), as were the various two-way interactions (all p 's $> .092$) and the three-way interaction between Affective information, Judgment Condition and the CRT group, $F(2, 38) = .29, p = .75$.

Effects of the Different Types of Vignettes. To examine whether the results differed depending on the structure of the low-benefit vignettes used for the different items, we examined whether there was an interaction of affective information and the two types of structures used for the negative vignettes. A 2×2 (Affective information [low benefit, high benefit] \times Low benefit structure [describe disadvantages, compare to alternatives]) within-subjects design using a RM-ANOVA yielded no significant effects (all $p > .188$), indicating that the results did not differ depending on the structure of the negative vignettes.

Discussion

The observation that people's judgment of risks is influenced by feelings such as worry, fear, dread or anxiety (Loewenstein et al., 2001; Slovic et al., 2004), suggests that risk assessments are influenced by emotion (Hardman & Hardman, 2009). The study of Finucane and colleagues (Finucane et al., 2000) offers a better understanding of the role of affect in risk judgments by showing that if people first read a description that presents many benefits of a certain technology or activity, then they will judge this technology or activity as less risky than when they first read a description of the same item that presents the disadvantages of the item.

In the current study, we replicated and expanded the study of Finucane et al. (2000) to further test the role of emotion in risk assessment and to determine whether the effect of emotion becomes stronger or weaker with the passage of time. To this end, we conducted a 3×2 (Judgment condition [immediate judgment, distraction prior to judgment, deliberation prior to judgment]) \times (Affective information [low benefit, high benefit]) within-subject experiment. Our primary objective in this study was to determine whether risk assessment was influenced by the high and low benefit affective conditions, and to what extent the influence depended on whether participants made these judgments immediately, after time for deliberation, or after a period of distraction.

Contrary to our expectations, the results of the experiment showed that individuals' judgments of risk were not influenced by the high and low benefit information regardless of whether participants had time to deliberate about this information. Thus, the earlier study of Finucane et al. (2000) was not replicated successfully in our study. To determine the possible reasons for why we failed to replicate the findings of Finucane et al. (2000), a series of exploratory follow-up analyses were conducted to examine

potential influences of gender, analytical vs. intuitive thinking, and the different structures of the vignettes of the items. The results of these analyses showed that there were no effects due to the different structures of the vignettes, and they also showed no differences between participants who were classified as analytical or intuitive thinkers, based on the CRT (Frederick, 2005). Interestingly, however, the results of the exploratory analyses did show some effects of gender. Specifically, these results suggest that males and females think in different ways when judging risks about technologies or activities. Specifically, when involving gender as a factor, we found a main effect of gender, with males judging the items to be less risky overall than females, and a trend towards an interaction of gender, affect, and deliberation condition, with male participants showing an effect of the affective information only in the deliberation condition.

Gender Differences in Risk Assessment, Intuitive Thinking, and Emotion.

In demonstrating that male participants tend to judge risks as smaller than the female participants (e.g., Byrnes et al., 1999; Croson & Gneezy, 2009; Fletchner et al., 2010), the results of the current study are consistent with a comprehensive meta-analysis of the psychological research on gender differences in risk taking conducted by Byrnes and colleagues (Byrnes et al., 1999). In this study, Byrnes and colleagues reviewed 150 relevant studies and found that although the effect of gender difference on judgment of risks varies with age and the context of the decisions, females are consistently less likely to take risks compared to males. More recently, a study carried out by Croson and Gneezy (2009), which summarized the experimental literature on gender differences in preferences, also found females to be more risk averse than males.

One widely accepted explanation offered for gender differences in risk taking is related to the differences in emotional reactions to risky situations. This approach holds that women experience emotions more strongly than men (Croson & Gneezy, 2009). Specifically, women are more likely to experience negative outcomes (Fujita, Diener, & Sandvik, 1991) and feel fear (Grossman & Wood, 1993) when facing risks. According to risk as feelings hypothesis and affect heuristic, when people are asked to assess the risk of some activity or technology, their judgment will be based on their emotional response to the item being judged such as worry, fear, dread or anxiety (Loewenstein et al., 2001; Slovic et al., 2004). As a result, one might expect that female participants are more likely to be influenced by the manipulations of affect such as that used in the current study. Another reason why this may be the case is that female participants are known to rely more strongly on intuition than male participants, who instead have been found to rely more on analytical thinking (Frederick, 2005). Since the influence of emotion is thought to be weakened by analytical thinking (Finucane et al. 2000), one could thus argue that female participants would be more likely to show an influence of the affective information than male participants.

Interestingly, however, even though our results did replicate the finding that male participants scored significantly higher than female participants on a test of analytical thinking ($M = 2.18$ vs. $M = 1.44$, $t(34) = 11.11$, $p = .004$), we found that female participants were not influenced by the affective information regardless of judgment condition, whereas our male participants only showed evidence for such an effect in the deliberation condition of our study. Evidently, these findings are inconsistent with a large number of previous studies showing that analytical thinking weakens the effect of emotions on risk assessment, but it is important to bear in mind that these effects were derived from a non-significant trend obtained through an exploratory analysis of our data. Accordingly, these results should first be replicated before they can be subjected to theoretical interpretation.

Known vs. Unknown Items in Risk Assessment

In considering alternative reasons for why we failed to replicate the basic observations of Finucane and colleagues (Finucane et al., 2000) it is of interest to note that the items we used in our study were drawn from the study of Finucane et al. (2000). Arguably, people have come to be more knowledgeable about the potential risks and benefits of these items in the years since Finucane's study, and as a result, the positive or negative vignettes we presented about these items may not have had a large impact on people's judgment of risks, the idea being that if people already know a lot about something, giving them some additional information may not lead to a large change of opinion, as intended by our positive and negative vignettes.

To examine the validity of this line of reasoning, we conducted a further exploratory analysis in which we selected 6 items (online shopping, home schooling, surfing internet, traveling solo, credit cards, and TMS) which were created by ourselves and which may be considered as relatively unfamiliar compared to the items used by Finucane and colleagues (Finucane et al., 2000). Interestingly, the results for this subset of items did show a significant main effect of affective information ($F(1, 22) = 4.97$, $p = .036$). Accordingly, these findings may be seen as preliminary support for the idea that we failed to replicate the emotion effect found by Finucane et al. (2000) due to the fact that the items we used did not include enough novel items for which the vignettes could lead to a strong effect..

Two Definitions of Affect in Risk Assessment

A last point of discussion regarding our failure to replicate the findings of Finucane and colleagues (Finucane et al., 2000) is that the study of Finucane and colleagues appear to be unique in demonstrating that providing people with high or low benefit information about a particular item leads to differences in risk assessment. Specifically, an interesting thing we found was that although the same term 'affect' was used to denote emotion in most studies of emotion's influence on risk assessment, the definition for affect is not consistent among these studies (e.g., Sjöberg, 2006;

Wardman, 2006). Specifically, most studies examining the role of emotions in risk assessment have focused on the influence of the moods that people experience, for example, happy, sad, dread, angry (e.g., Riener, Stefanucci, Proffitt, & Clore, 2003; Stefanucci, Proffitt, Clore, & Parekh, 2008), while the study by Finucane et al. (2000) is the sole study that suggests that providing participants with information about the qualities of an item can also lead to a corresponding effect on risk assessment. Accordingly, the current failure to replicate may be seen as an important methodological contribution as it suggests that while the effects of moods may be easily replicable, the effects of affect may be much more difficult to replicate.

General Conclusion of the Current Study

Although further work is required to gain a more complete understanding of the influence of affect in risk assessment, our findings do raise some important considerations for future studies about this topic. Firstly, although the current study was unsuccessful in replicating the findings of Finucane et al. (2000), our findings suggested that the influence of items in judgment of risks depends on the individuals' knowledge about the items. Specifically, people are more likely to be worried about unknown risks rather than known risks. Thus further studies would benefit from using more novel items. In addition, our findings supported the idea that, in general, women judge risks as higher than the men. Future studies could take gender difference into consideration when studying about risk assessment. Finally, it is necessary to make a clear distinction between moods and affect in exploring the influence of emotions in risk assessments.

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The C-E Translation of Poetic Characteristics in *Xixiang Ji*

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Abstract: Poetic characteristics, one of the basic characteristics of drama language, exists in *Xixiang Ji*, wrote by Wang Shifu in the Yuan Dynasty. The poetic characteristics in it mainly display in three aspects, namely “the image of language”, “the music of language” and “the cultural elegance of language”. Whether these features can be interpreted appropriately and accurately affects the appreciation of the target texts and the re-presentation of poetic features in target texts. Because of its unique artistic charming, there are many translators interpreting it, such as Xu Yuanchong, West and Idema, Hart etc. This paper will, from the perspectives of cognitive metaphor, make a comparative study on the C-E (Chinese-English) translation of poetic characteristics in *Xixiang Ji*. Based on the findings of this study, some examples about the C-E Translation of poetic characteristics in *Xixiang Ji* are commented on and some strategies about the C-E Translation of poetic characteristics in *Xixiang Ji* are put forward.

Key words: *Xixiang Ji*, poetic characteristics, cognitive metaphor

1. Introduction

In modern China, there are many scholars doing the research about the poetic characteristics of Chinese classical drama. Wang Guowei points out the most distinct features of Yuan Opera is using poetic languages to form its unique artistic conception. Yu Shangyuan, one of the representatives of the Chinese drama movement, sorted out different standpoints about the poetic natures of Chinese classical drama. Zhang Geng's “Drama-poetry Theory” reveals a major view on the essence of Chinese traditional drama. Therefore, poetic characteristics is said to be one of the basic and significant characteristics of drama language.

Xixiang Ji, one of the greatest China's classical dramas, not only obtains outstanding artistic achievement, but also moves up to the peak of Chinese classical dramas. The book is mainly about the love story between two legendary figures, Zhang Sheng and Cui Yingying, who break through the prejudice of tradition and live a happy life ever after, which causes a great influence in the feudal society. The topic of this book has a distinct purpose, that is anti-feudal society and anti-feudal marriage. The languages in *Xixiang Ji* are full of poetic beauty and poetic grace. The poetic characteristics in it mainly display in three aspects, namely “the image of language”, “the music of language” and “the cultural elegance of language”.

This thesis will, from the perspective of cognitive metaphor, do the research about the C-E translation of poetic characteristics in *Xixiang Ji*. All these examples, applied to make this comparative study, are taken from the English versions of *Xixiang Ji*, translated by Xu Yuanchong, West and Idema, Hart etc.

2. Cognitive metaphor

Traditionally, most people treat metaphor as a rhetorical device, using extraordinary language rather than ordinary language. “we share a fixed, conventional system of conceptual metaphor, a system of thousands of metaphorical mappings, each permitting us to understand one domain of

experience in terms of another, typically more concrete domain” (Lakoff&Johnson, 1980a, p.12). “Our ordinary conceptual system, in terms of which we both think and act, is fundamentally metaphorical in nature” (Lakoff&Johnson, 1980a, p.5). Cognitive metaphor believes that metaphor is not only a linguistic phenomenon, but a cognitive phenomenon and a human way of thinking. From the perspective of cognitive metaphor, metaphor is a mapping between two conceptual domains---the source domain and the target domain. Lakoff (1980a) believes that the essence of metaphor is to understand the one domain (target domain) through another specific domain (source domain), and he states that the partial features of the source domain are mapped to the destination, which is partially understood by the source domain.

Lakoff and Johnson proposed that two new terms, “target domain”, “source domain” are important to in understanding the formation of a metaphor. Lakoff (1980a) holds that the essence of metaphor is cross-domain mapping, from the abstract to concrete. We understand and infer the abstract target domain by the structure of the source domain, which is usually more familiar and specific to us.

In the book *Metaphors We Live By*, Lakoff and Johnson divides conceptual metaphor in three types: Structural Metaphor, Orientational Metaphor and Ontological Metaphor. Structural metaphor (Lakoff&Johnson, 1980b) is to structure one kind of experience or activity based on another kind of experience or activity. Such as “I'll take my chances”, “I see what you're saying”. In orientational metaphor (Lakoff&Johnson, 1980b), these structure concepts linearly, orienting them with respect to non-metaphorical linear orientations. Such as “The amount of artistic activity has gone down in the past year”, “He is under my control”. Ontological metaphor (Lakoff&Johnson, 1980b) refers to the projection of entity or substance status on something that doesn't have that kind of status inherently. Such as “I just run out of energy”, “His brain is packed with interesting ideas”.

In our daily language, there are a lot of “daily expressions in which aspects of love are conceptualized in terms of journey”

(Lakeoff&Johnson, 1980a, p.49). Such as: Life is a long, rough road etc. There is a chart in which we will see this mapping.

Table 1 The Mapping between the Source Domain and the Target

Domain	
Source Domain	Target Domain
Journey	Life
Travelers	People
Start Points	New Born
Initial Conditions	Endowment
Baggage	Problems or Difficulties
Distance Traveled	Accomplishment
End-point	Life Goals
Termination	Destination

Lakeoff and Johnson (1980a, p.7) concluded that “the essence of metaphor is to understand and experience one kind of thing through another”. The conceptual metaphor is systematically mapping between the source domain and the target domain; the metaphorical language is the external presentation of the conceptual metaphor. In cognitive metaphor, Lakeoff’s invariance principle states that metaphor maps components of meaning from the source language that remain coherent in the target context and components of meaning in the target context retain their “basic structure” in some sense. Lakoff (1993, p.215) gives the invariance principle as: “Metaphorical mappings preserve the cognitive topology (that is, the image-schema structure) of the source domain, in a way consistent with the inherent structure of the target domain”. Metaphor is not only a linguistic phenomenon, but a cognitive phenomenon; conceptual metaphor is a fixed, conventional mapping system. We share a fixed, conventional system of conceptual metaphor, a system of thousands of metaphorical mappings, each permitting us to understand one domain of experience in terms of another, typically more concrete domain. In the cognitive metaphor, there are three major approaches to understanding the metaphorical languages, namely image-schema, iconicity and analogy.

2.1 Image-Schema

In the book of *Metaphors We Live By*, Lakeoff and Johnson (1980a) firstly combined “image” and “schema” into “Image Schema”, which is applied to analyzing metaphor. Lakoff (1987, p.267) put forward the definition that “Image schemas are relatively simple structures that constantly recur in our everyday bodily experience...”. In the preface of *The Body in the Mind: The Bodily Basis of Meaning, Imagination and Reason*, Johnson (1987) points out that: “...An image schema is a recurring, dynamic pattern of our perceptual interactions and motor programs that gives coherence and structure to our experience.” Johnson (1987) gives further explanation about “Image Schema” that “Human bodily movement, manipulation of objects, and perceptual interactions involve recurring patterns without which our experience would be chaotic and incomprehensible. I call these patterns ‘image schemata’, because they function primarily as abstract structures of images”. An image schema is

an important way of forming a recurring structure via metaphor within our cognitive processes in which human beings establish patterns of understanding and reasoning. Image schemas are dynamic embodied patterns. The recognition of a dimension of metaphorical projection is based on image schemas. The human conceptual system is the result of the metaphorical mapping from our experience to concepts. People gradually recognize their own living space based on the perception (mainly seeing and touching), which is applied to form the image schema based on spatial structure and dynamic structure. The spatial nature of image schemas also gives them a role in structuring abstract categories and in constraining conceptual mappings (Wang, 2007). In contemporary cognitive linguistics, an image schema, as an embodied prelinguistic structure of experience, motivates conceptual metaphor mappings.

