

## Financial Crisis in the Taiwanese

A System-Dynamics Model of the Elementary-School Education System Financial Crisis in Taiwan

2008/04/02

A System-Dynamics Model of the Elementary-School Education System Financial Crisis in

[Insert 2 hyphens]

Taiwan  
Abstract

[syntax & morphology]

The long-term planning of the financial balance and human resources within the elementary-

school education system is a very important issue. Educational finance is a subsystem of the education

system. Whether or not it can maintain a long-term dynamic equilibrium affects the normal operation

of the entire education system; if it is imbalanced it will produce a serious crisis. In Taiwan educational

funding is shouldered by both the central and local governments. The financial well-being of the central

and local governments depends on the overall education of the people. Recently, governmental debt has

been consistently rising in Taiwan. The increasingly poor state of the financial sector, combined with

an increase in the raise in education expenditures, has caused elementary school education to suffer a financial crisis.

This crisis is a result of long-term accumulation but its structure and effect is widely debated among

government officials and society. In actuality, Taiwan's elementary school education system is

involved with the supply and demand factors of finances. On the supply side, the financial capabilities

of the government are influenced by factors such as the economic situation, whether or not the

allocation ratio of educational funding between the central and local government is fair, and the

crowding-out effect of educational funding. This results in a relatively low average in educational

funding for each elementary-school student. The demand side is affected by factors such as the

population's birth rate and the changing of educational policies. The fact that after Taiwan joined the

WTO, foreign private elementary schools have come to and established campuses in Taiwan has also

added to the uncertainty and complexity of the education system. The interaction between the

aforementioned factors has formed a dynamic system structure. Therefore, this paper uses system

dynamics to look at the financial supply and demand structure of Taiwan's elementary-school

education system and attempts to explain the system's behavior and simulate related policies.

2\* Keywords : Elementary School, System Dynamics, Educational Policy, Financial Crisis, Dynamic Equilibrium

2\* The circled punctuation marks are from your Chinese fonts. Use the comma in your Times New Roman font, and delete the strange marks.

- 1\* Avoid beginning a sentence with a mathematical symbol.  
2\* "Lion's share" is a colloquialism which should be avoided in formal academic writing.

[Correct the syntax as on p.1]

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### 3\* 1. Preface Introduction

Financial stability and long-term human resource planning are exceedingly important issues for elementary-school education systems: <sup>[hyphen]</sup> the lack of appropriate planning and management engenders severe crises. For example, appropriate financial planning must consider the continued recruitment of teachers, <sup>as well as their</sup> pensions, <sup>[delete comma]</sup> and salaries. The demand for human capital in the form of teachers is affected at a macrocosmic level by the birth rate, <sup>[semi-colon]</sup> whereas, <sup>[comma]</sup> government finances are affected by long-term developments in the economy. Economic development, in turn, is influenced by the calibre and availability of human resources, which are dependent on a competent educational system. Therefore, all of these factors are locked <sup>into</sup> in a mutually-sustaining cycle, <sup>[semi-colon]</sup> and if problems develop in a related factor, the other <sup>[redundant]</sup> factors are also endangered. Therefore, the financial stability and long-term planning of human resources strongly affects a <sup>national</sup> country's educational system on a holistic level.

<sup>[redundant]</sup> F <sup>constitute</sup> the overall <sup>[verbos]</sup> Educational finances are a subsystem of educational systems as a whole. To maintain a healthy

financial status, the larger educational context must also be functioning properly. The enormous <sup>[VT]</sup> financial crisis that <sup>the Taiwanese</sup> Taiwan's elementary school education system currently faces testifies to this

1\* <sup>[delete period]</sup> <sup>[redundant]</sup> <sup>the</sup> relationship, 99% of Taiwan's elementary school education budget originates from government funds.

Faced with long-term financial deficits exceeding \$126.3 billion USD (Lee, 2007), the government <sup>has evidently</sup> failed to appropriately distribute funds, properly implement resources, and provide sufficient funding.

<sup>[VT]</sup> <sup>[diction]</sup> Moreover, <sup>and staff</sup> in addition, staff salaries for teachers occupy a large proportion of <sup>the</sup> funding. These issues have already

led to severe problems. In 2006, Taiwan's total educational budget was \$13.5 billion USD, <sup>of which</sup> with a

2\* <sup>(83% of the total)</sup> lion's share of \$8.18 billion USD allocated to teacher salaries and pensions, <sup>[period]</sup> <sup>[verbos]</sup> a total proportion of 83%.

Local governments are faced with an even worse situation: in the same year, the educational budget of <sup>for</sup> Taipei County was \$1.05 billion USD, but staff salaries reached \$942 million USD <sup>more than 90% of the total</sup> for a proportion of <sup>[comma]</sup> over 90% (Ministry of Education, 2007). These proportions egregiously exceed the average of other

OECD countries (Organization for Economic Cooperation and Development, 2007). Teacher pensions <sup>[space]</sup> <sup>comprise</sup> <sup>leaving</sup> hold large proportions, such that the general administrative budget is left with less than 10%. <sup>Furthermore,</sup> <sup>[comma]</sup> Taiwan's

3\* "Sections and subsections should be clearly differentiated but should not be numbered." (Item #7, Script Requirements/Information for Contributors/JORS) 2/30



1\* 2003-1990 = 13

2\* The sentence within [ ] should be moved to the [Insert] position before the sentence beginning with "In 1975."

3\* Do not type parentheses within other parentheses. Instead, use brackets to enclose the inner parenthetical material. It is unnecessary to use periods in "R.O.C."

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the elementary school education system appears to have insufficient budgetary estimates. Subsequent levels of

government allocate barely enough to maintain salaries for staff members, at the loss of all other expenditures. This financial situation is a serious problem.

In recent years, government finances have gradually worsened, and government debt is continually rising. Increasing educational deficits only serve to exacerbate the financial situation of the elementary school educational system. Central and local governments are jointly responsible for funding the Taiwanese public system.

1\* Taiwan's educational funding. However, in 1975, the central government covered 13.42% of the costs; in 1990, that number rose to 26.81% to reach an all-time high 15 years later, 30.73% in 2003. The

financial burden on the central government to cover educational costs has increased incrementally over several years. In 2004, more than 50% of the local governments' budgets

3\* in 2004 (Statistics Bureau, Ministry of Education (MOE), R.O.C., 2008), showing how educational expenditures form one of the greatest proportions in county and city governments, as shown in Figure 1.

