

Plans to Increase Producing of Fire Safety Educator: Focused on Market Failure Theory

Ha-Sung Kong
Department of Fire Safety, Kyungil University, 50 Gamasilgil,
Haynagup Gyeongsan, 38428 Gyeongbuk, Korea

Abstract: This research analyzed fire safety educator system in the perspective of market failure theory. While analyzing fire safety educator system, moral hazard was considered as the key issue among problems found in existing documents or the current state. As plans to overcome moral hazard, the problem was drawn based on grounds that mainly proposed the construction of manned system through regulation reinforcement. Then the following three improvement plans were suggested. First, if certified fire safety educators are not arranged on the arrangement plan, penalty regulation should be newly legislated as a complement. Secondly, immoderate qualifications for test application should be changed. Completing a course in pedagogy or psychology before qualification acquirement should be changed to completing after qualification acquirement to increase test applicants. Finally, the aim of newly establishing fire safety educator qualification should be utilized to legislate for the liability of assigning them to elementary, middle and high schools.

Key words: Fire safety educator, market failure theory, framework act on fire services, manned system, moral hazard

INTRODUCTION

As safety accidents due to calamities like fire are consistently occurring, fire safety educator system was legislated to cope better in initial stages of crisis by studying course of action like evacuation and handling in case of fire through fire safety education and training. Currently, there is no research on fire educator system at all. However, it is possible to make assumptions on them through studies on safety education. First of all as existing studies on fire safety educator, Kim (2011) examined and investigated the current state and problems of fire safety education through literature investigation, statistics and policy documents of related organizations, survey data, et cetera (Kim, 2011).

Next, existing studies on fire safety education are as follows. Park (2014) studied various problems of current elementary school fire safety education by applying “adverse selection theory” and suggested possible alternatives that can actually be applied on the spot by comparing to fire safety education systems of developed countries. Choi and Choi (2006) figured out fire-fighting safety consciousness of technical high school students. Lee and Kim (2012) verified that fire safety education on teachers is also important by discovering the difference of fire-fighting safety education for kindergarten teachers and elementary teachers and the gap of teacher’s safety awareness according to whether

or not they have taken fire-fighting safety education. Shin (2011) analyzed the importance and the current state of fire safety education in Korea and suggested reinforcement plans of fire safety education (Lee *et al.*, 2015). Conducted survey on fire safety education experience and life safety awareness of technical college students majoring noncommissioned officer studies, gave the actual opportunity for the students experience fire safety education and looked for teaching methods to develop safety awareness and ways to open courses (Bang, 2006) performed research to enhance fire-fighting safety consciousness by investigating the awareness on fire-fighting safety of teachers in children education institutes. Lee and Son (2012), Lee and Oh (2009) examined the difference of awareness on fire safety among parents of infants living in Seoul, Daegu and Youngju area to provide data on parent’s and infant’s fire safety education. Bang and Choi (2004) conducted a survey to provide data that will enhance citizen’s fire-fighting safety consciousness by investigating the awareness on fire-fighting safety of citizens of Daegu. Bang (2009) investigated the fire-fighting safety consciousness of workers in traditional markets in Masan area studied the theoretical background of fire safety education among other children safety education areas and analyzed elementary school safety accident status and cases. Then they studied the curriculum, current status, education objective and contents of fire-fighting science class

focusing on elementary fire-fighting science class run by Gyeonggi-do Goyang Fire Station and conducted a satisfaction investigation through surveys on elementary school students and teachers in charge who attended fire-fighting science class (Hyun *et al.*, 2009). As a comprehensive study on safety education including fire safety education, Son and Lim, 2016 developed a program that integrates safety education and science education for middle school students subject to special education. Then they examined the influence of the program on safety awareness of the students (Son, 2007) investigated knowledge on safety education contents and analyzed the superordinate concept and subordinate concept using the concept map of Novak and Gowin targeting 40 nursing teachers in order to examine the knowledge of nursing teachers on infant safety education contents (Lee and Son, 2012). Park and Lee (2010) carried out an analysis on elementary students in 4 schools in J-city and K-city of J-province to find out the relation of influence of elementary school student's safety awareness on accident-type danger awareness.

Among the existing researches, the researches on fire safety educators lack delicacy since the theses take related legislations and the current status as the theoretic basis and the comprehensive researches on safety education including studies on fire safety education and fire safety education lack diversity since they rely only on statistical analysis. Unlike the existing researches, this research is significant in that it approached fire safety educator system using market failure theory as theoretical basis. As the system was left to the market until now, not only were the number of personnel produced too low for necessary assignments but even if assignments were not made, there were no penalty rules and people were disinterested, causing market failure. Thus, this research dealt with fire safety educator system in the perspective of market failure theory.