2.2 Iconicity

Givon (1990) argues that the correspondence between meaning and form is “iconicity”. In the proceeding *From Miming--Iconicity in Language and Literature* collected by Max Nanny and Olga Fischer (1999), there are many scholars have the similar perception, for example, Ivon Fonagy regarding iconicity as motivation, Hans Heinrich Meier proposing “Natural, I.e. Motivated, Iconic”, Muller putting forward “Non-arbitrarist Model=Iconicist Model”.

In 1972, Jackendoff (1985, p.13) proposed that “Many apparently syntactic constraints follow semantic constraints”. And Sweetser (1990, p.6) emphatically points out that “Language is shaped by cognition”. Dirven and Verspoor (1998, p.94) state “there is a motivation corresponding link between language form and the meaning of signified when language expressions, including vocabulary, grammar and discourse etc, are corresponding to conceptual metaphor system”.

In the book *Cognitive Linguistic* by Wang Yin (2007), he mentioned that Pierce regards metaphor as iconicity. He also states in his book that there are series of natural motivation between language form and the meaning of signified when language form (including words, grammars, discourse etc.) is corresponding to language content of conceptual metaphor. Meanwhile he clearly states the iconicity of language is the motivation between signifier and signified.

The iconicity of language is the motivation between A and B, which is corresponding to Saussure’s arbitrariness, say, iconicity has dialectic relationship with arbitrariness. In the cognitive linguistics, iconicity mainly emphasizes that the linguistic form is the result of the external and internal factors, such as experience, cognition, semantics, pragmatics and so on. Just like what Langacker (2001, p.261) claims “As a primary instrument of thought and communication, language is grounded in both cognition and social interaction”. The iconicity of language not only means the form of language imitating the objective of the real word, but also refers to the corresponding relationship between the form of language and experience models, cognitive rules and conceptual structures (Wang, 2007). From the cognitive metaphor, the iconicity assumes that the form or structure of language reflects the conceptual structure, and the conception of human reflects the objective world and its structure.

2.3 Analogy

Aristotle is the first person who defines “metaphor” in *Poetics* (around 335 BC) as the application of an alien term either transferred from the genus to the species, or from the species to the genus, or from one species to another, or by analogy. He treats analogy as a sort of metaphor. Winston (1980) holds that it is a core process when using analogy in understanding metaphor, say, the analogy is a kind of overlapping of metaphor. Winston (1980, p.689) holds the idea in his paper *Learning and Reasoning by Analogy* that “we face a situation, we recall a similar situation, we match them up, we reason, and we learn” and pays attention to “memory”, “useful remembered situations”. One of the key ingredients is “analogy-driven constraint learning” (Winston, 1980), namely “a constraint...is learned as a by-product of mapping the parts of a situation in a well-understood domain into the parts of another situation in an ill-understood domain” (Winston, 1980). Gentner (1983) puts forward that analogy is a kind of structure-mapping and states “the analogy ‘A T is (like) a B’ defines a mapping from B to T”. In his *Structure Mapping: A Theoretical Framework for Analogy*, he assumes “Many (perhaps most) metaphors are predominantly relational comparisons, and are thus essentially analogies” (Gentner, 1983). In the book *Cognitive Metaphor*, Hu Zhuanglin (2004) proposed that there are many similarities between analogy and metaphor and we can apply analogy to understand metaphor.

The basic idea of cognitive metaphor is the target domain B mapping source domain A, transferring some B’s characteristics to A. Analogy, as a powerful cognitive mechanism, is used by people to make inferences. Human beings use past experience and preconception to enlighten the new situation. Metaphors are analyzable as analogies or combinations of analogies. For example, in Shakespeare’s “Juliet is the sun”, said by Romeo, he doesn’t mean Juliet is hot, orbicular. Rather, the sun conveys that Juliet appears above him, bringing him hope and warmth, etc. Though some attributes may be mapped from “the sun” to Juliet, the metaphor mainly implies a kind of spatial and emotional relationships.

3. The C-E Translation of Poetic Characteristics in the *Xixiang Ji* from the Perspective of Cognitive Metaphor

Cognitive science pays attention to the individual’s embodied experience, and the poetic natures of language are also embodied experience. Poetic languages are closely related to the subjectivity and embody the subjects’ affection. This paper will make a comparative study on the C-E translation of poetic characteristics in *Xixiang Ji* from the perspective of cognitive metaphor. The poetic features in *Xixiang Ji* are divided into three aspects: the image of language, the music of language and the cultural elegance of language. The first part will discuss the C-E translation of image of language in *Xixiang Ji*, in which the C-E translation of the image of language is based on image schema. The second part will discuss the C-E translation of music of language in *Xixiang Ji*, combined with the iconic application of cognitive metaphor. The last part will analyze the cultural elegance in *Xixiang Ji*, integrated with the analogical application of cognitive metaphor.

3.1 The C-E Translation of Image of Language in *Xixiang Ji*

In the drama *Xixiang Ji*, there are a number of images of language required by the description of the characters, psychology and there are

many unique contents for this drama development. The image of language is one aspect of the poetic characteristics of language. This section will mainly discuss the C-E translation of the image of language in *Xixiang Ji*. As what Lakeoff and Johnson (1980a) have claimed in their *Metaphors We Live By*, most of metaphors of this type “have to do with spatial orientation: up-down, in-out, front-back, on-off, deep-shallow, central-peripheral”. Because the image schema is the conceptual structure of the metaphorical mapping from the physical space to the conceptual space, different image schemas, giving an adequate account of understanding, can be said to be different orientational metaphors.

CASE 1 The original version by Wang Shifu:

“行香云盖结，
 讽咒海波潮。
 幡影飘飏，诸檀越尽来到。
 法鼓金铙，二月春雷响殿角” (Wang, 2009, p.68).

The translated version by Xu Yuanchong:

“The smoke of incense forms of clouds a canopy;
 The prayers sound like rolling waves of the sea.
 The banners undulate with shadows to and fro.
 All benefactors have come from high and low.
 The sacred drums and brazen cymbals sound
 In every corner of the temple and all around
 Like thunder in the second moon of spring” (Wang, 2009, p.69).

The translated version by West and Idema:

The incense smoke forms a canopy of clouds;
 The changed incantations swell into ocean billows.
 The shadows of the pennants toss and flutter,
 And all of the temple patrons are here.
 Dharma drums and bronze clappers.
 Spring thunder of the second month echoes in the corner of the hall”
 (Wang, 1995, p.144).

These two short translated versions are used to describe the same religious service in which Madame Cui held a Bodhimanda for his dead husband. And in this religious service the poor Master Zhang wanted to see Yingying who, he thought, was such a beauty with a captivating face. The images of language in these sentences change along with the roles’ hearing and visual. The first and second sentences are the description about the whole scenery of the Buddha’s Temple that can be seen by eyes. The rest part is the description about the sound of drums and cymbals.

XuYuanchong, West and Idema all use “cloud” like “a canopy” to modify the smoldering “incense”, which is just like a “CONTAINER” fogging up the Buddha’s Temple. Here, the interpreters describe the same image schema just like the original author, Wang Shifu. In this image, Wang want to use such “CONTAINER” schema to describe Master Zhang’s sense of depression, who wanted to get close to Yingying, fear of the feudal force represented by Madame Cui.

However, in the rest part, Wang Shifu originally presents a “CENTER-PERIPHERY” schema, in which “drums and cymbals” are the

center and “every corner of the temple” is the periphery. Xu Yuanchong highlights “drums and cymbals”, coupled with two prepositional phrases, which construct the same image schema as the original author, “CENTER-PERIPHERY”. West and Idema’s Version changes the center into “drums, bronze and spring thunder of the second month”.

CASE 2 The original version by Wang Shifu:

“待月西厢下，迎风户半开。拂墙花影动，疑是玉人来” (Wang, 2009, p.222).

The translated version by Xu Yuanchong:

“Wait for moonrise in western bower,
Where the breeze opens half the door.
The wall is shaded by dancing flower
Then comes the one whom you adore” (Wang, 2009, p.223).

The translated version by Hart:

“When the moon sinks below the western chamber,
The side door will be half-open to the wind.
When I see the shadows of the flowers
Move upon the wall,
Then I shall know that man,
Handsome as is jade, has come to me” (Wang, 1936, p.114).

Here are translated versions to the same four verses of five characters, which is composed by Ying Ying to Master Zhang for an assignation. In the first line, Ying Ying tells Master Zhang the time to go to the garden, and in the second line it means the door will be open for him. The rest are the imaginary scene of date in Yingying’s mind, expressing the excitement and desire feeling of Yingying when waiting for Master Zhang, mainly displaying her longing for the Master Zhang and her loving affection on the Master Zhang.

In the translated dramatic verse by Xu Yuanchong, “the first two lines are arranged generally in the metrical pattern of trochaic tetrameter and the last two in iambic tetrameter. The interlacing sound echoes between the lines and produces the musical effect” (Deng, 2013). Meanwhile, “the breeze” opens “the door”, which constructs a “FORCE” schema, corresponding to the emotion of Yingying, full of romance and gallantry. “The side door will be half-open to the wind” can make the target readers know “the door will be opened for him”, but it cannot arouse the same feeling just like the original author. In Xu’s “The wall is shaded by dancing flower”, he uses the “SUPERIMPOSITION” schema to superimpose the “dancing flower” on Master Zhang’s figure, which reflects the joyful feeling of Yingying, while Hart’s translation with static expression “the shadows of the flowers” can not reveal Yingying’s cheerful feeling.

Whether the specific image schema is reproduced in the translation is determined by the interpreters’ understanding. Based on above analysis, we can make an conclusion that in order to translate images of language in *Xixiang Ji*, the translators should pay attention to the representation of image schema, because the image schema plays an important role in organizing the images and constructing different roles’ emotion.

3.2 The C-E Translation of Music of Language in *Xixiang Ji*

The iconicity of language is the signifier and signified, that is the motivation between language form A and language content B. Wang Hongyin (2005) states if the literary style is called form and the expression of thoughts and emotions in literary works are called content, the literary works is to express the appropriate literary content with the appropriate literary style. In short, the form is a form of meaning and there is iconicity between form and content. Translation must pay attention to the linguistic form corresponding with the meaning of linguistic expressions, corresponding with the content.

The language in *Xixiang Ji* is full of music, which is closely linked with the emotion of roles. In this view, the duplicated words and the rhythm in *Xixiang Ji* have become a form of emotional expression. There is iconicity with motivation between the form of music language and emotion. If the translator wants to show the musical characteristics in the translation, then in the process of translation the translator needs to pay attention to the form itself and the form of additional meaning.

CASE 3: The original version by Wang Shifu:

“痛煞煞伤别，
急煎煎好梦儿难应舍。
冷清清咨嗟，
娇滴滴玉人儿何处也” (Wang, 2009, p.352)!

The translated version by Xu Yuanchong:

“Acute, acute my grief at heart;
Painful and painful from my dream to be torn apart!
Lonely, lonely I sigh: O where,
O where is now my charming, charming lady fair” (Wang, 2009, p.353)?

The translated version by West and Idema:

“Painful, sensitive, the wound of parting;
Vexing, guiling, such a fine dream was hard to give up.
Chilling, chilling, cold moans:
That lovely and dainty jade person—where is she now” (Wang, 1995, p.51)?

These translated versions are all about a same song sung by Master Zhang, awakened from a dream on his way to win high rank with honor and power. The original author clung Chinese characters together as a figure of speech, reduplicated words, which is easy for Chinese author because Chinese characters are monosyllabic. The reduplicated words “痛煞煞(Tong Shasha)”, “急煎煎(Ji Jianjian)”, “冷清清(Leng Qingqing)”, “娇滴滴(Jiao Didi)” are used to describe the inner world of Master Zhang, expressing the deeply pain of Master Zhang after the separation from Yingying.

West and Idema translates these reduplicated words by using two adjectives with similar meaning. However, Xu Yuanchong uses repetition of the adjectives, “acute”, “painful”, “lonely”, “charming”, which is extraordinary. His extraordinary way of interpreting makes the translated version much more readable and memorable, and renders the target readers easy to feel Master Zhang’s grief. Therefore, we can say Xu

Yuanchong's version here achieve the "consistency of content and form" better than West and Idema's. There is iconicity with motivation between linguistic form and the emotion.

The example below will discuss another example about the iconicity with motivation between the form and content from a case of rhythm.

CASE 4: The original version by Wang Shifu:

“又是一个文章魁首，
一个仕女班头。
一个透彻三教九流，
一个晓尽描鸾刺绣” (Wang, 2009, p.304).

The translated version by Xu Yuanchong:

“One of them is a leading light,
The other is a lady fair and bright.
One knows the secular and divine,
The other drawing and embroidery fine” (Wang, 2009, p.305).

The translated version by Hart:

“One of the two is a genius in literature,
The other a very queen among all women.
One is a master of the Nine School and Three Teaching,
The other sews and paints and fine needle work” (Wang, 1936).

The translated version by West and Idema:

“That budding talent is a champion of cultured writing;
Elder sister is a leader among noble maidens;
One is thoroughly versed in the three creeds and nine schools;
One is perfectly adept at patterning and embroidery” (Wang, 1995, p.156).

These words were said by Madame Cui. The purpose of saying these words is to express her dissatisfaction to Master Zhang. In Madame Cui's mind, her daughter was perfect while Master Zhang was totally a evil.

Xu Yuanchong presents rhyming scheme *abab*, “one” and “the other” to translate the four same Chinese characters “一个(Yi Ge)”. And he also pays attention to the rhythm of last words in each line, “light, bright, fine, divine”. Compared with versions translated by Hart, West and Idema, it displays that Xu Yuanchong's version could render target readers easy to know that here is a comparison between Yingying and Master Zhang, made by Madame Cui. Xu Yuanchong's version not only maintains the beauty in sound, in form, in sense, but also achieves the iconicity with motivation between the language form and Madame Cui's emotion.

As is mentioned above, when interpreting the music of language in *Xixiang Ji*, the translators should present the information based on the original text and form the new iconicity with motivation between the form of music and its thoughts and emotions.

3.3 The C-E Translation of Cultural Elegance of Language in *Xixiang Ji*

The language in *Xixiang Ji* is full of classical cultural elegance, such as “allusion” and “poem”. The cultural elegance in the language is

analogized to the specific roles and to the unique plots. When interpreting the cultural elegance of language, translators should pay attention to “analogy-driven constraint learning”, using past experience and preconception.

Analogical mapping is a kind of metaphor in semantic domains, whose mapping is partial and selective. The cultural elegance of language in *Xixiang Ji* needs the translators to search and choose adequate vocabularies, to try their best to make the target readers get the same analogical mapping, and to maintain the same cultural elegance of language.

CASE 5: The original version by Wang Shifu:

“眼底空留意，寻思起就里，险化做望夫石” (Wang, 2009, p.324).

The translated version by Xu Yuanchong:

“In vain I center on him my eye,
Keep thinking on, And nearly turn into a stone” (Wang, 2009, p.325).