Along with the deteriorating government finances, the ratio of government debt to the Taiwan's

3\* gross domestic product (GDP) has risen steadily. In 1991, the proportion of debt to Taiwan's GDP was 17.9%. It has risen to 46.66% in 2003 (Statistics Bureau, Ministry of Finance (MOF), R.O.C., 2008), truly exacerbating the severity of the problem.

Other governmental spending is often prioritized over Taiwan's elementary education budget to the point where there are severe problems regarding dubious educational budget expenditures.

Kaohsiung City serves as an example; in 2005, the "municipal stadium budget," "Big Egg" stadium land tax, "auxiliary miscellaneous stadium renovation fund," and "2009 world sports planning

committee budget" funnelled an estimated \$25 million USD away from the educational budget, thus

excluding actual education operations and expenditures (Education Bureau, Kaohsiung City Government, R.O.C., 2008). Such situations are a manifestation of inaccuracies in the budgeting

4\* system. Not only did teaching salaries swallow most of the funding, local governments were unable to

4\* "Swallow" is a figurative colloquialism in this context.



\* "Added insult to injury" is a colloquialism; likewise, "tail-end."

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[verbose redundancy, continued]

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get "specialized budget" support from the central government to buttress their programs. This situation

\* truly added insult to injury for the developing elementary school educational system.

The ~~educational~~ funds allocated to individual elementary students ~~are clearly insufficient and far~~ lower than <sup>in</sup> any other developed or newly industrialized country (NIC). Elementary school <sup>in Taiwan</sup> education receives one third of the total educational budget (Statistics Bureau, MOE, R.O.C., 2008), as listed in Table 2. According to estimates from the <sup>[space]</sup> Ministry of Education, <sup>MOE</sup> Taiwan's per capita elementary student funding in 2004 averaged \$2089 USD (Statistics Bureau, MOE, R.O.C., 2008). This <sup>allocation</sup> amount fails to <sup>even one</sup> even reach <sup>the</sup> a third of <sup>in the USA</sup> America's per capita expenditure, and compares <sup>unfavorably</sup> poorly with Hong Kong's \$3793, South Korea's \$3714, and Singapore's \$2426. Indeed, in terms of per capita educational expenditures, Taiwan occupies the <sup>hindmost extremity</sup> tail-end of Asia's four economic dragons, as <sup>[insert quote marks]</sup> listed in Table 3. After <sup>deductions</sup> taking out funds for staff overhead, land acquisition fees, and a 3% construction fee, Taiwan's educational investment fund essentially provides a 3.95% (around \$82.52 USD) per capita "active investment" for students, as listed in Table 4. This value is not even <sup>one</sup> a tenth of South Korea's \$855.52. Although it is a "high-income country," Taiwan has <sup>[hyphen]</sup> <sup>apparently mismanaged</sup> mangled its indigent public education system. The "80 to 800 dollar" comparison between Taiwan and South Korea highlights the <sup>budgetary deficiencies</sup> insufficient educational budget of Taiwan, <sup>and</sup> which ultimately heralds an ever-growing disparity in competitive ability between Taiwan and the rest of the world.

Because <sup>Taiwanese</sup> the government <sup>has</sup> also advocated particular policies and supplanted obsolete laws, the educational system encountered yet another shock. <sup>[delete period]</sup> <sup>during</sup> In the past decade, <sup>namely,</sup> the Taiwanese government <sup>[redundant]</sup> advocated educational reform. However, with policy and curriculum changes occurring too rapidly, <sup>many</sup> elderly teachers <sup>[comma]</sup> <sup>being</sup> were unable to adapt to the implementation of novel <sup>[redundant]</sup> educational reforms <sup>[comma]</sup> and many opted to retire. The government's former projections were insufficient to cover the retirement costs of this flood of retirees; <sup>[semi-colon]</sup> <sup>therefore,</sup> <sup>[comma]</sup> and many teachers were unable to retire. This situation negatively influenced the quality of public education. Between 2002 and 2006, Taiwan's elementary <sup>[redundant]</sup> school education staff overhead <sup>consumed</sup> occupied 83 - 93% of the entire budget, with <sup>the</sup> a proportion channelled to support teacher



- 1\* Something must be inserted between "births" and "population" to avoid an unidiomatic phrase.
- 2\* Restrict usage of "while" to its temporal [time] meaning.

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retirement <sup>increasing</sup> growing to 34% within four years (Statistics Bureau, MOE, R.O.C., 2008). Addressing this <sup>rapid increase in</sup> snowball effect of educational expenditures <sup>has been</sup> was a primary burden for central and local governments, <sup>thereby resulting in</sup> which also created a financial crisis for the educational system.

The financial situation of <sup>in the Taiwanese</sup> Taiwan's elementary school education system is also influenced by non-financial factors including urban-rural discrepancies, <sup>and</sup> a reduction in national birth rate, <sup>the</sup> etc. <sup>The</sup> A reduced birth rate subsequently reduced the demand for elementary school teachers, <sup>thus</sup> impacting the demand for educational resources <sup>and schools</sup> (Wang, 2004; Xue, 2004). The number of birth <sup>per million in the</sup> population in Taiwan <sup>decreased</sup> fell from 329,581 in 1995 to 192,021 in 2007 (Statistics Bureau, MOE, R.O.C., 2008), a total reduction of 41%. According to estimates from the <sup>Ministry</sup> Department of Education, the birth <sup>date</sup> in 2003 was 0.0101. Slightly <sup>lower</sup> smaller than the 0.011 average of other developed countries, this value shows a <sup>foreshadows</sup> trend of future <sup>decline</sup> reduction, thus reducing the demand for elementary school teachers and creating a large number of surplus teachers. <sup>At least</sup> A cumulative number of 50,000 elementary school teachers were unemployed <sup>as of</sup> 2006 (Statistics Bureau, MOE, R.O.C., 2008).

<sup>Moreover</sup> In addition, foreign elementary schools have started branches in Taiwan, <sup>established</sup> further jeopardizing the financial situation of <sup>domestic</sup> Taiwanese elementary schools. After becoming a formal member of the World Trade Organization (WTO) in December of 2001, <sup>it was incumbent upon</sup> Taiwan was called to gradually open its educational market to ensure equality in reciprocal benefits among member states. <sup>Therefore, the establishment</sup> As a result, a steady flow of <sup>of high-tuition</sup> highly-priced foreign private schools <sup>has proceeded at a steady rate</sup> have set up schools in Taiwan (Lin, 2001). While these private <sup>Although</sup> schools have divided the elementary school education market and clearly <sup>have</sup> impact education on a holistic level, it is difficult to estimate <sup>the</sup> their future ramifications.