MATERIALS AND METHODS

Market failure theory: Market failure means the decrease in resource distribution efficiency due to cease of the function of Adam Smith's "invisible hand." The term market failure was first used by economist Francis Bator. In two theses uncovering free market economy's merits and limits in the late 1950s, Bator pointed out that monopoly, public goods, externality and others are the factors causing market failure (Chang, 2012). Market failure refers to a situation when efficient distribution in resources or fair distribution in profits is not realized in case economic activities are left to the market (Kim and Wang, 2009). There is a need for price incentive and

availability of perfect information in order for the market to efficiently distribute resources. However in reality, price incentive is distorted because condition for perfect competition market is not fulfilled. Also, price mechanism sometimes does not operate the best distribution of resources it can essentially achieve because it failed to use perfect information due to asymmetry of information. This is called market failure.

On the other hand, there are a number of existing studies related to causes of market failure theory; Lee, 2011). This study saw causes of market failure largely in 4 parts based on the existing studies. The 4 parts are monopoly, externality, public goods and asymmetry of information. Also, the reason why asymmetry of information occurs can be found in adverse selection, moral hazard and principal-agent problem.

RESULTS AND DISCUSSION

Analysis on fire safety educator system: On analyzing fire safety educator system this study decided that moral hazard is the salient point among problems exposed in existing studies or current state. We will draw problems based on suggested reasons, mainly about building incentive system through reinforcement of regulations as a solution to solve moral hazard (Kim, 2000; Kang *et al.*, 2005; Kim, 2002; Son, 2007; Joe, 2011).

Although, the government set arrangement standards for certified fire safety educators, there are a number of circumstances that companies do not arrange certified fire safety educators due to absence of penalty clauses followed by poor production of certified fire safety educators. In other words, plan of incentive system through reinforcement of regulations is not properly done.

As a result of the least number for arrangement estimated by a researcher, it appeared that at least total subject of 254 people should be secured as shown in Table 1. This was based on arrangement standards of fire safety educator per arranged subject by the regulations of the law.

According to q-net.or.kr, people who passed appeared to be total 92 people currently in 2016 as shown in Table 2. It is outrageously insufficient to meet the least arranged subject estimated by the researcher based on arrangement standards per arranged subject. Furthermore, special punishment clauses do not exist in case of violations of enforcement ordinance of the same law. Systematic safety education did not proceed due to this.

In Japan, a company should appoint a certified fire safety educator and is punished if a certified fire safety

Table 1: Arrangement standards of fire safety educators per arranged subject (organization)

Arranged subject (organization)	Arrangement standards	Notes	Estimate
Ministry of public safety and security	2 or more	1 site	2 or more
Fire department	2 or more	19 sites	38 or more
Fire station	1 or more	196 sites	196 or more
Korea fire safety association	Headquarters: 2 or more	1 site	
City/provincial subdivision: 1 or more	14 sites	14 or more	2 or more
Korea Fire Institute	2 or more	1 site	2 or more
Total	-	232 sites	254 or more

Table 2: Current state of production of fire safety educator

Round	Years	Production of certified educator
1st	2008	19 people
2nd	2010	29 people
3rd	2011	23 people
4th	2012	15 people
5th	2014	6 people
Total	-	92 people

educator is not appointed. In other words, there are arrangement standards and specified punishment clauses which Republic of Korea do not have (Shin, 1999).

In Australia, there is no enforcement regulation for a company to arrange a certified fire safety educator, however, a company or the government automatically arranges certified fire safety educators in appropriate places by need (Shim, 2011).

Plan for increase in production of the certified fire safety educators: Based on critical analysis on moral hazard in market failure theory, we propose the following plan for increase in production of the certified fire safety educators in order to prevent from cases where certified fire safety educators are not arranged due to absence of penalty clauses followed by poor production of certified fire safety educators.

First, when certified fire safety educators are not arranged in arrangement subject, punishment regulations should be newly established as a means of supplementation by no arrangement. In Japan, a company should appoint a certified fire safety educator and is punished if a certified fire safety educator is not appointed. In other words there are arrangement standards and specified punishment clauses which Republic of Korea do not have Suug and Juug, 2011. Second, there is a need to improve excessive qualification for exam application. It is necessary to have a plan for increasing applicants by changing completion condition of pedagogy or psychology course from before acquiring the qualification to after acquiring it. In case of fire safety educator, qualification for exam application is given to an university graduate from Article 2 Number 1 to Number 6 in Higher Education Act' who has >3 credits in pedagogy or psychology as shown in Table 3. Qualification for application is also given to a firefighting officer who completed 2 weeks of professional curriculum related to

fire safety educator at central and regional firefighting school and to elementary, middle and high school teachers regardless of credits.