The translated version by West and Idema:

“Such romantic signals from the eyes
Trip thoughts of the feelings behind them
And nearly turn me into a husband-watching rock.

Note: Sometimes also called husband-longing rock: a woman who stood so long watching for her husband that she metamorphosed into stone” (Wang, 1995, p.242).

Here is internal monologue of Yingying, in which she expresses her faithfulness to Master Zhang after he is compelled to win the highest honor in the Capital's examination. “望夫石(Wang Fushi)” is an allusion, in which a woman, who loves her husband deeply, persists in waiting for her husband, even if she knew her husband had sacrificed himself in the war. Finally, the woman turns into a stone. Chinese people analogize “望夫石(Wang Fushi)” to the “longing to see husband”, “the desire for uniting with husband” and “the loving for husband”.

Xu Yuanchong just translates “望夫石(Wang Fushi)” into “a stone” without conveying the culture of this allusion. And “stone” means “hard solid mineral substance”(Hornby, 1997), which may give the target readers an icy and emotionless picture. In West and Idema's translated version, it is translated into “a husband-watching rock”, coupled with a note, which not only delivers the cultural connotation, but also reflects the endless love of Yingying to Master Zhang. The target readers will get the same mapping from “a husband-watching rock” to “Yingying's affection and missing”

CASE 6: The original version by Wang Shifu:

“杨柳颦眉，人比黄花瘦” (Wang, 2009, p.364).

The translated version by Xu Yuanchong:

“My eyebrows knit like a willow leaves;
Slimmer than gold flower my face appears” (Wang, 2009, p.365).

The translated version by West and Idema:

“You frown over your willow-thin waist;
You are thinner than a chrysanthemum” (Wang, 2006, p.361).

“人比黄花瘦(Ren Bi Huang Hua Shou)” comes from the poem Shadow of Flowers by Li Qinzhaoh, in which she uses this line to describe extreme weight loss and unnatural thinness because of missing her husband. Here it maps a thinning of almost skeletal-seeming state because of Yingying’s lovesickness. In West and Idema’s translated version, they misunderstand it as “you are thinner than a chrysanthemum”, which may be understood by the target readers from the whole context, but the special mapping from “黄花(Huang Hua)” to “physical appearance of emaciation” in Chinese culture does not exist. Xu Yuanchong translates “黄花(Huang Hua)” into “gold flower” literally, which not only transmits the Chinese culture, but also lets the target readers get the same analogy between the words and its meaning as the original readers.

As a qualified translator, we should not only interpret the content of source target, but also transmit the culture. Therefore, When interpreting the cultural elegance of language in *Xixiang Ji*, they should pay attention to maintain the same analogical mapping.

4. Conclusion

This paper mainly focuses on the C-E translation of poetic characteristics in *Xixiang Ji* from the perspective of cognitive metaphor. The view of cognitive metaphor holds that metaphor is not only a linguistic phenomenon, but also a cognitive phenomenon and a kind of human thinking. *Xixiang Ji*, as a typical Chinese classical literature, presents a fascinating poetic features in three aspects: “the image of language”, “the music of language” and “the cultural elegance of language”. The interpretation of these specific features determines the representation of poetic characteristics of the target text. According to the comparative study on different versions about its C-E translation of poetic characteristics, we can make an conclusion as following: firstly, in the translation of drama’s image of language, the translator should focus on the mapping of the spatial structure and dynamic structure of image schema; secondly, in the translation of drama’s music of language, the translator needs to pay attention to the iconicity with motivation between the form of musical presentation and the emotional content of roles; thirdly, in the translation of cultural elegance of language, the translator needs to notice the reproduce the allusion and poem to transmit the special culture of original text.

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Semi-supervised Text Classification Research Based on Ant Colony algorithm

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Abstract: In view of the characteristics of sparse sexual text classification, this paper proposes a kind of semi-supervised text classification algorithm based on the characteristics of ant colony algorithm. The method applied in this paper is to increase the effect factor of the concentration of pheromone ant colony aggregation to extended ant pheromone diffusion mode and propose the ant population marker based on Top-k strategy and randomly selected candidate judgment confidence into the ant population classification. This paper selects the 20 Newsgroups corpus for experimental test and EM algorithm as compared algorithm. It has obvious advantages in terms of the index of F-1 degree as well as precision ratio and the recall ratio.

Key words: Semi-supervised; Text classification; Ant colony algorithm

1. Introduction

At present, many scholars have once studied the semi-supervised text classification^[1] and the combination of EM algorithm and the Naive Bayes Classifier adopted by Nigam K and others have achieved a semi-supervised text classification. The algorithm in [1] involves three steps. Firstly, an initial classifier was trained with labeled samples. Next the classifier was used to conduct uncertainty label for unlabeled samples, as a result each unlabeled samples partly belongs to some category. Finally, a new classifier was trained with all samples. The steps were iterated until the classifier was stable. Zhang^[2] suggest an advanced EM algorithm based on self-training. In the process of training an intermediate classifier with EM algorithm, a self-training mechanism was introduced, which means put the unlabeled samples of a high confidence level into the labeled sample set, making the unlabeled data set shrink constantly. Thereby the iteration is sped up and the training performance of the classifier is also improved. However, due to the possibility of large misclassification in the trained intermediate classifier, the existing methods were not applicable to the case of labeled classes. Zheng^[3] proposed a semi-supervised text classification method based on the tightness. This method has three steps: the first step is to extract some negative examples with high confidence level from the negative examples set. The next step was to extend the credible negative examples set correspondingly and gained negative examples set for classification training based on the tightness of samples and positive examples in unlabeled set and extracted negative examples. And the last step was to text classification according to the given positive examples set in the training set. The above semi-supervised text classification methods are all based on distribution hypothesis of statistical theory essentially, that is, labeled samples and unlabeled samples are viewed as independent and identically distributed text data. This

assumption is hardly supported in reality. When the distribution of labeled samples and unlabeled samples is different, the use of unlabeled samples may reduce the performance of the classifier. Therefore, how to improve the performance of semi-supervised text learner when there exists large differences between the distribution of labeled and un-labeled samples have become a research hotspot in the field of semi-supervised learning.

This paper presents a semi-supervised text classification algorithm based on ant colony algorithm^[4,5,6]. According to the text data, the text similarity is integrated into the computation of aggregation pheromones^[7], thereupon extending the calculation model of aggregation pheromone concentration.

2. Proposed methodology

2.1 APSSC Algorithm

Halder^[8] introduced the ant colony aggregation pheromone into semi-supervised classification in 2010 and put forward the self-training [9, 10] APSSC algorithm (aggregation pheromone density based semi-supervised classification, APSSC). APSSC algorithm is 'self-training' in nature. Each sample is regarded as an ant, so the text classification is the process of classification of each ant population. It consists of two steps. The first step is 'self-training' strategy, where the semi-supervised classifier is (re)trained iteratively by using the small number of labeled ants along with the 'high confidence' unlabeled ants (described latter). The second step is 'testing'. Once self-training is over (i.e., colony is stabilized), the new test ants are predicted to assign a particular class (colony) in the testing phase. The details of the proposed methods are described below.

Step 1: Self-training.

If each sample is regarded as an ant, then text classification is the species classification of each ant. The labeled ant a_i^k represents the labeled samples $x_i^k \in C_k^0$ of class k , and the unlabeled ant

a_i^u represents the unlabeled samples $x_i^u \in U$. At the beginning, the training populations include only labeled ants, each training population released aggregation pheromone concentration is zero to unlabeled ants. In the learning process of each generation, we need to make the following operations to each unlabeled ants.

(1) Calculation the training population k have released the

$$\Delta \bar{\tau}_{jk}^t = \frac{1}{|C_k^t|} \sum_{x_i^k \in C_k^t} \Delta \tau^t(x_i^k, x_j^u); \forall j, \forall k \quad (1)$$

aggregation pheromone concentration to unlabeled ant a_i^u :

where $|C_k^t|$ is the number of ants that the training population k contains. $\Delta \tau^t(x_i^k, x_j^u)$ is the labeled ants a_i^k releases the aggregation pheromone concentration to unlabeled ants a_i^u . The calculation model is:

$$\Delta \tau^t(x_i^k, x_j^u) = \frac{1}{(2\pi)^{\frac{d}{2}} (\det(\Sigma_k))^{-\frac{1}{2}}} \exp\left\{-\frac{1}{2}(x_j^u - x_i^k)^T (\Sigma_k)^{-1} (x_j^u - x_i^k)\right\} \quad (2)$$

where Σ_k is the covariance matrix of training population k , $\det(\Sigma_k)$ is the determinant of covariance matrix, k is the dimension of the data set.

(2) Update training population k have released the aggregation pheromone concentration to a_i^u :

$$\tau_{jk}^t = (1 - \rho)\tau_{jk}^{t-1} + \rho\Delta \bar{\tau}_{jk}^t \quad (3)$$

where $\rho \in [0, 1]$ is the evaporation constant.

(3) When all training population have all released the aggregation pheromone concentration to unlabeled ant a_j^u , we need to begin the normalized processing to the updated τ_{jk}^t , gaining the normalized aggregation pheromone concentration:

$$u_{jk}^t = \frac{\tau_{jk}^t}{\sum_{k=1}^K \tau_{jk}^t}; \forall j, \forall k \quad (4)$$

where K is the total number of training population.

(4) According to algorithm 1, we should select unlabeled ants of high confidence level and add them into a training population h which is the most attractive. It will be viewed as labeled ants of population h in $t+1$ generation self-training process.

(5) When all training population are stable, self-training process is over and the training population has been expanded at this time. Otherwise, we need to conduct $t+1$ generation study.

Algorithm 1. Determination of the 'confidence' of an unlabeled ant a_j^u

INPUT: unlabeled ants a_j^u

OUTPUT: The extended training species h

Begin for $u_{ij}^t (k \neq h)$

$$\text{if} \left(\frac{u_{jk}^t}{u_{jh}^t = \max(u_{jk}^t)} \leq \frac{1}{K} \right)$$

Then $flag_variable = 1$;

else $flag_variable = 0$;

Break;

if ($flag_variable == 1$) then

Add unlabeled ants a_j^u to training species h ;

else

Don't add unlabeled ants a_j^u to any training species;

The above is the self-training process of APSSC algorithm. The self-training phase of the algorithm stops when there is no(re)assignment. This is done by computing the colony centers. If the colony centers in two successive iterations do not change then it can be said that there is no (re)partition. At that time colony formation by the unlabeled ants is over and the unlabeled ants are stabilized. It means either they have joined any colony with sufficient confidence, or (rest) have not joined any colony (with sufficient confidence). The unlabeled ants, which have joined in any colony are now considered as training samples, and thus, the size of the training set is increased with the help of the unlabeled patterns.

Step 2: Testing

After the colony formation (by the unlabeled ants) is over, the new ants (patterns) are tested as follows: If the test ant a_n at x_n appears in the system, the average aggregation pheromone density (at the location of the new ant a_n) by the colony C_k^t is given by [as in Eq. (1)]. The test ant a_n will move toward a colony for which the average aggregation pheromone density (at the location of that test ant) is higher than that of the other colonies. Hence, finally the said ant will join the colony that will be governed by the following equation:

$$ColonyLabel(x_n) = \arg \max_k (\Delta \bar{\tau}_{nk}^t) \quad (5)$$

The complete procedure is summarized in Algorithm 2.

Algorithm 2. Aggregation Pheromone density based on Semi-Supervised Classification (APSSC)

1: **begin self_training()**

2: **Initialize:** Iteration counter $t \leftarrow 0$; initial pheromone density

3: **repeat**

4: for each unlabeled ant a_j^u located at x_j^u **do**

5: for each training colony C_k^t at iteration t **do**

6: Calculate the average aggregation pheromone density $\Delta \bar{\tau}_{jk}^t$ on the j th unlabeled ant a_j^u due to all ants in present training colony C_k^t at iteration t using equation (1).

7: Update pheromone density τ_{jk}^t due to k th colony C_k^t on the j th unlabeled (pattern) ant at iteration t by Equation (3).

8: **end for**

9: for each training colony C_k^t at iteration t **do**

10: Compute the n. p. d. u_{jk}^t of each unlabeled ant a_j^u

due to each colony C_k^t at iteration t using Equation (4).

11: **end for**

12: Compute the ‘confidence’ of the unlabeled ant a_j^u and add or do not add the ant to the appropriate colony for the next iteration ($t + 1$) according to Algorithm 1.

13: **end for**

14: $t \leftarrow t + 1$

15: **until** <StoppingCriteria>

16: **end_self_training**

begin_testing()

for each new test ant a_n located at x_n **do**

for each colony C_k^t **do**

Calculate the average aggregation pheromone density

$\Delta\tau_{nk}$ at location x_n due to all ants in colony C_k^t using

Eq. (2).

end for

Compute the ColonyLabel(x_n) of the ant a_n by Eq. (5). //

Ties

are broken arbitrarily.

end for

end_testing

2.2 The drawbacks of the APSSC algorithm

(1)In the formula (2), the dimension of the data set is d , since $2\pi > e$, When the value of d is larger, formula (2) tends to zero, so the algorithm can't deal with high dimensional text data.

(2)In the formula (2), $det(\Sigma_k)$ as a factor appears in the denominator, this requires the covariance matrix of the data must be reversible, so APSSC algorithm needs improvement given that it cannot classify high dimensional data and sparse text.

(3)In the algorithm 1, the determination condition of selecting the ants of high confidence level must satisfy the following conditions:

$$\frac{u_{jk}^t}{u_{jh}^t = \max(u_{jk}^t)} \leq \frac{1}{K}$$

when dealing with data sets of large category and great similarity, the said algorithm may not learn high confidence degree ants. Thus we can't achieve the goal of extended training population

2.3 Semi-supervised text classification algorithm based on ant colony algorithm(SSTCACAP algorithm)

2.3.1 The principal of ant colony algorithm

If m is the number of ants, n is the number of areas, d_{ij} is the distance between area i and area j , $\tau_{ij}(t)$ is the amount of information in $e(i, j)$ at iteration t .

The ant as a whole contains the following elements:

①When ants get through pathways, they produce pheromones there.

②Ants judge following areas according to whether there is pheromone.

③To achieve the established plan, we have to make ants unable to judge the areas that they have been to before reaching a searching circle.

In the beginning, the amount of pheromone of each pathway is equivalent. If $\tau_{ij}(0) = c$ (c is a constant) when searching a pathway, ant k judge future movement by the amount of information in each pathway. When the time is t , the moving rate of ant k is $p_{ij}^k(t)$ between area i and j . The formula is :

$$p_{ij}^k(t) = \begin{cases} \frac{[\tau_{ij}(t)]^\alpha [\eta_{ij}(t)]^\beta}{\sum_{s \in allowed_k} [\tau_{is}(t)]^\alpha [\eta_{is}(t)]^\beta}, & j \in allowed_k \\ 0, & others \end{cases} \quad (6)$$

In the formula, $allowed_k$ is the following area that ants can judge; α is the core pheromone in terms of pathways; β is the core pheromone in terms of visibility; η_{ij} is a developed formula. The formula is:

$$\eta_{ij} = \frac{1}{d_{ij}} \quad (7)$$

Obviously, this formula shows the expected value of ant k between area i and area j .