<sup>The aforementioned circumstances</sup> These situations suggest that the financial situation of Taiwan's elementary school education system is a complex and dynamic problem. <sup>in the Taiwanese</sup> Implicating central and local governments, <sup>both the</sup> who shoulder different proportions of the educational <sup>period</sup> budgets, <sup>whether</sup> the distribution of high-calibre teachers is equal, <sup>whether</sup> retirement funds are sufficient, <sup>the</sup> the reduction of birth rates in the population, <sup>and the</sup> introduction of foreign private schools, <sup>all contribute to the virtual impossibility of estimating</sup> it is almost impossible to estimate the number of matriculating



- 1\* Tables should NOT have vertical lines. Re-format all Tables.
- 2\* Semantical problem: a study cannot "hope," but human researchers can. Since you have identified yourself as a doctoral student, I am assuming that your major professor's name will also appear in the byline of this paper. Therefore, the pronoun "we" becomes appropriate.

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students per classroom. Furthermore, Educational policies and laws are also unable to adapt in a timely fashion to the changes in this dynamic environment and framework. This study hopes to clarify the Taiwanese elementary school education system's financial crisis, discussing relevant subsystem relationships and effects. Aiming to study complex, dynamic, and mutually-linked factors that are simultaneously causes and effects, this study uses a comprehensive system method to discuss frameworks the financial system that elementary school education might need, discovering possible pathways to ameliorate the situation, by using the system dynamic model to simulate relevant policies, suggesting practical policy recommendations for educational policymakers to reference, ultimately hoping to have a positive impact on the future development of Taiwan's Elementary School Education.

~~Table 1 Taiwan's Allocation Ratio of Educational Funding between Each Government Level from~~

1975-2005 (unit: %)

Table 1 Taiwan's public educational expenditures by governments from 1975-2005 (unit: %)

| Fiscal Year | Total  | Central Government | Taipei City Government | Kaohsiung City Government | Taiwan Provincial Government | Local Governments |
|-------------|--------|--------------------|------------------------|---------------------------|------------------------------|-------------------|
| 1975        | 100.00 | 13.42              | 14.02                  | —                         | 20.33                        | 49.52             |
| 1980        | 100.00 | 17.05              | 14.93                  | 6.04                      | 17.87                        | 42.38             |
| 1985        | 100.00 | 20.50              | 14.50                  | 5.20                      | 20.15                        | 38.61             |
| 1990        | 100.00 | 26.81              | 10.61                  | 4.57                      | 22.57                        | 34.57             |
| 1995        | 100.00 | 26.63              | 8.56                   | 4.65                      | 21.70                        | 37.53             |
| 2000        | 100.00 | 28.69              | 12.01                  | 5.12                      | 8.39                         | 45.35             |
| 2005        | 100.00 | 30.73              | 11.67                  | 5.37                      | —                            | 51.78             |

~~Table 2 Taiwan's Allocation Ratio of Educational Funding between Each School Level from 2000-~~

2005 (unit: %)

Table 2 The ratio of total educational expenditure at all level of schools in Taiwan from 2000-2005 (unit: %) (Which one if perfect?)

| Year | Total | Preschool | Elementary School | Junior High School | High School | Vocational High School | College | University | Others |
|------|-------|-----------|-------------------|--------------------|-------------|------------------------|---------|------------|--------|
| 2000 | 100   | 2.90      | 32.86             | 18.45              | 20.58       | 10.32                  | 4.48    | 19.84      | 0.57   |
| 2001 | 100   | 2.73      | 32.06             | 16.00              | 9.78        | 7.05                   | 1.74    | 30.10      | 0.55   |
| 2002 | 100   | 3.04      | 31.09             | 15.50              | 9.67        | 5.34                   | 1.19    | 32.79      | 0.56   |
| 2003 | 100   | 2.98      | 31.22             | 15.25              | 9.72        | 5.26                   | 1.25    | 32.72      | 0.60   |
| 2004 | 100   | 3.95      | 25.04             | 13.92              | 11.06       | 5.70                   | 0.95    | 38.64      | 0.73   |
| 2005 | 100   | 1.10      | 37.86             | 20.36              | 8.48        | 5.15                   | 0.20    | 25.91      | 0.94   |

- 3\* For the sake of brevity, use headline grammar (omit "the") in captions and headers.



1\* Use sentence-style capitalization in captions.

2\* There is a subtle difference between the adjective "educational" and "education" used as an adjective. The form ending in "-al" frequently means "instructive" or "informative"; whereas, the "-tion" form refers more specifically to a system.

## A System Dynamics Model of the Elementary School Education System Financial Crisis in Taiwan

[Syntax]

Taiwanese

1\* Table 3 Comparison of Per Capita  
2\* Elementary School Educational Funding in  
2004 with that of six other countries

| Country       | Educational Funding Per Capita (US\$) |
|---------------|---------------------------------------|
| United States | 7,560                                 |
| Japan         | 5,771                                 |
| Germany       | 4,237                                 |
| Hong Kong     | 3,793                                 |
| Korea         | 3,714                                 |
| Singapore     | 2,426                                 |
| Taiwan        | 2,089                                 |

(go back & revise)

See bottom margin for clarified revisions of captions.