After reaching a searching circle, the formula of the pheromone in each pathway is:

$$\tau_{ij}(t+1) = (1-\rho)\tau_{ij}(t) + \Delta\tau_{ij}(t) \quad (8)$$

where ρ is the index of scattered pheromone, so $1-\rho$ is the remaining particle of the pheromone. Since pheromone can't integrate many times, the interval of ρ is: $\rho \in (0,1)$; $\sum \Delta\tau_{ij}^k(t)$ is increased value of pheromones in the repeated interval of $e(i,j)$. The formula is:

$$\Delta\tau_{ij}(t) = \sum_{k=1}^m \Delta\tau_{ij}^k(t) \quad (9)$$

The methods of pheromone reset varies, so does the calculation methods of $\Delta\tau_{ij}^k$.

Dorogo M developed three ant colony algorithm systems, namely, the ant cycle system, the ant number system and the ant density system.

In the ant cycle system,

$$\Delta\tau_{ij}^k(t) = \begin{cases} \frac{Q}{L_k} & \text{system,} \\ 0 & e(i,j) \text{ between } t \text{ and } t+1 \end{cases}$$

In the ant number system,

$$\Delta \tau_{ij}^k(t) = \begin{cases} \frac{Q}{d_{ij}} \\ 0 \end{cases}$$

, if ant k passes $e(i, j)$ between t and

$t + 1$

In the ant density system,

$$\Delta \tau_{ij}^k(t) = \begin{cases} Q \\ 0 \end{cases}$$

, if ant k passes $e(i, j)$ between

t and $t + 1$

where Q is the concentration of pheromone; L_k is the journey in the repeated searching of ant k ; d_{ij} is the distance between area i and area j .

2.3.2 SSTCACAP algorithm description

According to the drawbacks of the APSSC algorithm, the main idea of SSTCACAP algorithm is to increase the impact factor for ant colony to aggregate pheromone concentration. Pheromone concentration is extended to:

$$\Delta \tau^t(x_i^{l_k}, x_j^u) = \exp \left[\frac{[1 - \text{similarity}(x_i^{l_k}, x_j^u)]^2}{2\delta^2} \right] \quad (10)$$

where $\text{similarity}(x_i^{l_k}, x_j^u)$ represents the cosine similarity, and δ represents the coefficient of diffusion rate of Gaussian function.

In semi-supervised learning, the text which needs to be classified contains class features. In order to speed up classification, *Top-k* query strategy^[11] is adopted when there is little information in the initial species, which means choosing k attractive species as the candidate species set T_{top-k} . When the total number of training species is set as K

$$\left| \frac{T_{top-k}}{K} \right| \leq \beta \quad (11)$$

where β represents set threshold.

Based on the analysis above, the method of selecting unlabeled ants with high confidence is:

Algorithm 3. Selecting unlabeled ant with high confidence (The improvement of algorithm 1)

INPUT: unlabeled ants a_j^u

OUTPUT: the extended training species h

Begin

$T_{top-k} = \{h\}$
 For $u_{ij}^t \neq 0$
 If $\begin{pmatrix} u_{ik}^t \geq 0 \\ u_{ih}^t \geq 0 \end{pmatrix}$, then add a_k to the candidate species T_{top-k}
 End for
 If $\left| \frac{T_{top-k}}{K} \right| \leq \beta$, then output a randomly-selected species in T_{top-k}

Else don't add unlabeled ants a_j^u to any training species
 End if
 End

3. Simulation Experiment

3.1 Pretreatment and parameter setting

This paper selects the 20Newsgroups corpus in which 1132 articles are selected as the experimental object, 10% of which are extracted as the test data in each sub-document and 50% of which are classified unlabeled. Vector Space Model is used to process documents, removing noises and then using Porter Stemming algorithm to stem and stop word removal. Parameter setting of the semi-supervised classification algorithm is based on ant colony aggregation pheromone which is introduced in this paper as follows: $\delta = 1, \alpha = 0.9, \beta = 0.6$.

3.2 Performance Evaluation Measures

In order to evaluate the performance of the proposed classifier, we have used the following three kinds of performance measures in this article. Namely,

$$p_k = \frac{\# \text{partterns_correctly_classified_into_class_k}}{\# \text{partterns_classified_into_class_k}}$$

(i) The precision (p_k) of class k :

$$r_k = \frac{\# \text{partterns_correctly_classified_into_class_k}}{\# \text{partterns_that_are_truly_present_in_class_k}}$$

(ii)The recall (r_k) of class k :

(iii) The F-1 degree of class k the harmonic mean between precision and recall.

$$(F_1)_k = \frac{2 \times p_k \times r_k}{p_k + r_k}$$

The F-1 degree was given equal importance to both precision and recall.

3.3 Experimental Results Analysis

Following the comparison between EM algorithm with algorithm, the classification test results of experimental data in different label proportion are shown in the following figures.

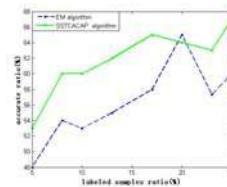


Figure. 1 the accurate ratio of the algorithm in the 20Newsgroup data set

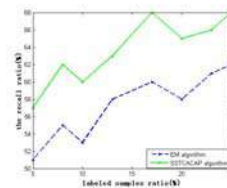


Figure. 2 the recall ratio of the algorithm in the 20Newsgroup data set

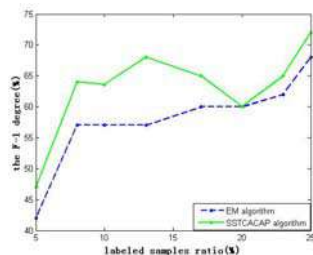


Figure.3 the F-1 degree of the algorithm in the 20Newsgroup data set

From figure 1, we can see the accurate ratio of the SSTCACAP algorithm increases by 6% than EM algorithm, but when labeled samples ratio is 20%, the accurate ratio of SSTCACAP algorithm is inferior to EM algorithm. One possible reason is that, some training population is more attractive than other populations, as a result this training population learned most of unlabeled ants with the high confidence degree. Thus it appeared classification errors.

From figure 2 and figure 3, we can see that the recall ratio and the F-1 degree of SSTCACAP algorithm introduced in this essay are obviously superior to EM algorithm.

The figure above has proved the good classifier performance of SSTCACAP algorithm. We can see a large number of ants with high confidence level will occur in training population. And with the ever-increasing proportion of labeled samples, the complexity of classification reduces and also the classification errors.

4. Conclusion

In this paper, we present a semi-supervised text classification algorithm based on ant colony aggregation pheromone concentration (SSTCACAP algorithm). The text similarity is considered as an important factor when we compute the concentration of pheromones aggregation, which extends the concentration calculation model of pheromone aggregation. In the process of semi-supervised learning, the first step, we should find out is that the population set to which unlabeled ants may belong to, the next step is to calculate and judge the confidence level of unlabeled ants according to judgment rules, and the last step is to add the unlabeled ants that meet the confidence level to the same training population through random selection, so as to extend the training population. The experiment results prove the validity of the SSTCACAP algorithm in this paper, showing a fact that the text classification based on the algorithm model of ant colony aggregation pheromone concentration is obviously superior to that of the traditional model, which is the semi-supervised classification model based on the distribution assumption of statistical theory.

For the SSTCACAP algorithm in this paper, one critic step we should do is to set the parameter of the algorithm manually. As parameters affect the classifier performance, our next work is to look into the parameter optimization of the algorithm so as to further improve its performance.

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H_∞ observer-based controls of nonlinear fractional-order systems with disturbances

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Abstract: In this paper, the issue of H_∞ observer-based controls for a class of Lipschitz nonlinear fractional-order systems is investigated. By adopting the indirect Lyapunov method with the diffusive representation, the sufficient conditions of the observer gains are given in the form of some linear matrix inequalities (LMI) formulation, which is developed for nonlinear fractional-order systems with disturbances.

Key words: Nonlinear fractional-order systems with disturbances, observer-based controls, Indirect Lyapunov method, Linear matrix inequalities

Introduction

Many systems such as viscoelastic systems, electromagnetic waves, biology (Magin, 2006; Freed, & Diethelm, 2006), chemistry (Darling & Newman, 1997; Audounet, Giovangigli & Roquejoffre, 1998; Lederman, Roquejoffre & Wolanski, 2002), economics (Scalas, Gorenflo & Mainardi, 2000; Gorenflo, Mainardi, Scalas, & Raberto, 2001; Meerschaert & Scalas, 2006), engineering applications (Battaglia, Le, Batsale, Oustaloup & Cois 2000; Vinagre 2001; Sabatier, Agrawal & Machado 2007;

Sheng, Chen & Qiu, 2012; Hilfer, Butzer & Westphal 2003; Ortigueira & Machado 2003; Ahmad & El-Khazali 2007; Song, Xu & Yang 2010; Podlubny, 1998; Sheng, Chen & Qiu 2012), dielectric polarization (Hilfer, Butzer & Westphal 2003; Ortigueira & Machado 2003), psychology (Ahmad & El-Khazali 2007; Song, Xu & Yang 2010), physical and the real word processes generally or most likely are fractional order systems (FOS). In fact, they can be modelled with the help of fractional derivatives and integrals, then fractional-order calculus have attracted a significant amount of interests of physicists and engineers (Podlubny, 1998; Sheng, Chen & Qiu 2012; Das, 2008). The main reason for using the integer-order models was the absence of solution methods for fractional differential equations. Inherited from state space linear H_∞ control theory (Van, 1992), a number of nonlinear H_∞ solutions have been presented in terms of various formulations (Isidori & Astolfi, 1992; Isidori, 1994a). The nonlinear H_∞ control problem can be stated as follows: Find a compensator, either state feedback or more general output feedback such that (1) the internal state of the closed-loop system is stable and (2) the L2 gain of the mapping from the exogenous input disturbance to the controlled output like tracking error or cost variables is minimized or guaranteed to be less than or equal to a prescribed value (Ball & Walker, 1993; Isidori, 1994b). Some inspiration arises from a natural question: When considering about FOS, can we get the same conclusion to the FOS?

According to, Isidori, A it is easy to construct a Lyapunov-Krasovskii functional and get the derivation of it for the integer system. However, when talking about the fractional ones, it will be hard to define the Lyapunov function and get the Caputo-type derivation of it due to the complicated computing. At the same time, we know that in many practical systems especially FOS, the states of a system are not always measurable or have practical sense, so the design of a state observer is crucial for controlling the system, which shows the interest of observer design researches. Thanks to (Trigeassou, Maamri, Sabatier & Oustaloup, 2011), we can deal with the Lyapunov-Krasovskii functionals as in the integer atmosphere. And the fact shows that the indirect the Lyapunov-Krasovskii functionals is efficient such as (Boroujeni & Momeni, 2012; Lan, Gu, Chen, Zhou & Luo, 2014).

The contribution of this paper lies in two aspects. Firstly, we address some LMI-like conditions for the nonlinear fractional-order systems with disturbances. Secondly, we use the indirect Lyapunov method to deduce the criteria, which can avoid the tedious computation.

preliminaries

Definition 1 (Kilbas, Srivastava & Trujillo, 2006) The fractional integral with non-integer order $\alpha > 0$ of function $x(t)$ is defined as follows:

$${}_0 I_t^\alpha x(t) = \frac{1}{\Gamma(\alpha)} \int_0^t (t-\tau)^{\alpha-1} x(\tau) d\tau$$

Where $x(t) \in \mathbb{R}^n$ is an arbitrary integrable function and $\Gamma(\bullet)$ is the Gamma function. $\Gamma(s) = \int_0^\infty t^{s-1} e^{-t} dt$

Definition 2 (Kilbas, Srivastava & Trujillo, 2006) The Caputo derivative with fractional order α of function $x(t)$ is given by

$${}_0^C D_t^\alpha = \frac{1}{\Gamma(k-\alpha)} \int_0^t (t-\tau)^{k-\alpha-1} x^k(\tau) d\tau$$

Where \mathbf{k} is the first larger than α , i.e. $k-1 < \alpha < k, k \in \mathbb{Z}^+$.

For simplicity, we denote the fractional integral ${}_0 I_t^\alpha$ by I^α and the Caputo derivative ${}_0^C D_t^\alpha$ by D^α , respectively.

Definition 3 (Trigeassou & Maamri, 2009) Consider a linear system such as:

$$y(t) = h(t) \bullet u(t),$$

Where \bullet is the convolution operator.

The impulse response $h(t)$ verify the pseudo-Laplace transform definition from (Matignon, 1994):

$$h(t) = \int_0^\infty \mu(\eta) e^{-\eta t} d\eta$$

Where $\mu(\eta)$ is called the diffusive representation (G. Montseny)(sometimes we call it frequency weighting function) of the impulse response $h(t)$, which has the following form

$$\mu(\eta) = \frac{\sin(\alpha\pi)}{\pi} \eta^{-\alpha}$$

Lemma 1 (Chen & Zhang, 2007) Consider a non-linear fractional derivative system:

$$D^\alpha x(t) = g(x(t)) \quad (2)$$

Due to the continuous frequency distributed model of the fractional integrator, the non-linear fractional system (2) can be expressed as:

$$\begin{cases} \frac{\partial \Phi(\eta, t)}{\partial t} = -\eta \Phi(\eta, t) + g(x(t)) & (3a) \\ x(t) = \int_0^\infty \mu(\eta) \Phi(\eta, t) d\eta & (3b) \end{cases}$$

Where $\mu(\eta)$ is given by (1).

SYSTEM DESCRIPTION AND CONTROLLER DESIGN

Then we consider a fractional-order system of the form:

$$\begin{cases} D^\alpha x(t) = Ax(t) + B_u u(t) + f(x, u) + B_w w(t) & (4a) \\ y(t) = Cx(t) & (4b) \\ z(t) = C_1 x(t) + D_1 u(t) & (4c) \\ x(0) = x_0 & (4d) \end{cases}$$

For any $\hat{x}(t), x(t) \in \mathbb{R}^n$, there exist a positive constant λ such that the nonlinearity $f(x, u)$ verifies the Lipschitz constraints:

$$\|f(x(t), u(t)) - f(\hat{x}(t), u(t))\| < \lambda \|x(t) - \hat{x}(t)\|$$

for any $t \in [0, H]$. It is assumed that $f(0, u) = 0$.

Without loss of generality, we also assume that the system (4) are controllable and observable.

Definition 4 (Shen, Zang & Tamura, 2009) Given a prescribed scalar $\gamma > 0$, the system(4) is said to be stable with H_∞ disturbance attenuation γ if the matrix A is stable and satisfies

$$J = \int_0^\infty (z^T(t)z(t) - \gamma^2 w^T(t)w(t)) dt \leq 0$$

Then the observer-based control for the practical implement is considered in the following form:

$$\begin{cases} D^\alpha \hat{x}(t) = A\hat{x}(t) + B_u u(t) + f(\hat{x}, u) + L(y(t) - C\hat{x}(t)) & (5a) \\ \hat{y}(t) = C\hat{x}(t) & (5b) \\ u(t) = K\hat{x}(t) & (5c) \end{cases}$$

where, $\hat{x}(t)$ is the observer state, L is an observer gain matrix, K is a feedback gain matrix with proper dimensions.

Therefore, the aim is to give a observer-based H_∞ controller in spite of observer and controller gain variations.

Let $e(t) = x(t) - \hat{x}(t)$ denote the error signal, then we obtain the following system from (4) and (5):

$$\begin{cases} D^\alpha e(t) = Ae(t) + (B_u - B_u)K\hat{x}(t) + f(x, u) - f(\hat{x}, u) - LCe(t) + B_w w(t) & (6a) \\ D^\alpha \hat{x}(t) = A\hat{x}(t) + B_u u(t) + f(\hat{x}, u) + LCe(t) + B_w w(t) \\ = (A + B_u K)\hat{x}(t) + LCe(t) + f(\hat{x}, u) & (6b) \end{cases}$$

which can be rewritten as:

$$\begin{aligned} \text{where} \quad D^\alpha X(t) &= \tilde{A}X(t) + \tilde{f}(x, u) + \tilde{B}_w w(t) \\ \tilde{A} &= \begin{bmatrix} A + B_u K + B_u K & LC \\ (B_u - B_u)K & A - LC \end{bmatrix} \quad \tilde{f} = \begin{bmatrix} f(\hat{x}, u) \\ f(x, u) - f(\hat{x}, u) \end{bmatrix} \quad \tilde{B}_w = \begin{bmatrix} 0 \\ B_w \end{bmatrix} \end{aligned}$$

In this paper our objective is to develop a procedure to design a controller of the form (5) such that the closed-loop system (7) is asymptotically stable and satisfies $\|T_{zw}(s)\|_\infty < \gamma$, then we say system (5) is a H_∞ observer.

MAIN RESULTS AND PROOFS

Lemma 2 (Cauchy matrix inequality) For any positive matrix $N \in \mathbb{R}^{n \times n}$, we have $2x^T y, x^T N x + y^T N^{-1} y, \forall x, y \in \mathbb{R}^n$.

Lemma 3 For any positive scalar $\varepsilon > 0$, we have

$$2x^T P y, \varepsilon x^T x + \varepsilon^{-1} y^T P^T P y, \forall x, y \in \mathbb{R}^n.$$

Proof In Lemma 2, we can define $N = \varepsilon I$, and easily get $2x^T z, \varepsilon x^T x + \varepsilon^{-1} z^T z$, and let, then we have $2x^T P y, \varepsilon x^T x + \varepsilon^{-1} y^T P^T P y, \forall x, y \in \mathbb{R}^n$ (8)

Lemma 4[34] Given matrices Q, H, E and R of appropriate dimensions and with Q is symmetrical and $R > 0$, then $Q + HFE + E^T F^T H^T < 0$, for all F satisfying $F^T F \leq R$, if and only if there exist $\varepsilon > 0$, such that $Q + \varepsilon^2 H H^T + \varepsilon^{-2} E^T R E < 0$.

In this paper, a observer-based control (5) will be designed and satisfies the following conditions:

(i) With $w(t) = 0$, the closed-loop system 4 with 5 is exponentially stable with convergence rate $\rho > 0$.

(ii) With zero initial conditions (i.e. $x(0) = \hat{x}(0) = 0$)

$$J = \int_0^\infty (z^T(t)z(t) - \gamma^2 w^T(t)w(t)) dt \neq 0$$

(i.e.) $\sup_{0 \neq w \in L_2[0, \infty)} \frac{\|z\|_2}{\|w\|_2} \neq \gamma$

Lemma 5[35] Let be matrices of appropriate dimensions.

Then the linear matrix inequality

$$\begin{bmatrix} H & P^T \\ P & R \end{bmatrix} < 0 \quad (9)$$

is equivalent to $R < 0, H - P^T R^{-1} P < 0$.

Theorem 1 Under the assumption of Lipschitz, there exist a observer-based control (5) such that the closed-system of (4) has the H_∞ -performance if there exist matrices L, K and B_1 , two positive definite symmetric matrices \bar{P}_1, \bar{P}_2 and two positive constants δ, γ such that

Minimize γ ,

$$\begin{bmatrix} \Theta_{11} & \Theta_{12} & 0 & \Theta_{14} \\ * & \Theta_{22} & B_w & \bar{P}_2 C_1^T \\ * & * & -\gamma^2 I & 0 \\ * & * & * & -I \end{bmatrix} < 0 \tag{10}$$

where

$$\begin{aligned} \Theta_{11} &= (A+B_1K)\bar{P}_1 + \bar{P}_1(A^T + K^T B_1^T) + \delta I + \delta^{-1}\gamma^2 \bar{P}_1^2, \\ \Theta_{12} &= LC\bar{P}_2 + \bar{P}_1 K^T (B_u - B_1)^T, \\ \Theta_{14} &= \bar{P}_1 (C_1^T + K^T D_1^T), \\ \Theta_{22} &= (A-LC)\bar{P}_2 + \bar{P}_2 (A^T - C^T L^T) + \delta I + \delta^{-1}\gamma^2 \bar{P}_2^2. \end{aligned}$$

Proof By using Lemma 1, equation (7) can be rewritten as the following forms:

$$\begin{cases} \frac{\partial \phi(\eta, t)}{\partial t} = -\eta \phi(\eta, t) + \tilde{A}X(t) + \tilde{f}(x, u) + \tilde{B}_w w(t) \\ X(t) = \int_0^\infty \mu(\eta) \phi(\eta, t) d\eta \end{cases}$$

We can consider the following monochromatic Lyapunov function corresponding to the elementary frequency ω defined as: $v(t) = \phi^T(\eta, t)P\phi(\eta, t)$, where $P > 0$.

The partial derivative of $v(t)$ with respect to $\phi(\eta, t)$ and t are given by

$$\frac{\partial v(t)}{\partial \phi(\eta, t)} = 2\phi^T(\eta, t)P$$

and we have

$$\begin{aligned} \frac{\partial v(t)}{\partial t} &= \frac{\partial v_1(t)}{\partial \phi(\eta, t)} \frac{\partial \phi(\eta, t)}{\partial t} \\ &= 2\phi^T(\eta, t)P[-\eta \phi(\eta, t) + \tilde{A}X(t) + \tilde{f}(x, u) + \tilde{B}_w w(t)] \end{aligned}$$

Now, a Lyapunov function candidate $V(t)$ is defined by summing all the monochromatic $v(\eta, t)$ with the weighting $\mu(\eta)$, i.e. $V(t)$ is given by

The dynamic of the Lyapunov function along the solution trajectories of (4) is

$$V(t) = \int_0^\infty \mu(\eta) v(\eta, t) d\eta. \tag{13}$$

$$\begin{aligned} \frac{dV(t)}{dt} &= \int_0^\infty \mu(\eta) \frac{\partial v(t)}{\partial t} d\eta \\ &= 2 \int_0^\infty \mu(\eta) \phi^T(\eta, t) P [-\eta \phi(\eta, t) + \tilde{A}X(t) + \tilde{f}(x, u) + \tilde{B}_w w(t)] d\eta \\ &= -2 \int_0^\infty \eta \mu(\eta) \phi^T(\eta, t) P \phi(\eta, t) d\eta + 2 \int_0^\infty \mu(\eta) \phi^T(\eta, t) d\eta P [\tilde{A}X(t) + \tilde{f}(x, u) + \tilde{B}_w w(t)] \\ &\stackrel{(12a)}{=} -2 \int_0^\infty \eta \mu(\eta) \phi^T(\eta, t) P \phi(\eta, t) d\eta + 2X^T(t) P [\tilde{A}X(t) + \tilde{f}(x, u) + \tilde{B}_w w(t)] \\ &< 2X^T(t) P [\tilde{A}X(t) + \tilde{f}(x, u) + \tilde{B}_w w(t)] \\ &\leq 2X^T(t) P \tilde{A}X(t) + \delta X^T(t) P^2 P X(t) + \delta^{-1} \tilde{f}^T \tilde{f} + 2X^T(t) P \tilde{B}_w w(t) \end{aligned} \tag{14}$$

$$\begin{aligned} \tilde{f}^T \tilde{f} &= [f^T(\hat{x}, u) \quad (f(x, u) - f(\hat{x}, u))^T] \begin{bmatrix} f(\hat{x}, u) \\ f(x, u) - f(\hat{x}, u) \end{bmatrix} \\ &= \|f(\hat{x}, u)\|^2 + \|f(x, u) - f(\hat{x}, u)\|^2 \\ &< \gamma^2 \|\hat{x}\|^2 + \gamma^2 \|x - \hat{x}\|^2 \\ &= \gamma^2 \tilde{x}^T(t) \tilde{x}(t) + \gamma^2 e^T(t) e(t) \end{aligned} \tag{15}$$

Under the assumption, we can deduce that:

From the system (4) and condition (14) with (15), we have:

$$\dot{V}(v(t)) \leq \begin{bmatrix} X^T(t) & w^T(t) \end{bmatrix} \begin{bmatrix} \Sigma_{11} & \Sigma_{12} & 0 \\ * & \Sigma_{22} & P_2 B_w \\ * & * & 0 \end{bmatrix} \begin{bmatrix} X(t) \\ w(t) \end{bmatrix}$$

where

$$\begin{aligned} \Sigma_{11} &= P_1(A+B_1K+B_1) + (A^T + K^T B_1^T + B_1^T)P_1 + \delta P_1^2 + \delta \gamma^2 I, \\ \Sigma_{12} &= P_1 LC + K^T (B_u - B_1)^T P_2, \\ \Sigma_{22} &= P_2[A-LC] + (A^T - C^T L^T)P_2 + \delta P_2^2 + \delta^{-1}\gamma^2 I. \end{aligned}$$

Then we have

$$\text{where, } Y^T(t) = \begin{bmatrix} X^T(t) & w^T(t) \end{bmatrix}.$$

While $\dot{V}(v(t)) - \gamma^2 w^T(t)w(t) \leq Y^T(t)\Omega Y(t)$.

$$\Omega = \begin{bmatrix} \Sigma_{11} & \Sigma_{12} & 0 \\ * & \Sigma_{22} & P_2 B_w \\ * & * & -\gamma^2 I \end{bmatrix}$$

$$\begin{aligned} z^T(t)z(t) &= [C_1 x(t) + D_1 u(t)]^T [C_1 x(t) + D_1 u(t)] \\ &= [e^T(t)C_1^T + \hat{x}^T(t)(C_1^T + K^T D_1^T + D_1^T)] [C_1 e(t) + (C_1 + D_1 K + D_1)\hat{x}(t)] \\ &= e^T(t)C_1^T C_1 e(t) + \hat{x}^T(t)(C_1^T + K^T D_1^T + D_1^T)(C_1 + D_1 K + D_1)\hat{x}(t) \\ &\quad + e^T(t)C_1^T (C_1 + D_1 K + D_1)\hat{x}(t) + \hat{x}^T(t)(C_1^T + K^T D_1^T + D_1^T)C_1 e(t) \\ &= Y^T(t)\hat{\Omega}^T \hat{\Omega} Y(t) \end{aligned}$$

where

$$\hat{\Omega}^T = \begin{bmatrix} C_1^T + K^T D_1^T + D_1^T \\ C_1^T \\ 0 \end{bmatrix}$$

So we can deduce from the above formula that

$$\dot{V}(v(t)) + z^T(t)z(t) - \gamma^2 w^T(t)w(t) \leq Y^T(t)(\Omega + \hat{\Omega}^T \hat{\Omega})Y(t)$$

Using Lemma 5, $\Omega + \hat{\Omega}^T \hat{\Omega} < 0$ is equivalent to .

$$\bar{\Omega} = \begin{bmatrix} \check{\Omega} & \hat{\Omega}^T \\ \hat{\Omega} & -I \end{bmatrix} < 0$$

Pre- and post-multiplying and its

$$\begin{bmatrix} P_1^{-1} & & & \\ & P_2^{-1} & & \\ & & I & \\ & & & I \end{bmatrix} = \begin{bmatrix} \bar{P}_1 & & & \\ & \bar{P}_2 & & \\ & & I & \\ & & & I \end{bmatrix}$$

transpose, we have

$$\tilde{\Omega} = \begin{bmatrix} \Theta_{11} & \Theta_{12} & 0 & \Theta_{14} \\ * & \Theta_{22} & B_w & \bar{P}_2 C_1^T \\ * & * & -\gamma^2 I & 0 \\ * & * & * & -I \end{bmatrix}$$

Here we can get the conclusion. Integrating the inequality in

$$V(v(\infty)) - V(v(0)) + \|z(t)\|_2^2 - \gamma^2 \|w(t)\|_2^2 \leq 0$$

(16) from 0 to ∞ , we have .

$$V(v(0)) = 0, V(v(\infty)) \geq 0 \quad \text{With zero initial condition, we have, then we get .}$$

$$\|z(t)\|_2 \leq \gamma \|w(t)\|_2$$

Conclusion

In this paper, the H_∞ observer-based controls for the nonlinear fractional-order systems with $0 < \alpha < 1$ has been considered. A series of criteria have been derived by applying indirect Lyapunov method and some lemmas. Then we have transformed all the conditions into a feasibility problem including LMIs.

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A New Chosen Ciphertext Secure Certificateless Threshold Decryption Scheme from Pairing

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Abstract: In distributed systems threshold cryptosystems are important to avoid single point of failure. This paper studies threshold decryption in the context of Certificateless Public Key Cryptography, aiming to avoid costly management of certificate in Public Key Infrastructure and settle the matter of key escrow in Identity-Based Cryptography. Combining Paterson and Al-Riyami's security model of certificateless encryption schemes with the notion of threshold cryptography, an improved certificateless threshold decryption structure is constructed. Furthermore, we present a new security model concerning certificateless threshold decryption schemes. Compared with previous studies, our study is more generic and effective because of less requirement of broadcast information. The new scheme which consists of ten algorithms can not only remove the problem of the centralization of decryption power by means of distributing the power among several servers, but also be proved secure in the proposed adaptive adversarial model. Security proof can be presented under the condition of hard computation of a problem in relation to Bilinear Diffie-Hellman Problem in the random oracle model.

Key words: threshold decryption, certificateless public key cryptography, adaptive chosen-ciphertext attack, bilinear map

1. Introduction

Certificateless Public Key Cryptography (CLPKC) has been put forward by Al-Riyami and Paterson (2003). CLPKC avoids costly management of certificate in "Public Key Infrastructure" (PKI) and settles a matter of key escrow in Identity-Based Cryptography (IBC). Recently, a variety of certificateless encryption schemes derived from pairings were proposed (e.g., Cheng & Comley, 2005; Shi & Li, 2005; Zhang & Feng, 2005; Libert & Quisquater, 2006; Bentahar, Farshim, Malone-Lee, & Smart, 2008). The first certificateless encryption scheme without pairings was constructed by Baek, Safavi-Naini and Susilo (2005). Afterwards, Sun, Zhang and Baek (2007) constructed a new strongly secure scheme without pairings. Dent, Libert and Paterson (2008) found a new security model in the standard model. Yang, Zhang and Shen (2014) proposed an effective certificateless encryption scheme, in which attacks of malicious Key Generation Center (KGC) can be withstanding.