[Syntax]

ratio of Taiwanese

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1\* Table 4 Comparison of Elementary  
2\* School Educational Funding Proportion of  
Total Funding between Taiwan and Other  
OECD Nations

| Country       | Ratio |
|---------------|-------|
| Korea         | 23.0  |
| Britain       | 22.9  |
| Holland       | 22.0  |
| Australia     | 21.4  |
| France        | 19.3  |
| OECD average  | 17.4  |
| United States | 16.7  |
| Japan         | 11.0  |
| Taiwan        | 3.95  |

expenditures with that of

## 2. Literature Review and Characteristics of Taiwan's Elementary School Education

The effect finances have on education systems has always attracted the attention of various

countries around the world. The issues that scholars look at include the crisis of education (Ducan et al.,

2004) and educational finances (Fisher, 2004; Duncombe & Yinger, 1998). There are three main points  
elementary education system focuses on three areas: in literature regarding Taiwan's elementary school education system. First, issues that look at the

(1) national education financial policies (Cheng, 2006; Lin, 2005; Chen, 2004; Sun, 2000; Sheu, 1993);

(2) second, issues that deal with elementary school teacher human resources (Lin, et al., 2007; Wu, 2006;

Chen et al., 2005; Yang, et al., 2005; Chang, 2005; Chang, 1991); third, issues exploring the financial  
capabilities and educational funding burden of local governments (Tseng, 2004; Chen, 2002b, 2002c;

Chen & Chen 2001a; Chen, 2001b; Tseng & Wu, 2000; He et al., 2000). In actuality, Taiwan's

elementary school education's financial problems are affected by factors such as the supply and  
demand of teachers, the number of retirees, and the government's financial capability. The

mentioned factors are interconnected and have a cause and effect relationship, yet prior literature

lacks analyses via research adopts the Taiwanese elementary school education system.  
fails to analyze the situation through systems. Therefore, this paper uses a holistic perspective to look at  
the financial dynamic equilibrium problem faced by Taiwan's elementary school education system.

The following sub-sections  
This section will introduce the characteristics of Taiwan's elementary school education and the  
allocation ratio of educational funding.

Page Break: Do not place a header with nothing under it  
at the bottom of a page. [Keep headers as brief as possible.]

## 2.1 Characteristics of the Elementary School Education in Taiwan

Taiwanese

Table 3 Comparison of Taiwanese elementary education funding with that of six other countries in 2004

Table 4 Comparison of ratio of Taiwanese elementary education funding proportion to total expenditures with that of other OECD nations



1\* "Besides" is colloquial.

2\* "Education" is an uncountable noun; therefore, it cannot be preceded by an indefinite article.

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Countries in East Asia are ~~strongly~~ influenced by Confucian philosophical thought ~~and heavily~~ emphasize education. This can be ~~seen~~ in Taiwan, Japan, South Korea, mainland China, and Hong Kong; Chinese

1\* societies especially stress national education (Han, 2003). ~~Besides~~ mainland China, other countries lack

natural resources such as steel and iron, petroleum, natural gas, and coal. The development of human resources ~~was~~ an important factor ~~in allowing~~ these countries to rapidly develop their economies. Both

the government and the people ~~viewed~~ education and manpower development as the main force behind

~~the nation's~~ long-term ~~development~~ (Chang, 1991). The development of Taiwan's elementary school

education ~~was~~ influenced by factors such as history, culture, traditional thought, location, law, and educational policies. Its characteristics include ~~the following six items.~~

(1) ~~Law-regulated~~ Compulsory Education

According to provision 160 of Taiwan's constitution, all children aged six to twelve are required

to receive basic tuition-free education. ~~There are~~ nine years of national compulsory education; ~~the first~~

six ~~are~~ elementary school education while the latter three ~~are~~ middle school education. Education is

~~mainly~~ public in nature, which allows everyone to have equal educational opportunities; ~~this~~ directly

protects an individual's rights and indirectly facilitates the opening and improvement of society.

(2) High Prevalence Rate

Under the premise of national law and a traditional cultural emphasis on education, the prevalence

rate of national education is high in Taiwan. Even parents from low-income households attempt to ~~let~~

their children obtain national education. According to the Ministry of Education's statistics, when the

government actively promoted a six-year national education in 1951, the enrollment rate of children

aged six to twelve was 81.49%. When national education was extended to nine years in 1968, the

enrollment rate of school-aged children had risen to 97.67% and the government invested large

amounts of manpower and capital in order to improve the quality and quantity of education. In 2005,

the net enrollment rate of Taiwanese receiving an elementary school education was 97.98%, higher than

the world-wide average of 83.7% and the average among developed countries' 95.7% (Directorate-



1\* See Note 3, p.3.

2\* This sentence needs at least one citation at the end.

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1\* General of Budget, Accounting and Statistics (DGBAS), Executive Yuan, R.O.C., 2004). The enrollment rate of school-aged children rose to 99.02% in 2006 (Statistics Bureau, MOE, R.O.C., 2008), once again showing the emphasis the Taiwanese government and people have placed on education in order to develop high-caliber human capital. This has set a solid foundation for the development of the national Taiwan's economy and created the well-known and admired Taiwan Miracle.

#### (3) Difference between Urban and Rural Locations

#### Urban-Rural Dichotomy

Job opportunities in Taiwan are concentrated in urban areas. Most rural families migrate to urban areas in search of future prospects and opportunities. There is a serious population outflow in remote areas, forcing the scale of schools in urban areas to grow bigger and bigger and small schools in remote areas to be consolidated; this creates an imbalance in educational development. According to research, this dichotomy between education in urban and rural areas in Taiwan face disparity regarding funding, teachers, resources and facilities, matriculation ratio, and student academic achievement. Investing educational funds in remote elementary schools is not economically beneficial; there are often too few students in these schools, which makes it difficult for teachers to instruct students to have peer interaction and receive cultural stimulation. According to the Ministry of Education's statistics, the scale of Taiwan's national middle and elementary schools are very different in different areas. Urban areas face the problem of "Large Scale, Large Schools" (Large schools with large class sizes) while rural areas are troubled by "Mini-Elementary Schools" (Small schools with small class sizes) (Statistics Bureau, MOE, R.O.C., 2008).

The difference between school operating scales is a result of a continued lack of investment by the government and inappropriate resource allocation. (Sun, 1998)

#### (4) Teaching Materials - One Guide Multiple Texts

The elementary schools in Taiwan have very diverse instructional materials but the continuity of the curriculum needs to be improved. Since the lifting of martial law in July 1987, diverse thoughts have gradually emerged. After the removal of strict restrictions on the press in 1988, the education democratic movement began to grow, and numerous kinds of non-governmental educational reform



1\* Use "amount" with uncountable nouns, but "number" with countable.