Threshold cryptosystems are important in distributed systems, and will be useful if any single person is not trusted by people. Secret key is shared among all decryption servers in threshold decryption approach. Aiming to generate decryption shares, decryption servers can perform the decryption operation all alone. Then decryption shares will be collected and combined for the recovering of plaintext by a combiner. Consequently threshold decryption removes the problem of the centralization of the decryption power by means of distributing the power among several

servers. Related details of security model of threshold cryptosystem were given by Fouque and Pointcheval (2001) and Shoup and Gennaro (2002).

Threshold decryption in the context of PKC and IBC has been studied for a long time. Boneh and Franklin (2001) used the techniques of threshold cryptography and created a new structure called "Distributed Private Key Generator(PKG)". In their scheme, a (t, n) secret-sharing method proposed by Shamir (1979) is employed to distribute the master key s among different PKGs so that every PKG can obtain the share $s_i \in Z_q^*$. Each PKG can compute a user's private key share. Afterward, Boneh and Franklin implied that each PKG who has got a share s_i of the master key s should be able to function as a decryption server for threshold decryption.

However, Baek and Zheng (2004) argued the low practicability of this approach as every PKG should be on-line aiming to generate the decryption shares. They presented a new structure where a private key was shared instead of sharing the master key. Their proposed scheme *IdThBm* is the first identity-based threshold decryption scheme. A series of study (e.g., Chai, Cao & Lu, 2004; Mei, He & Zheng, 2005; Long, Chen & Hong, 2006; Liu, Chen & Qiu, 2007; Long, Chen & Liu, 2007) on identity-based threshold decryption were evoked by their work.

In 2007, Long and Chen (2007) studied threshold decryption in certificateless cryptography and firstly presented a certificateless threshold decryption scheme. They proved their scheme can resist threshold chosen-ciphertext attacks in the random oracle model. The

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security proof utilized the assumption that some potential problems concerning Bilinear Diffie-Hellman Problem are difficult to calculate. Two novel certificateless threshold decryption schemes (Zhang, 2009; Yang, Cao & Dong, 2009) were presented respectively. Both two schemes were studied in the standard model. A common drawback of them lies in short of a method to verify the validity of the decryption shares. This may result in a false plaintext due to invalid decryption shares from some (maybe dishonest) decryption servers. In the scheme provided by Zhang (2009), the KGC generates and distributes shares of the partial private keys among the decryption servers. This is not preferable and adds an additional burden to the KGC. Also note that the distributed key generation algorithm is not secure as pointed out by Gennaro, Jarecki, Krawczyk and Rabin (1999). The scheme proposed by Yang et al. (2009) requires a very long public key and master key. Typically, a master key consists of $n+3$ elements of Z_q^* . A public key is composed with $n+1$ elements in G plus one element in G_T , in which n denotes an identity's bit length, q denotes the order of bilinear groups G and G_T . The computational cost is also very heavy. Therefore it is not efficient for practical applications.

This study put forward a strong security model and a secure and efficient certificateless threshold decryption scheme. Compared to previous schemes, the construction of our scheme was focused on the improvement of the generality and the reduction of computation.

2. Preliminaries

2.1 Bilinear Map

G_1 and G_2 denote the groups of the same order q . The generator of G_1 is described as P . A bilinear map $\hat{e}: G_1 \times G_1 \rightarrow G_2$ satisfies the conditions as follows:

- (1) Bilinear: $\hat{e}(xM, yN) = \hat{e}(M, N)^{xy} = \hat{e}(xyM, N)$ for $M, N \in G_1$ and $x, y \in Z_q^*$.
- (2) Non-degenerate: $\hat{e}(P, P)$ will be G_2 's generator when P is G_1 's generator.
- (3) Computable: For any $M, N \in G_1$, $\hat{e}(M, N)$ is able to be calculated.

2.2 Bilinear Diffie-Hellman Assumption

We firstly describe the **Bilinear Diffie-Hellman Problem (BDHP)** as below:

Given $\langle P, xP, yP, zP \rangle$ with randomly chosen $x, y, z \in Z_q^*$, BDHP aims to calculate $W = \hat{e}(P, P)^{xyz}$ in $\langle G_1, G_2, \hat{e} \rangle$.

Bilinear Diffie-Hellman Assumption: Assumed Ig is a randomized algorithm called BDH parameter generator (Boneh & Franklin, 2001), which inputs a security parameter and outputs $\langle q, G_1, G_2, \hat{e} \rangle$. It is assumed that no randomized polynomial time algorithm A can work out the BDHP for Ig with non-negligible advantage.

The Bilinear Diffie-Hellman assumption is utilized in our

security analysis. A problem which is reduced to the BDHP is used for our security proof.

3. A New Certificateless Threshold Decryption Scheme

Definition 1 (CLThdBm): Our new construction called "CLThdBm" represents "Certificateless threshold decryption scheme from the bilinear map" and comprises ten algorithms as follows.

Setup: Input a security parameter sp , run a BDH parameter generator Ig and then produce $\langle G_1, G_2, \hat{e} \rangle$ which satisfies the conditions in **Section 2.1**. P is an arbitrary generator of G_1 . From Z_q^* , a master-key m is selected randomly and uniformly, then we set $P_0 = mP$. Four hash functions H_i ($1 \leq i \leq 4$) are chosen: $H_1: \{0,1\}^* \rightarrow G_1^*$; $H_2: G_2 \rightarrow \{0,1\}^l$; $H_3: G_1^* \times \{0,1\}^l \rightarrow G_1^*$; $H_4: G_2^4 \rightarrow Z_q^*$, in which l means plaintexts' bit-length. This algorithm outputs m and system parameters $pms = \langle G_1, G_2, \hat{e}, l, P, P_0, H_i \rangle (1 \leq i \leq 4)$. KGC publishes pms authentically and keeps m in private.

Partial-Private-Key-Ext: On input an identity ID , the procedure outputs $D_{ID} = m? H_1(ID)$ as the partial private key. KGC delivers D_{ID} to entity through a confidential way.

Secret-Value-Set: Given pms and an identity ID as inputs, the entity itself chooses x_{ID} randomly from Z_q^* and sets x_{ID} as secret value.

Public-Key-Set: The inputs are pms and x_{ID} . The public key $PB_{ID} = \langle M_{ID}, N_{ID} \rangle$ ($M_{ID} = P? x_{ID}$, $N_{ID} = x_{ID}? P_0$, $x_{ID} \hat{e} \hat{e} m P$) will be returned.

Private-Key-Set: The inputs are pms , x_{ID} and partial private key D_{ID} . The full private key for ID will be returned as $SK_{ID} = x_{ID} D_{ID}$.

Private-Key-Share: This algorithm inputs a threshold value t , the number n of decryption servers and an entity ID 's private key SK_{ID} , and selects R_1, R_2, \dots, R_{t-1} from G_1^* at random. It then designs $W(u) = SK_{ID} + \sum_{j=1}^{t-1} u^j R_j$ and calculates each decryption server Γ_i 's private key share $sk_i = W(i)$. Meanwhile, it computes $vk_j = \hat{e}(R_j, P)$ for $1 \leq j \leq t-1$, and $vk_0 = \hat{e}(SK_{ID}, P)$. Subsequently, it broadcasts $\{(i, vk_j): 0 \leq j \leq t-1\}$ authentically, and sends (i, SK_i) to Γ_i in secret. Each server Γ_i checks the accuracy of sk_i through verifying if $\hat{e}(sk_i, P) = \prod_{j=0}^{t-1} vk_j^{i^j}$.

Encrypt: Given a public key $PB_{ID} = \langle M_{ID}, N_{ID} \rangle$ of an entity and a message M as inputs, this algorithm examines if $\hat{e}(M_{ID}, s \times P) = \hat{e}(N_{ID}, P)$ holds. When the equation is failed, it outputs \perp and aborts. Otherwise, it computes $Q_{ID} = H_1(ID)$ and chooses a value u from Z_q^* randomly. The output is the ciphertext $C = (X, Y, Z)$ where $X = u \times P$, $Y = H_2(\hat{e}(Q_{ID}, N_{ID})^u) \oplus M$ and $Z = u \times H_3(X, Y)$.

Decryption-Share-Gen: For each decryption server Γ_i , this algorithm takes Γ_i 's private key share sk_i of SK_{ID} as well as a ciphertext C generated under the public key PB_{ID} as inputs. This algorithm first verifies whether $\hat{e}(P, Z) = \hat{e}(X, H_3(X, Y))$ to check

C 's validity. When this equation doesn't hold, it returns "Invalid Ciphertext". Else, Γ_i randomly picks $L_i \in G_1$ and then computes $\alpha_i = \hat{e}(sk_i, X)$, $\alpha_i' = \hat{e}(sk_i, P)$, $\beta_i = \hat{e}(L_i, X)$, $\beta_i' = \hat{e}(L_i, P)$, $\theta_i = H_4(\alpha_i, \alpha_i', \beta_i, \beta_i')$, $M_i = L_i + \theta_i \times sk_i$, and outputs $\delta_{i,C} = (i, \alpha_i, \alpha_i', \beta_i, \beta_i', \theta_i, M_i)$.

Decryption-Share-Verify: When inputting a ciphertext generated using entity ID 's public key PB_{ID} , a set of verification keys $\{vk_0, vk_1, \dots, vk_{t-1}\}$ corresponding to the private key shares $\{sk_1, \dots, sk_n\}$ of ID 's private key SK_{ID} , a decryption share $\delta_{i,C}$ generated by decryption server Γ_i , this algorithm will compute $Y_i = \prod_{j=0}^{t-1} vk_j^{y_j}$ and $\theta_i' = H_4(\alpha, Y_i, \beta, \beta')$.

At last, this algorithm tests whether $\hat{e}(M_i, P) / Y_i^{\theta_i'} = \beta_i'$, $\theta_i' = \theta_i$ and $\hat{e}(M_i, X) / \alpha_i^{\theta_i'} = \beta_i$. It returns "Valid Share" only if all above equations hold. Otherwise, it returns "Invalid Share".

Share-Combine: After inputting no less than t correct decryption shares $\{\delta_{j,C}\}_{j \in \phi}$ in which $|\phi| \geq t$ and a ciphertext $C = (X, Y, Z)$, this algorithm returns $M = Y \oplus H_2(\prod_{j \in \phi} \alpha_j^{\delta_{j,C}})$ where $c_{0_j}^{\delta_{j,C}} = \prod_{i \in \phi, i \neq j} i / (i - j)$.

In conclusion, the process of our new scheme can be shown in Figure 1.

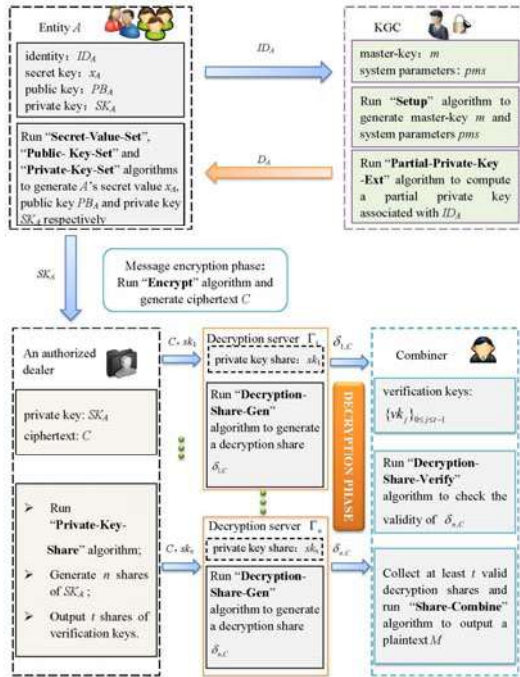


Fig 1 The process of CLThdBm

4. The Security Model for CLThdBm

Our new security model involves two parties, the challenger \mathcal{C} and the adversary \mathcal{A} . Similar to ordinary certificateless encryption schemes, adversaries in our security model has two types denoted by \mathcal{A}_I and \mathcal{A}_{II} respectively. \mathcal{A}_I can change entities' public keys casually, but cannot obtain the master-key. While \mathcal{A}_{II} is in

possession of master-key and cannot replace public keys. In addition, we allow adversaries to corrupt $t-1$ decryption servers in certificateless (t, n) threshold decryption schemes, and thus adversaries can own the corrupted decryption server's private key share.

Compared with the security model proposed by Long and Chen (2007), our security model is stronger because we eliminate some restrictions which are necessary in Long's paper. In order to transmit the partial private keys through public channels, Long applies the "binding technique" in which an identity's public key and secret value should be primarily fixed, and thus the partial private key was produced by KGC based on the binding of the identity and its public key. However, when an adversary has changed a public key, the challenger is incapable of computing partial private key in this situation. Hence, \mathcal{A}_I in the security model (Long & Chen, 2007) is not allowed to get corrupted decryption servers' key shares or partial private key when entity's public key was changed. Meanwhile \mathcal{A}_I cannot issue decryption queries on $\langle ID, PB_{ID}' \rangle$ where PB_{ID} has already been replaced by PB_{ID}' . We remove these two restrictions and construct a stronger security model.

A list of a general adversary's actions is presented as follows:

1. Partial private key extraction: \mathcal{A} may ask any identity ID 's partial private key of its choice. Challenger \mathcal{C} runs **Partial-Private-Key-Ext** algorithm to respond the adversary with D_{ID} .

2. Private key extraction: For an entity ID which is chosen by \mathcal{A} at its will, the challenger \mathcal{C} responds \mathcal{A} with SK_{ID} through **Private-Key-Set** algorithm.

3. Public key request: \mathcal{A} may ask any identity ID 's public key. \mathcal{C} produces PB_{ID} through **Public-Key-Set** algorithm.

4. Replace public key request: For any entity, \mathcal{A} can repetitively replace PB_{ID} using arbitrary value PB_{ID}' . Hereafter \mathcal{C} utilizes current value PB_{ID}' for any responses to the adversary's requests or any computations.

5. Decryption share query: \mathcal{A} may ask a decryption share of a ciphertext C from an uncorrupted decryption server Γ_i . To generate the decryption share, the challenger responds through the algorithm **Decryption-Share-Gen** on input Γ_i 's private key share sk_i and a ciphertext generated under the public key PB_{ID} .

Remark: In our security model, an adversary can make as many decryption share queries to different decryption servers as she wants. After having collected at least t valid decryption shares, she can recover the plaintext M by herself. Consequently, to avoid the repetition, it is unnecessary to provide adversaries with a decryption oracle in our security model.

Next we distinguish two kinds of adversary. \mathcal{A}_I could inquire or replace public keys, request private keys, partial private keys or decryption share of any identity. Several necessary restrictions on the behaviors of adversary \mathcal{A}_I are:

1. If ID^* has been selected as the challenge identity, \mathcal{A}_I is unable to extract ID^* 's private key anyhow.
2. If \mathcal{A}_I has replaced a public key, then she cannot request any private key.
3. \mathcal{A}_I should be forbidden to inquire a challenge identity ID^* 's partial private key and meanwhile replace ID^* 's public key.
4. \mathcal{A}_I should be forbidden to request a decryption share of the challenge ciphertext C^* .

\mathcal{A}_{II} could calculate partial private keys and model an eavesdropping KGC. \mathcal{A}_{II} may extract private keys and inquire decryption shares for any identity. The restrictions of \mathcal{A}_{II} are:

1. \mathcal{A}_{II} is unable to replace public keys in any case.
2. If ID^* has been selected as the challenge identity, adversary \mathcal{A}_{II} is unable to extract ID^* 's private key anyhow.
3. \mathcal{A}_{II} should be forbidden to request a decryption share on C^* .

Definition 2 (IND-CLTHD-CCA): A (t, n) CLTHD scheme is IND-CLTHD-CCA secure when no polynomial time \mathcal{A} has considerable advantages during interactions as follows:

Phase 1: \mathcal{C} carries out **Setup** on input a security parameter. When \mathcal{A} is a Type I attacker, \mathcal{C} publishes system parameters pms but holds master-key in private. On the contrary, \mathcal{A} will get pms as well as master-key.

Phase 2: A series of requests will be issued by \mathcal{A} , each of which could be one of the following items: inquire or replace public keys, request private keys or partial private keys. All the queries should be under restrictions defined above.

Phase 3: \mathcal{A} colludes with $t-1$ decryption servers. Then \mathcal{A} can obtain all verification keys and private key shares of $t-1$ decryption servers who has been corrupted.

Phase 4: \mathcal{A} outputs the challenge identity ID^* . It is noted that ID^* is unable to be an identity whose private key has been inquired. Furthermore, when \mathcal{A} acts as \mathcal{A}_I , ID^* should not be the identity whose partial private key was requested and public key has been replaced. On receiving ID^* , \mathcal{C} executes **Private-Key-Set** procedure to calculate SK_{ID^*} . \mathcal{C} then runs **Private-Key-Share** algorithm and obtains private key shares and verification keys. \mathcal{C} publishes $t-1$ corrupted decryption servers' private key shares and all verification keys. Nevertheless only \mathcal{C} knows uncorrupted servers' private key shares.

Phase 5: A second requests sequence is issued by \mathcal{A} . Similarly, each request could be one of the following items: inquire or replace public keys, request private keys or partial private keys of an especial entity, or a decryption share request of the uncorrupted decryption servers. The challenger \mathcal{C} responds the adversary as specified above. The adversary \mathcal{A} 's behavior is also subject to the restrictions defined above.

Phase 6: Two messages M_0 and M_1 with the same length are proposed by \mathcal{A} . \mathcal{C} selects a bit $b=0$ or $b=1$ randomly and

executes the **Encrypt** algorithm by input M_b and PB_{ID^*} to compute C^* . The adversary will immediately lose the game if the output of the **Encrypt** algorithm is \perp . On the contrary, the challenger delivers C^* to \mathcal{A} .

Phase 7: A third requests sequence similar to **Phase 5** is issued by \mathcal{A} . The challenger \mathcal{C} responds the adversary as specified above.

Phase 8: At the last step a guess b' will be output by \mathcal{A} . When $b' = b$, \mathcal{A} wins this game.

5. Security Analysis

Theorem 1 It is assumed that H_i ($1 \leq i \leq 4$) are four hash functions. *CLThdBm* is IND-CLTHD-CCA secure on condition that no randomized algorithm can work out BDHP with non-negligible advantage.

5.1 An Ordinary Threshold Decryption Scheme in Traditional PKC

A related threshold decryption scheme called "*BasicThd*" in traditional PKC is derived from our scheme to prove **Theorem 1**. We will reduce the security of our *CLThdBm* to that of *BasicThd*. The algorithms of *BasicThd* are as follows.

Setup: This algorithm runs *Ig* and gets $\langle G_1, G_2, \hat{e} \rangle$. P is a random generator of G_1 . Three hash functions H_i ($2 \leq i \leq 4$) are chosen as follows: $H_2: G_2 \rightarrow \{0, 1\}^l$, $H_3: G_1 \times \{0, 1\}^l \rightarrow G_1^*$, $H_4: G_2^4 \rightarrow Z_q^*$ in which l is plaintexts' bit-length. It randomly chooses x from Z_q^* , m from Z_q^* , and $Q \in G_1$. This algorithm generates private key $S = xmQ$ as well as the public key $PB = \langle G_1, G_2, \hat{e}, l, Q, P, M, N, P_0, H_i \rangle$, where $2 \leq i \leq 4$ and $M = xP$, $N = xmP$, $P_0 = mP$.

Private-Key-Share: This algorithm inputs a threshold value t , the number n of decryption servers and the private key, and selects R_1, R_2, \dots, R_{t-1} from G_1^* at random. It then designs $W(u) = S + \sum_{j=1}^{t-1} u^j R_j$ and calculates each decryption server Γ_i 's $sk_i = W(i)$. Meanwhile, it computes verification keys $vk_j = \hat{e}(R_j, P)$ where $1 \leq j \leq t-1$, and $vk_0 = \hat{e}(S, P)$. Subsequently, it broadcasts $\{(i, vk_j): 0 \leq j \leq t-1\}$ authentically, and transmits (i, SK_i) to Γ_i in secret. Each server Γ_i checks the accuracy of sk_i through verifying if $\hat{e}(sk_i, P) = \prod_{j=0}^{t-1} vk_j^{i^j}$.

Encrypt: This algorithm first examines if $\hat{e}(M, P_0) = \hat{e}(N, P)$. When this equation doesn't hold, it outputs \perp . Otherwise, this algorithm selects $u \in Z_q^*$ randomly. Then the output is the ciphertext $C = (X, Y, Z)$ where $X = u \times P$, $Y = H_2(\hat{e}(Q, N)^u) \oplus M$ and $Z = u \times H_3(X, Y)$.

Decryption-Share-Gen: For each decryption server Γ_i who holds valid private key share sk_i , it takes sk_i and a ciphertext C as inputs. The way to generate decryption share is similar with this algorithm in *CLThdBm*.

Decryption-Share-Verify and **Share-Combine:** These steps are similar with them in *CLThdBm*.

An IND-CCA adversary \mathcal{A}_I of *BasicThd* can substitute the public key according to his will. The challenger will use the current value to compute and response to the adversary's requests. If the encryption of M_b is \perp , then \mathcal{A}_I has failed. An IND-CCA adversary \mathcal{A}_{II} of *BasicThd* is similar with \mathcal{A}_I except that the adversary knows the value m and cannot replace the public key. Usually, no matter which type the adversary is, their task are both to obtain the surmise b' of b .

IND-CPA adversaries will be similar to IND-CCA adversaries, unless they are forbidden to inquire the decryption share.

5.2 Descriptions of Lemmas

Through combining Lemma 1 and Lemma 2, Theorem 1 for \mathcal{A}_I can be proved. Likewise, by combining Lemmas 3 and 4, Theorem 1 for \mathcal{A}_{II} can be confirmed.

Lemma 1: \mathcal{A}_I is an IND-CLTHD-CCA attacker of *CLThdBm*, it runs in time t . We assume this adversary issues up to q_{H_i} ($1 \leq i \leq 4$) queries to four hash functions as well as q_d decryption share requests respectively and has advantage ϵ_{CLTHD} . Then an IND-CPA attacker \mathcal{B} for the *BasicThd* can be constructed using \mathcal{A}_I as a subroutine. \mathcal{B} 's running time is t' . \mathcal{B} issues up to q'_{H_i} requests for H_i ($2 \leq i \leq 4$). We assume the probability that \mathcal{B} precisely responds to decryption share query is at least χ . Then \mathcal{B} has an advantage with a minimum value of $\epsilon_{CLTHD}\chi^{q_d} / 4q_{H_i}$, no matter he is \mathcal{B}_I or \mathcal{B}_{II} .

Lemma 2: Assume that an attacker \mathcal{B} mentioned in Lemma 1 has advantage ϵ_{THD} . A BDH attacker who is able to settle BDHP in groups produced by Ig can be constructed using \mathcal{B} as a subroutine. We use t_{BDH} to bound BDH attacker's running time.

Lemma 3: \mathcal{A}_{II} is an IND-CLTHD-CCA attacker against *CLThdBm* and its running time is t . We assume \mathcal{A}_{II} issues up to q_{H_i} ($1 \leq i \leq 4$) queries to four hash functions as well as q_d decryption share requests respectively and has advantage ϵ_{CLTHD} . Then an IND-CCA Type II attacker \mathcal{B} for the *BasicThd* scheme can be constructed using \mathcal{A}_{II} as a subroutine. \mathcal{B} runs in time t' and issues up to q'_{H_i} ($2 \leq i \leq 4$) requests for hash functions as well as q'_d decryption share requests respectively. The advantage bound can be achieved:

$$Succ_{CLThdBm}^{IND-CLTHD-CCA} (t, q_d, q_{H_1}, q_{H_2}, q_{H_3}, q_{H_4}) / q_{H_1} \leq Succ_{ThdBm}^{IND-CCA} (t', q'_d, q'_{H_2}, q'_{H_3}, q'_{H_4}) \text{ where } q'_d = q_d, q'_{H_2} = q_{H_2}, q'_{H_3} = q_{H_3}, q'_{H_4} = q_{H_4} \text{ for a security parameter } sp.$$

Lemma 4: A BDH attacker can be constructed using \mathcal{B} who has been mentioned in Lemma 3 as a subroutine. We use t_{BDH} to bound BDH attacker's running time. The advantage bound can be achieved: $Succ_{ThdBm}^{IND-CCA} (t', q'_d, q'_{H_2}, q'_{H_3}, q'_{H_4}) / 2 \leq Succ_{G_1}^{BDH} (t_{BDH}) + (q'_d + q'_d q'_{H_2}) / 2^{sp}$.

5.3 Proofs

Proof of Lemma 1: We assume that challengers have two kinds \mathcal{C}_I and \mathcal{C}_{II} , who will act with IND-CPA attackers \mathcal{B}_I and \mathcal{B}_{II}

respectively.

In the beginning, \mathcal{B} chooses η and φ randomly where $1 \leq \varphi \leq q_{H_1}$. When $\eta=0$, \mathcal{B} is a Type I attacker and plays against \mathcal{C}_I . When $\eta=1$, \mathcal{B} is a Type II attacker and plays against \mathcal{C}_{II} . By ID_φ , we denote the identity of \mathcal{B} 's φ -th request for H_1 and ID_φ is hoped to be the target identity.

Meanwhile, we define \mathbf{U} as the event that ID_φ has been selected as the challenge identity by \mathcal{A}_I . We define \mathbf{EV}_0 as the event that ID_φ 's partial private key is extracted by \mathcal{A}_I and \mathbf{EV}_1 as the event that \mathcal{A}_I changes ID_φ 's public key. Next we prove that \mathcal{B} 's advantage will be non-negligible when \mathcal{A}_I 's advantage is non-negligible.

Phase 1: \mathcal{B} will obtain the public key $\langle G_1, G_2, \hat{e}, l, Q, P, M, N, P_0, H_i \rangle$ where $2 \leq i \leq 4$ from a Type I challenger \mathcal{C}_I if $\eta=0$. Otherwise, \mathcal{B} will obtain the public key plus a value m from a Type II challenger \mathcal{C}_{II} if $\eta=1$. Afterwards algorithm **Setup** of *CLThdBm* will be simulated by \mathcal{B} to give \mathcal{A}_I $pms = \langle G_1, G_2, \hat{e}, l, P, P_0, H_i \rangle$ ($1 \neq i \leq 4$). We assume \mathcal{A}_I 's decryption servers are the same with \mathcal{B} 's decryption servers. Note that, as a random oracle, H_1 is controlled by \mathcal{B} . \mathcal{A}_I can issue queries to four hash functions. \mathcal{B} answers as below:

● **H_1 queries:** The initially empty H_1 list $\langle ID_i, e_i, x_i, F_i, M_i, N_i \rangle$ is maintained by \mathcal{B} . If H_1 is queried at ID , \mathcal{B} calculates $H_1(ID) = F_i$ when ID has existed at H_1 list. Otherwise, do the following:

1. If ID is the φ -th H_1 query, \mathcal{B} chooses $e_\varphi \in Z_q^*$ randomly, calculates $H_1(ID) = e_\varphi Q$, then a tuple $\langle ID, e_\varphi, \perp, e_\varphi Q, M, N \rangle$ is contained into H_1 list.

2. Else ID is the i -th ($i \neq \varphi$) H_1 query, \mathcal{B} selects $e_i \in Z_q^*$ and $x_i \in Z_q^*$ randomly, calculates $H_1(ID) = e_i P$ and then the tuple $\langle ID, e_i, x_i, e_i P, x_i P, x_i P_0 \rangle$ is contained into H_1 list.

● **H_2, H_3 and H_4 queries:** If \mathcal{A}_I proposes H_2, H_3 and H_4 queries, all of them can be passed to \mathcal{C} to answer.

Phase 2: After receiving pms from \mathcal{B} , \mathcal{A}_I can make several kinds of requests as below. The requests are replied by \mathcal{B} :

● **Partial Private Key Extraction of ID_i :**

1. If $i \neq \varphi$, then \mathcal{B} computes $D_{ID_i} = mH_1(ID_i) = m \times e_i P = e_i P_0$ and returns D_{ID_i} to \mathcal{A}_I .

2. If $i \neq \varphi$ and $\eta = 0$, \mathcal{B} tries to compute $D_{ID_\varphi} = mH_1(ID_\varphi) = m \times e_\varphi Q$. However, \mathcal{B} cannot reply \mathcal{A}_I because \mathcal{B} does not know m , and consequently \mathcal{B} has to abort.

3. If $i = \varphi$ and $\eta = 1$, \mathcal{B} replies with $m e_\varphi Q$ (\mathcal{B} knows m).

● **Public Key Request on ID_i :** If $i \neq \varphi$, \mathcal{B} will return $\langle M_i, N_i \rangle$ through the access of H_1 list. Otherwise, \mathcal{B} responds with $\langle M, N \rangle$.

● **Replace Public Key of ID_i :** Assume \mathcal{A}_I wants to set ID_i 's public key with a valid value $\langle M'_i, N'_i \rangle$.

1. If $\eta = 1$ and $i = \varphi$, \mathcal{B} is failed.

2. Otherwise, if $\eta = 0$ and $i = \varphi$, \mathcal{B} issues a replace public

key request to challenger \mathcal{C} so that $\langle M, N \rangle$ will be replaced with $\langle M'_\varphi, N'_\varphi \rangle$, else if $\eta = 0$ and $i \neq \varphi$, then $\langle M_i, N_i \rangle$ will be replaced with $\langle M'_i, N'_i \rangle$ in the H_1 list by \mathcal{B} .

● **Private Key Extraction of ID_i :** When ID_i 's public key is not changed, we perform the following:

1. When $i \neq \varphi$, \mathcal{B} computes $SK_{ID_i} = x_i e_i P_0$ and returns SK_{ID_i} to \mathcal{A}_I .
2. \mathcal{B} aborts when $i = \varphi$.

Phase 3 and 4: \mathcal{A}_I outputs the challenge identity ID^* whose private key has not been extracted. If $ID^* \neq ID_\varphi$, \mathcal{B} aborts.

\mathcal{A}_I colludes with $t-1$ decryption servers. \mathcal{A}_I can obtain all decryption servers' verification keys and corrupted decryption servers' private key shares $\{sk_i\}_{1 \leq i \leq t-1}$.