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groups began to form. <sup>In</sup> Starting from 1996, the preparation of textbooks was changed from the traditional model of having only one version of ~~textbooks~~ to a new validation model with one unified guide but multiple textbook versions, <sup>thus</sup> allowing Taiwan to officially enter the "One-Guide Multiple-Text" era (Chen, 2006; Department of Elementary and Junior High School Education, MOE, R.O.C., 2008). <sup>verbose</sup> In order to pursue diverse values, the government opened up the textbook industry to non-governmental organizations, <sup>thereby</sup> allowing <sup>independently written</sup> non-governmentally-made textbooks to become official school <sup>texts</sup> textbooks as long as they were validated by the Ministry of Education. After <sup>several</sup> many years of implementation <sup>comma</sup> numerous problems have arisen. For example, curriculum reform <sup>merely</sup> only focused on the revision of the capability index <sup>but</sup> and neglected the preparation of teaching materials and <sup>both</sup> the importance of and continuity <sup>in</sup> of curriculum implementation.

### ~~(5) Overemphasis of Intellectual Development~~

In 2000, <sup>on the basis of</sup> based on the "Educational Reform Program of Action," the <sup>MOE</sup> Ministry of Education reformed national education <sup>redundant</sup> curriculum and teaching by implementing <sup>a</sup> the nine-year integrated <sup>dangling participle</sup> curriculum and seven learning fields; <sup>with</sup> it also stipulated that the total amount of learning periods each <sup>period</sup> <sup>The new regulations for elementary schools stipulated</sup> that the total instructional time <sup>notice hyphens</sup> must be distributed between "field-" and "flexible-week in national elementary schools must be divided into "field learning periods" and "flexible learning periods" (Department of Elementary and Junior High School Education, MOE, R.O.C., 2008), as listed in Table 5. <sup>occupies about</sup> The language learning field takes up around 20% to 30% of the field-learning periods while physical education, social studies, art and humanities, natural and life science and technology, mathematics, and integrated activities <sup>still about</sup> learning fields each take up around 10% to 15%. Table 5 shows <sup>that</sup> the proportion <sup>of field-learning consist of 83.3% to 90.9% of the total instructional periods in the lower grades, 80.6% to 89.3% in the middle grades, and 81.8% to 90% in the upper grades.</sup> learning field periods take up of total learning periods in the lower, middle, and high stages of elementary school; they take 83.3% to 90.9%, 80.6% to 89.3%, and 81.8% to 90% respectively. Overall, the <sup>redundant</sup> learning curriculum <sup>appears to overemphasize</sup> overemphasizes intellectual development and <sup>but</sup> neglects <sup>\*2</sup> character and ethical development.

Page Break (Do NOT separate a caption from its table or figure via page break.)

Table 5 2007 Taiwan Elementary School Education Weekly Learning Period Distribution Table

Weekly learning period distributions in Taiwanese elementary schools, 2007

10/30

2\* In this sentence you are making a subjective judgment; therefore, hedging is needed to protect yourself from undue criticism.

All captions should use sentence-style capitalization.



1\* I cannot find the details of this citation in your References.

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Use sentence-style capitalization in column headers.

| Elementary School Level | Grade | Total of learning periods | Field Learning Periods | Percentage of Total Learning Periods Taken by Field Learning Periods | Flexible Learning Periods | Percentage of Total Learning Periods Taken by Flexible Learning Periods |
|-------------------------|-------|---------------------------|------------------------|--|---------------------------|---|
| Low                     | 1,2   | 22-24                     | 20                     | 83.3%-90.9%  | 2-4                       | 9%-16.7%  |
| Middle                  | 3,4   | 28-31                     | 25                     | 80.6%-89.3%  | 3-6                       | 10.7%-19.4%   |
| High                    | 5,6   | 30-33                     | 27                     | 81.8%-90%  | 3-6                       | 10%-18.2%   |

Upper

## (6) Popularity of Unofficial Education

[Save the word "popularity" for use in the explanation.]

Because of the diverse development of elementary-school education, the parents of elementary

students often arrange for their children to attend after-school cram schools and extracurricular classes,

causing unofficial education to become very popular. According to the academic preparation industry's

2005 statistics, Taiwan's elementary school cram-school business not only earns \$1.8 billion USD

yearly but there is also a downward trend in age for cram-school students. In addition, the scale of the

market for children's English cram schools reaches \$2.2 billion USD a year, causing a strong demand

for after-school cram schools (Cram School, 2005). This allowed the academic preparation industry to

continually remain among the top ten most popular industries to enter in Taiwan. In 2007, the authors

randomly chose two elementary schools to investigate. One was Tainan City's A Elementary School A in

(urban elementary school) while the other was Changhua County's B Elementary School B in Changhua

County (rural elementary school). In both schools, one class was randomly selected from each grade and the students

were surveyed about their after-school, unofficial educational activities (e.g., cram schools, and

extracurricular classes). It was discovered that elementary school students living in urban areas had

more opportunities to participate in unofficial education compared to students from rural areas, as listed

in Table 6. Also, the costs of sending students to cram schools have already become a burden for low-

income families; the academic achievements of students from low-income families are far below those

of students from high-income families.

Table 6 2007 Ratio of Unofficial Education Participated In By Students from Two Randomly Selected

| Grade levels                              | First Grade | Second Grade | Third Grade | Fourth Grade | Fifth Grade | Sixth Grade | Standard Deviation |
|---|-------------|--------------|-------------|--------------|-------------|-------------|--------------------|
| member of Tainan City A Elementary School | 33          | 33           | 33          | 37           | 34          | 35          |                    |

of students, Elementary School A, Tainan

11/30

2\* Your generalization from your specific findings is inappropriate at this point in the report.



- 1\* Revision: Number of students, Elementary School B, Changhua County  
 2\* Revision: Elementary School B, cram school enrollments

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| Elementary School A, cram school enrollments       |       |       |       |        |        |        |        |
|--|-------|-------|-------|--------|--------|--------|--------|
| 1* A Elementary School Cram School Education Ratio | 90.9% | 100%  | 90.9% | 40.54% | 91.18% | 88.57% | 0.2150 |
| member of Changhua County B Elementary School      | 33    | 34    | 33    | 33     | 35     | 37     |        |
| 2* B Elementary School Cram School Education Ratio | 60.6% | 58.8% | 75.8% | 78.8%  | 85.7%  | 73.0%  | 0.1052 |

~~2.2 Allocation Ratio of Educational Funding Has Not Reach Legal Standards~~

The Education Basic Law was implemented on June 23, 1999, and clearly specified the usage of educational funding. In 2002, the Educational Budget Allocation and Management Law was put into practice and became an important reform in educational finance. The allocation of educational funding was safeguarded; the combined educational budget from the central and local governments should not be lower than that year's budget estimates and it should be 21.5% of the average income from the past three years. The proportion educational funding took up of Taiwan's total government expenditures from 2000 to 2005, as shown in figure 1 (Statistics Bureau, MOE, R.O.C., 2008). One can see that for the past six years, the educational budget did not reach legal standards; therefore, there is still room for improvement regarding the allocation ratio of educational funding.

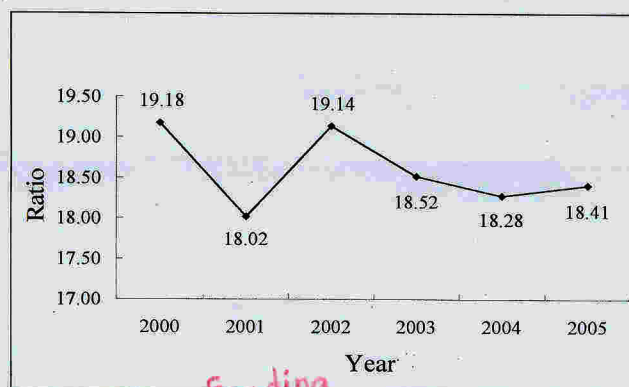


Figure 1 The ratio of public educational expenditures to total government expenditures in Taiwan from 2000-2005

### 3. System Dynamics for Compulsory Education

#### 3.1 System Dynamics Definition and applications

System dynamics (SD) was developed in 1956 at MIT's Sloan School of Management by a group led by American scholar Jay W. Forrester. It is a methodology that was developed from and combined System Theory, Cybernetics, Servo-Mechanism, Information Theory, Decision Theory, and Computer Simulation. Forrester believed that every human action involves "change." Therefore, if one can clearly



- 1\* Use "one can" very sparingly as a means of depersonalizing and objectifying your writing. This phrase can quickly become redundant. The passive voice of the verb is usually more appropriate.
- 2\* Your repeated usage of "in [year]" in reference to citations constitutes redundancy. The 1971 publication by Forrester seems to be missing from the References.

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- \* illustrate the trajectory of change, one can improve the recognition and understanding humans have of

all natural and societal dynamic processes (Forrester, 1961).

SD is a way to study and manage complex feedback systems and emphasizes the need to consider a full and macroscopic overview of the entire system. One must use system thinking to understand all

of the elements within the system and the interaction between the elements; then, one needs to use

computer software modeling to show the relationship between the system's structure, policy, and delay,

the interactions between the elements, and the development and stability conditions of the holistic

system in order to add to one's understanding of the nature of complex problems. The ultimate goal is

not to predict the happening of events but to thoroughly consider the system's holistic operational

process and its true nature in order to achieve the goal of system management (Coyle, 1996).

2\* In 1961, Forrester applied SD to industry, creating industrial dynamics; he also applied SD to

urban dynamics in 1969 (Forrester, 1969) and to world dynamics in (1971). In 1972, Meadows and

others published "The Limits to Growth," which became an international sensation (Meadows, 1972).

Peter Senge published "The Fifth Discipline" in 1990 (Senge, 1990), which further pushed SD into the

field of organized learning and allowed it to become a focus of attention in the academic and practical

world.

3\* System dynamics has been used in various industrial researches to explore system structures and

to improve the policymaking process. This methodology suggests that a system's behavior is caused by

that system's structure, which could be interpreted by feedback loops, stocks and flows, time delays,

and non-linearity. 18 For the long-term industrial development in a developing country, the underlying

structure could evolve according to internal and external changes in the environment. 19 SD is a useful

methodology that not only advances understanding of the dynamic industrial development process, but

also helps governmental and industry policymaking.

Having expanded from industry to the social sciences (Jan, 2007), SD has been

SD went from an industrial field application and expanded to the social science field (Jan, 2007); its

various applications include management abilities, Organizational Strategy (Stata, 1989), Industry

- 3\* "Research" is an uncountable noun; hence, it cannot (correctly) be made plural. Since the adjective "various" modifies only plural nouns, the most appropriate revision is "studies."

- 4\* What does this "18" mean? Is it a citation by another system? If so, you must convert it to the style prescribed by the JORS stylesheet. 5\* Same question & remarks as in Note 4.



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Economy (Jan & Hshiao, 2004), Macroeconomics (Forrester, 1980), and global-level applications.

In addition to the aforementioned, scholars have also continuously studied issues relating to

SD. Some examples include the concepts and methods of SD (Hsieh, 1980), the study of model

construction (Jan, 2007), validity of models (Sterman, 1988), theory and practice, and case studies (Tarter

& Hoy, 2004). There is research regarding SD being applied to education and human resource planning

or long-term dynamic financial system planning. Tarter & Hoy use systems to evaluate elementary-

school education school quality (Tarter & Hoy, 2004).

### 3.2 Modeling

The present research is a perspective examining the Taiwanese elementary school education financial subsystem. Factors that influence the operation of the financial subsystem include the government's financial capabilities, education policies, teacher retirement regulations, as well as requirements, and the number of retirees, all of which therefore affect the education system.

Elementary school teachers in Taiwan are currently facing a transitional period between new and old retirement guidelines. This study looks at the system behavior of Taiwan's elementary school education financial subsystem and analyzes the supply and demand of capital from local government's education development funds (LGEDF) and the application of pension funds. Then, issues such as the effect the number of retirees has on education development funds and the effect retirement requirements has on pension needs are discussed and the elementary school education system financial dynamic model is constructed.

#### 3.2.1 Analysis of the Supply and Demand of Capital from LGEDF and the Application (or Performance) of Pension Funds

Some sources of LGEDF include the general education subsidy from the Executive Yuan, the targeted education subsidy from the Ministry of Education (MOE, R.O.C.), and educational funding allocations from local governments. The educational funding is calculated by looking at the basic education needs. Using 2004 as an example, the national educational funding was around \$14.643 billion USD (Statistics Bureau, MOE, R.O.C., 2008). The local governments shouldered 51% of the



\* Identify the acronym PSPF. This is its first occurrence in this manuscript.