Phase 5: \mathcal{A}_I makes several kinds of requests as in **Phase 2**, and issues some decryption share requests for the uncorrupted decryption servers. Note that private key extraction on ID^* is forbidden. In addition, when the challenge identity's public key has been substituted in **Phase 2**, its partial private key should not be extracted. \mathcal{B} replies to decryption share requests as follows:

● **Decryption Share Request:** Suppose the request is to get the decryption shares of a ciphertext C for ID_i . We must note that \mathcal{B} should not utilize \mathcal{C} for answering this decryption share request in that \mathcal{B} represents an IND-CPA adversary.

1. If $i \neq \varphi$, \mathcal{B} can compute $SK_{ID_i} = x_i e_i P_0$ and run the **Private-Key-Share** algorithm to generate n shares of SK_{ID_i} . Then \mathcal{B} runs the **Decryption-Share-Gen** algorithm by inputting a private key share sk_i as well as the ciphertext and then obtains $\delta_{i,C} = (i, \alpha_i, \alpha'_i, \beta_i, \beta'_i, \theta_i, M_i)$. \mathcal{B} responds to \mathcal{A}_I with $\delta_{i,C}$.

2. In contrast $i = \varphi$, \mathcal{B} picks $SK_{ID_\varphi} \in G_1$ and $L_i \in G_1$ at random and selects R_1, R_2, \dots, R_{t-1} from G_1^* randomly. Then \mathcal{B} designs $W(v) = SK_{ID_\varphi} + \sum_{j=1}^{t-1} v^j R_j$ and calculates decryption server's private key share $sk_i = \hat{W}(i)$. Meanwhile, it computes verification keys $vk_j = \hat{e}(R_j, P)$ for $1 \leq j \leq t-1$, and $vk_0 = \hat{e}(SK_{ID_\varphi}, P)$. Then \mathcal{B} computes $\alpha_i = \hat{e}(sk_i, P)$, $\alpha'_i = \hat{e}(sk_i, X)$, $\beta_i = \hat{e}(L_i, P)$, $\beta'_i = \hat{e}(L_i, X)$, $\theta_i = H_4(\alpha_i, \alpha'_i, \beta_i, \beta'_i)$, $M_i = L_i + \theta_i \times sk_i$, and outputs $\delta_{i,C} = (i, \alpha_i, \alpha'_i, \beta_i, \beta'_i, \theta_i, M_i)$. \mathcal{B} sends vk_j ($0 \leq j \leq t-1$) and $\delta_{i,C}$ to \mathcal{A}_I .

Hereafter, \mathcal{A}_I is able to verify $\delta_{i,C}$'s validity by running the **Decryption-Share-Verify** algorithm.

\mathcal{A}_I Computes $\theta_i = H_4(\alpha_i, \alpha'_i, \beta_i, \beta'_i)$, $Y_i = \prod_{j=0}^{t-1} vk_j^{e_i^j}$ and tests whether $\hat{e}(M_i, X) / \alpha_i^{e_i} = \beta_i$, $\hat{e}(M_i, P) / Y_i^{e_i} = \beta'_i$ and $\theta_i = \theta_i$.

Consequently, due to the perfect coherence of the algorithms, we are sure that $\delta_{i,C}$ satisfies the conditions of validity test. So the simulation is identical to the real attack.

Remark: In Phase 5, we assume that if $i = \varphi$, \mathcal{A}_I is unable to issue a decryption share query for ciphertext C_1 which is the encryption of M for identity ID_j ($j \neq \varphi$) under PB_j , and meanwhile makes the decryption share query on the ciphertext C_2

which is the encryption of M for ID_φ under PB_φ .

Phase 6: \mathcal{A}_I submits two plaintexts (M_0, M_1) whose length are equal. \mathcal{A}_I wishes that this pair of messages will be challenged on. Then \mathcal{B} gives (M_0, M_1) to \mathcal{C} as its plaintext-pair. \mathcal{C} selects a bit $b=0$ or $b=1$ randomly, computes $C' = \langle X', Y', Z' \rangle$ and sends C' to \mathcal{B} . Afterwards \mathcal{B} offers $C^* = \langle e_\varphi^{-1} X', Y', Z' \rangle$ to \mathcal{A}_I . Obviously C^* is an encryption for M_b through ID_φ 's public key in $CLThdBm$.

Phase 7: \mathcal{A}_I issues several requests again, and just like **Phase 5**, all requests will be replied by \mathcal{B} .

Phase 8: \mathcal{A}_I generates b' as the guess. Then \mathcal{B} submits its guess b' .

Analysis: The simulation can be the same as the real attack when \mathcal{B} has not aborted, and we can get $2(\Pr[b = b'] - 1/2) \geq \epsilon_{CLThdBm}$.

We see that \mathcal{B} may abort in case:

1. $\eta = 0$ and the event \mathbf{EV}_0 occurred, or
2. $\eta = 1$ and event \mathbf{EV}_1 occurred, or
3. $ID_\varphi \neq ID^*$, or
4. \mathcal{A}_I extracted ID_φ 's private key.

Using the method described by Al-Riyami and Paterson (2003), we can get the probability that \mathcal{B} has not aborted is with a minimum of $1/2q_{H_1}$.

We assume that χ is the minimum of the probability that \mathcal{B} responds to each decryption share request correctly. So \mathcal{B} 's advantage is greater than $\epsilon_{CLThdBm} \chi^{q_u} / 2q_{H_1}$. No matter \mathcal{B} acts as \mathcal{A}_I or \mathcal{A}_{II} , its advantage is at least $\epsilon_{CLThdBm} \chi^{q_u} / 4q_{H_1}$.

Proof of Lemma 3: We assume that \mathcal{C} is the challenger who will act with the Type II IND-CCA attacker \mathcal{B} for *BasicThd*.

Phase 1: \mathcal{B} will obtain $\langle G_1, G_2, \hat{e}, l, Q, P, M, N, P_0, H_1 \rangle$ where $2 \leq i \leq 4$ together with m from \mathcal{C} , and then choose a value of $\varphi \in [1, q_{H_1}]$ randomly. Afterwards algorithm **Setup** of *CLThdBm* will be simulated by \mathcal{B} to supply \mathcal{A}_{II} with m and $pms = \langle G_1, G_2, \hat{e}, l, P, P_0, H_1 \rangle$ ($1 \neq i \neq 4$). Note that H_1 is managed by \mathcal{B} . \mathcal{A}_{II} can issue queries to four hash functions and \mathcal{B} responds as follows:

● **H_1 queries:** An initially empty list $\langle ID_i, F_i, e_i, x_i \rangle$ called H_1 list is maintained by \mathcal{B} . If H_1 is queried at ID , \mathcal{B} calculates $H_1(ID) = F_i$ when ID has existed at H_1 list. Otherwise, do the following:

1. If ID is the φ -th H_1 query, \mathcal{B} chooses $e_\varphi \in Z_q^*$ randomly, calculates $H_1(ID) = e_\varphi Q$ and then the tuple $\langle ID, e_\varphi Q, e_\varphi, \perp \rangle$ is contained into the H_1 list.

2. Else ID is the i -th ($i \neq \varphi$) H_1 query, \mathcal{B} selects $e_i \in Z_q^*$ and $x_i \in Z_q^*$ randomly and calculates $H_1(ID) = e_i P$, then the tuple $\langle ID, e_i P, e_i, x_i \rangle$ is contained into H_1 list.

● **H_2, H_3 and H_4 queries:** If \mathcal{A}_I proposes H_2, H_3 and H_4 queries, all of them can be passed to \mathcal{C} to answer.

Phase 2: \mathcal{A}_{II} makes several kinds of requests as below. The

requests are replied by \mathcal{B} .

● **Public Key Request on ID_i** : If $i \neq \varphi$ \mathcal{B} returns $\langle x, P, x, mP \rangle$. Otherwise, \mathcal{B} responds with $\langle M, N \rangle$.

● **Private Key Extraction on ID_i** :

1. When $i \neq \varphi$, \mathcal{B} finds the tuple $\langle ID_i, F_i, e_i, x_i \rangle$ in H_1 list, computes $SK_{ID_i} = x_i m F_i$ and returns SK_{ID_i} to \mathcal{A}_{II} .

2. If $i = \varphi$ \mathcal{B} aborts.

Phase 3 and 4: \mathcal{A}_{II} outputs the challenge identity ID^* whose private key has not been extracted and the entity ID^* has been inquired to H_1 . If $ID^* \neq ID_\varphi$ \mathcal{B} aborts. \mathcal{A}_{II} corrupts $t-1$ decryption servers so that \mathcal{A}_{II} can obtain all verification keys as well as corrupted decryption servers' private key shares $\{sk_i\}_{1 \leq i \leq t-1}$.

Phase 5: \mathcal{A}_{II} makes several kinds of requests as in **Phase 2**, and a decryption share request for the uncorrupted decryption servers. To answer the decryption share request, \mathcal{B} passes decryption share queries to its challenger \mathcal{C} and then utilizes its decryption servers.

Phase 6: \mathcal{A}_{II} submits two plaintexts (M_0, M_1) whose length are equal. \mathcal{A}_{II} wishes that this pair of messages will be challenged on. \mathcal{B} transfers (M_0, M_1) to \mathcal{C} as its plaintext-pair. \mathcal{C} computes $C' = \langle X', Y', Z' \rangle$ and sends C' to \mathcal{B} . Then \mathcal{B} supplies \mathcal{A}_{II} with $C^* = \langle e^{-1} X', Y', Z' \rangle$.

Phase 7: \mathcal{A}_{II} continues to issue several requests, and just like **Phase 5**, all requests will be replied by \mathcal{B} .

Phase 8: \mathcal{A}_{II} generates b' as the guess. Then \mathcal{B} submits its guess b' .

Since φ was picked in $[1, q_{H_1}]$ and b was selected in $\{0, 1\}$ randomly, it will obtain $Succ_{CLThdBm}^{IND-CLTHD-CCA}(t, q_d, q_{H_1}, q_{H_2}, q_{H_3}, q_{H_4})$

$$/ q_{H_1} \leq Succ_{ThdBm}^{IND-CCA}(t, q_d, q_{H_2}, q_{H_3}, q_{H_4}).$$

Proof of Lemma 2 and 4: Baek and Zheng (2004) constructed a threshold decryption scheme *ThdBm* which is non-ID-based and has proved that *ThdBm* is IND-CCA secure. Using the similar method, we can affirm that our *BasicThd* is both IND-CCA and IND-CPA secure. For space limitation, we omit the details.

6. Performance Analysis

Computational complexity was discussed in the light of the main computational overhead. In addition, we also compared the transmission rate, the lengths of the public key and master secret key of our scheme with those of some other existing schemes.

In our scheme, $\alpha_i, \beta_i, \theta_i$ and M_i are generated to verify the validity of the decryption shares, so α_i is the "real" decryption share. When a combiner runs the **Share-Combine** algorithm, it only needs to take at least t valid α_i as inputs and then it can compute the message M . In Zhang's scheme (2009) and Yang et al.'s scheme (2009), they only output the "real" decryption share and there are no methods to examine the validity of the decryption shares. Consequently, we should only investigate the generation cost of α_i when we compared computational overhead of **Decryption-Share-Gen** with that of their schemes.

Table 1 shows the calculation cost of schemes without thinking about the pre-computation, in which evaluation notations are as follows: T_e is the time of an exponentiation computation, T_h is the time of a hash computation and T_p is the time of a bilinear pairing.

Table 1 Performance comparison

	Zhang's scheme	Yang et al.'s scheme	Our scheme
Encrypt	$1 T_p + 4 T_e + 1 T_h$	$5 T_e + 1 T_h$	$3 T_p + 1 T_e + 3 T_h$
Decryption-Share-Gen	$4 T_p + 1 T_e + 1 T_h$	$4 T_p + 0 T_e + 1 T_h$	$3 T_p + 0 T_e + 1 T_h$
Share-Combine	$t T_e + 1 T_h$	$2 T_p + t T_e + 1 T_h$	$t T_e + 1 T_h$

In our proposed scheme, the ciphertext includes two elements in G_1 plus the bit length of the message M . In Zhang's scheme (2009) and Yang et al.'s scheme (2009), the ciphertexts are both consists of three elements in G_1 plus one element in G_2 . It is easy to observe that *CLThdBm* has a shorter ciphertext and higher transmission rate.

Meanwhile, the lengths of our master secret key and public key are as short as those of schemes proposed by Long and Chen (2007) and Zhang (2009), and are both shorter than those of Yang et al.'s scheme (2009). The master secret key of our scheme consists of one element of Z_q^* and the public key consists of two elements in G_2 . While in Yang et al.'s scheme (2009), the public key contains one element in G_2 plus $n+1$ elements in G_1 and the master secret key contains $n+3$ elements of Z_q^* , in which n is an identity's bit length.

7. Conclusions

In this study the issues of threshold decryption have been investigated in the scenario of certificateless cryptography. An appropriate security model of certificateless threshold decryption schemes is introduced. The security model is a combination of the models of threshold decryption schemes and certificateless public key encryption schemes. We have also put forward a concrete threshold certificateless decryption scheme based on bilinear maps. In the random oracle model, we proved the security of *CLThdBm* under the condition of hard computation of a problem in relation to the BDHP.

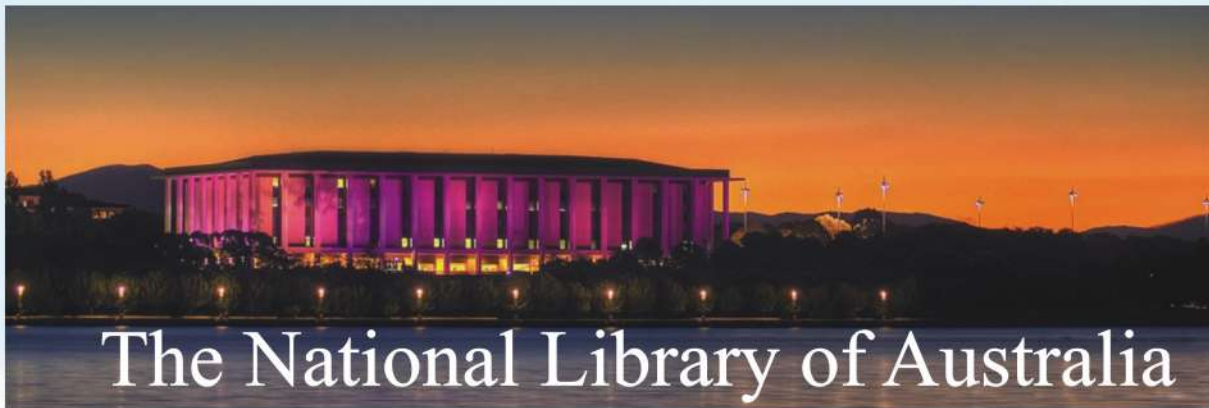
Compared with some other available proposals on threshold certificateless decryption schemes, our construction is more generic and shows higher efficiency both in computation and

communication.

We will continue to pay close attention to construct a stronger security model, for instance, reply the decryption shares queries more perfectly and simulate the decryption oracle more realistically.

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