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total funding while the central government contributed the <sup>remaining</sup> other 49%. <sup>[Redundant sentence]</sup> One can see that the half of the

[This is too obvious to verbalize. Conserve your words.]

educational funding is shouldered by the central government. The four major categories <sup>of</sup> regarding basic

education needs are <sup>(1)</sup> human <sup>[hyphen]</sup> resource expenses, <sup>(2)</sup> government-financed pensions <sup>[space]</sup> (GFP), government

<sup>assumption</sup> \* shouldering of PSPFs, and administrative costs <sup>plus</sup> and capital expenditures. GFP <sup>consume</sup> take up 17% of total

educational <sup>budget; however, the proportion continues</sup> funding <sup>[comma]</sup> and this number is <sup>a trend which</sup> continuing to increase annually; <sup>[semi-colon]</sup> <sup>[comma]</sup> this increase might persist for many <sup>more</sup> years.

[Stop: 5/16/08]

Taiwan's elementary school education is currently facing a transitional period between new and old retirement guidelines, resulting in an increase in the complexity of financial programming. The pension guideline reform in February 1996 changed pension plans from the totally government-financed superannuation system to the "Contributory Pension Fund" that is to be contributed by the government as well as the participants (teachers). Accordingly, the Public Service Pension Fund (PSPF) started to pay the pension benefits based on the service years after new system adopted.

There are two sources for PSPF. The first is from salary deductions; the teachers shoulder 35% of the deduction while the LGEDF shoulders the other 65% of it. The second source is investment operating performance. The amount of pension accumulated is invested in the stock market, the credit market, or bank interest.

The payment of pensions for both GFP and PSPF is determined by the number of retirees. The number of retirees is the sum of the total amount of retired teachers that year while the decrease in number of retirees is determined by multiplying the rate of death to the total number of retirees.

#### 3.2.2 The Effect the Number of Retirees has on Education Development Funds

More than ten years after Taiwan's educational reform, many education policies are still unclear. This causes instability in the educational job market and teachers were therefore unsure what to do. Many teachers who were over the age of fifty and had accrued over twenty-five years of teaching experience applied for retirement, resulting in a teacher retirement trend. With the increase in the number of retirees, GFP demand has skyrocketed and local governments are not longer able to



- 1\* Identify the acronym PSPF. This is its first occurrence in this manuscript.
- 2\* Move the full name to the previous paragraph, and enclose the acronym in parentheses.

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total funding while the central government contributed the ~~other~~ 49%. ~~One can see that the half of the~~ <sup>remaining</sup> educational funding is shouldered by the central government. The four major categories <sup>of</sup> regarding basic education needs are <sup>(1)</sup> human <sup>[hyphen]</sup> resource expenses, <sup>(2)</sup> government-financed pensions <sup>[space]</sup> (GFP), government <sup>assumption</sup> shouldering of **PSPFs**, and administrative costs and capital expenditures. GFP take up 17% of total educational funding and this number is continuing to increase annually; this increase might persist for many more years.

← [Stop: 5/16/08] [Continue: 6/26/08]

Taiwan's elementary <sup>use</sup> school <sup>[redundant]</sup> education is currently facing a transitional period between new and old retirement guidelines, resulting in an increase in the complexity of financial programming. The <sup>[redundant with later use]</sup> pension guideline reform <sup>initiated</sup> in February 1996 changed pension plans from the <sup>a</sup> totally government-financed superannuation system to <sup>a</sup> the "Contributory Pension Fund" that is to be <sup>supported</sup> contributed by the government as well as the participants (teachers). Accordingly, the **Public Service Pension Fund (PSPF)** <sup>3x</sup> began <sup>paying</sup> to pay the pension benefits based on the <sup>basis of the years of service after the adoption of the</sup> service years after new system adopted. <sup>[syntax]</sup> The PSPF has <sup>[comma]</sup> <sup>being</sup> two sources for PSPF. The first is from salary deductions; the teachers shoulder 35% of the deduction while the LGEDF shoulders the other 65% of it. The second source is <sup>from</sup> investments, <sup>[comma]</sup> operating performance. The amount of pension accumulated is invested in the stock market, the credit market, or <sup>interest-earning bank accounts</sup> bank interest.

The payment <sup>P</sup> of pensions <sup>S</sup> for both GFP <sup>from</sup> and PSPF <sup>are</sup> is determined by the number of retirees, <sup>defined</sup> The number of retirees is the sum of the total amount of retired teachers that year, while the decrease in <sup>as</sup> number of retirees is determined by multiplying the rate of death <sup>by</sup> to the total number of retirees. <sup>Notice semi-colon and comma</sup>

<sup>Double space</sup> <sup>\*5</sup> <sup>[More than one?]</sup> <sup>s of</sup> 3.2.2 The Effect the Number of Retirees has on Education Development Funds <sup>[sentence-style capitalization]</sup>  
<sup>4\*</sup> More than ten years after Taiwan's educational reform, many education policies are still unclear. This causes instability in the educational job market and teachers were therefore unsure what to do. Many teachers who were over the age of <sup>50</sup> fifty <sup>who</sup> and had accrued <sup>more than 25</sup> over twenty-five years of teaching experience applied for retirement, <sup>thereby initiating a</sup> resulting in a teacher retirement trend. With <sup>this</sup> the increase in the number of retirees, GFP demand has skyrocketed and local governments are not longer able to <sup>to the extent that</sup>

- 3\* Use only the acronym, without parentheses.
- 4\* Revision of sentences: More than ten years after the implementation of educational reforms in Taiwan, many policies remain unclear, a situation causing instability in the academic job market and uncertainty among teachers regarding career decisions. <sup>See stylesheet: Script Requirements, #7.</sup>
- 5\* Delete "3.2.2" and go back to previous pages to delete all numbers in headers and sub-headers.



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financially support the pension demand. The teacher retirement approval rate is lower than 50% in areas suffering from financial difficulties. This has caused many to panic, and this problem has become a political issue. Facing pressure from society, the Executive Yuan specifically designed a retirement budget in 2004 that would help alleviate the pressure of the retirement trend by placing 924 million USD over three years into the retirement funds of the LGEDF. This was obviously an action that attempted to solve the problem without understanding its true causes. Therefore, the number of retirees and the education development fund form a balancing feedback loop, as seen in figure 2.

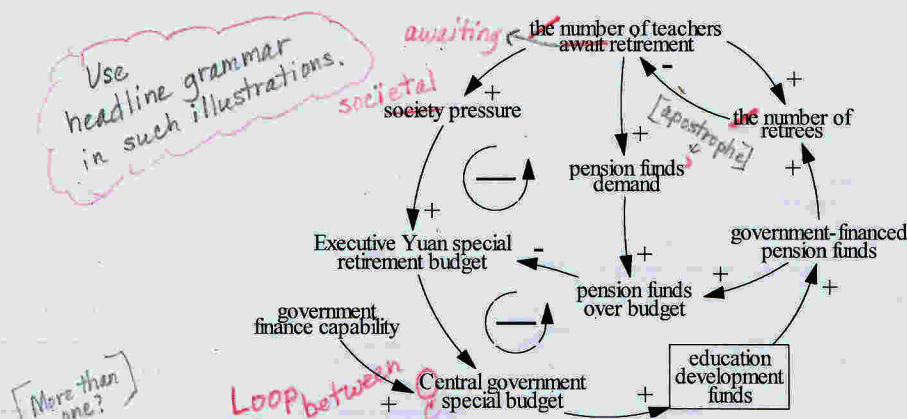


Figure 2 Education development funds and the number of retirees loop.

### 3.2.3 The Effect Retirement Requirements have on Pension Demand

The current retirement requirements for elementary school teachers is for the teacher to be at least 50 years of age and have accrued at least 25 years of teaching experience, otherwise known as the "Seventy-Five Guideline." The mandatory retirement age is sixty-five years old. Because of financial difficulties, the government amended the retirement requirements in two ways. The first was to change the "Seventy-Five Guideline" to the "Eighty-Five Guideline." This meant that only teachers who were above the age of sixty and have accrued over twenty-five years of teaching experience or teachers who were above the age of fifty-five and accrued over thirty years of teaching experience were eligible for retirement. The second was to revise the retirement income-replacement ratio. There are many factors that caused the retirement trend among teachers. One was the educational reforms while another was the excellent retirement requirements. Because pensions were calculated using the new and



1\* A more concise way to express the material within [ ]: There is an inverse relationship between the number of retirees and the cumulative number of teaching positions. (I reduced your 50 words to only 17.)

2\* It is impossible to "delay" age, for this is something that proceeds at a steady rate from birth to death.

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old pension guidelines, the retirement income-replacement ratio <sup>exceeded 100%</sup> was over one hundred percent, <sup>2008/04/02</sup> making <sup>a trend-facilitating factor</sup> it one of the factors that facilitated the retirement trend. <sup>thereby constituting</sup>

<sup>[Redundant sentence - delete]</sup> Following the increase in the number of retirees, pension demand has exceeded its budget. The <sup>After the government</sup> government, under financial pressure, amended the retirement requirements by changing the "Seventy-Five Guideline" to the "Eighty-Five Guideline" and altering <sup>changed</sup> the income-replacement ratio. This has <sup>[comma]</sup> caused the number of teachers applying for retirement and those actually retiring to decrease. The effects <sup>are illustrated</sup>

<sup>of the type [redundant]</sup> the number of retirees has on pension demand can be seen on the left side of figure 3. Both of the negative causal feedback loops are <sup>also</sup> balancing feedback loops. Also, the number of retirees is influenced

<sup>application</sup> by the retirement approval rate. <sup>number</sup> When the amount of retirees increases, the cumulative number of teaching positions decreases. As the number of teaching positions increase throughout the years, the <sup>also</sup> number of teachers awaiting their retirement increases as well. At the same time, as the number of retirees increases, the <sup>concurrently</sup> amount of teachers awaiting retirement decrease. Therefore the number of retirees and the <sup>number</sup> amount of teachers waiting for retirement is a negative causal feedback loop, as <sup>shown</sup> seen on the right side of figure 3. In 2006, there were originally 4500 elementary-school teachers <sup>Taiwanese [hyphen]</sup> who applied

for retirement in Taiwan. <sup>Due to</sup> Because there was an 18% change in the prime rate, 14% of the teachers <sup>continue working; hence, [semi-colon]</sup> chose to remain teaching and only 3890 teachers <sup>ultimately</sup> applied for retirement in the end.

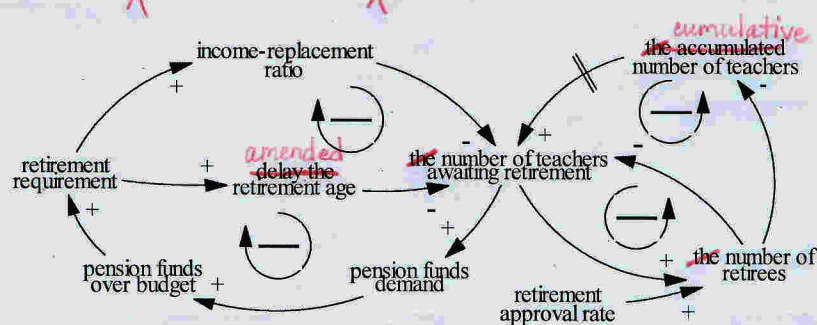


Figure 3 A Cause-and-Effect Loop between Retirement Requirements and Number of Retirees

Figure 3 Retirement requirements and the number of retirees interaction loop (which one is better)

### 3.2.4 Elementary School Education System Financial Dynamic Model

Combining the capital supply of the LGEDF, the analysis of pensions, the effect the number of retirees has on the education development fund, and the influence retirement requirements have on the







The authors wish to express appreciation to Cheryl for <sup>her</sup> <sup>revisions</sup> your editorial assistance.

↓  
Dr. Cheryl Rutledge, Department of English,  
Da-Yeh University



1\* At the end of the article, references should be listed (unnumbered) MAY 09 2008  
ordered alphabetically by author name. ("Instructions for Authors"/Script Requirements)  
excerpt from Item #11) One of your sample articles did not observe this prescription either.  
You consulted the wrong example instead of observing the Instructions. ☹

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1\* References 3\* This list should be double-spaced. I have insufficient room to mark corrections. ☹

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2\* "References to internet sites must be given <sup>31</sup> <sub>30/32</sub> in brackets in the text, not in the reference list." ("Instructions for Authors"/Script Requirements/Item #12)

4\* What kind of source is this? The style might need revision. APA Manual, 5th ed., p.11

5\* Be informed that "Study of" is redundant when placed at the beginning of a title; "Discussion of," likewise.



1\* See Note 5, p. 3 (the previous page). Likewise for "Investigation of."  
2\* See Note 2, previous page.

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3\*

dissertation

3\* In the USA: master's "thesis" and doctoral "dissertation"; in the UK: exchange the nouns.



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you paid very little attention to the JORS stylesheet. ☹