RESULTS AND DISCUSSION

In order to improve excessive qualification for exam application, it is necessary to have a plan for increasing applicants by changing completion condition of pedagogy or psychology course from before acquiring the qualification to after acquiring it as shown in Table 4.

Lastly, there is a need to save the aim to newly establish qualifications for fire safety educator and regulate the obligation to arrange at elementary, middle or high school. In United States of America, qualification is given to work as an active teacher or take in charge of safety education programs by specially recruitment as a firefighting officer after completion of safety education at firefighting education training centers (Naeil Shinmoon, 2014). It supports the researcher's suggestion by arguing that there is no legal and systematical support for performing work after acquirement depending on qualifications and there is no need to acquire because the market is not active. Also in case requirements for acquiring the qualification are too strict, there is a need for measures such as legally and systematically granting full charge of work and alleviating requirements for qualification (Choi *et al.*, 2003). Meanwhile, there is also a counterargument. In the counterargument, it is emphasized to create a recruit climate by ensuring certified fire safety educator's professionalism. This can make companies employ certified fire safety educators according to their own needs, not by being compelled by the law Choi *et al.* (2003).

Overall, it can be effective in the short term to arrange the detailed guidelines on fire safety education time and training contents and to expand the work scope of the fire safety educators to elementary and middle schools but this is not the ultimate countermeasure for increasing production of the fire safety educators. Therefore, the establishment of punishment regulations is required for the case where diplomats are not arranged due to absence of penalty clauses followed by poor production of the talented fire safety educators. Also, we suggest to

Table 3: Qualification for application to fire safety educator (current)

Certified fire safety engineer	Person with academic ability	Expert/course-finisher/teacher
Certified industrial engineer fire protection system, engineer fire protection system or professional engineer fire protection+college graduate+3 credits in pedagogy or psychology	College graduate (fire major)+3 credits (pedagogy/psychology)or College graduate (other major)+3 credits in fire safety theory (introduction to fire science, disaster management or fire related regulations)+3 credits in pedagogy/psychology/first aid	Completion of 2 weeks of professional curriculum related to fire safety educator at central or regional firefighting school as a firefighting officerorElementary, middle or high school teacher

Table 4: Qualification for application to fire safety educator (improvement plan)

Certified fire safety engineer	Person with academic ability	Expert/course-finisher/teacher
Industrial Engineer fire protection system, Engineer fire protection system, professional engineer fire protection+college graduate* Completion of 3 credits in pedagogy or psychology after qualification and before appointment	College graduate (fire major)* Completion of 3 credits in pedagogy or psychology after qualification and before appointmentor College graduate (other major)* Completion of 3 credits in pedagogy/psychology/first aid after qualification and before appointment	Firefighting officer: completion of 2 weeks of professional curriculum related to fire safety educator at central or regional firefighting school after acquirment of qualification and before appointmentor

alleviate requirements for qualification by changing completion of pedagogy of psychology course from before acquiring the qualification to after acquiring it and to save the aim to newly establish qualifications for fire safety educator and obligate to arrange at elementary, middle and high school. On the other hand, in the long term, it is needed to strengthen the ability of the fire safety educators so that a company can recruit one on its own.

CONCLUSION

This research approached fire safety educator system in the perspective of market failure theory. While analyzing fire safety educator system, moral hazard was considered as the key issue among problems found in existing documents or the current state. As plans to overcome moral hazard, the problem was drawn based on grounds that mainly proposed the construction of manned system through regulation reinforcement. Then the following three improvement plans were suggested. First, if certified fire safety educators are not arranged on the arrangement plan, penalty regulation should be newly legislated as a complement. Secondly, immoderate qualifications for test application should be changed. Completing a course in pedagogy or psychology before qualification acquirement should be changed to completing after qualification acquirement to increase test applicants. Finally, the aim of newly establishing fire safety educator qualification should be utilized to legislate for the liability of assigning them to elementary, middle and high schools.

REFERENCES

Bang, C.H. and Y.S. Choi, 2004. A study on the recognition of Daegu citizen on fire safety. Fire Sci. Eng., 18: 25-29.

Bang, C.H., 2009. A study on the recognition of fire safety of traditional market employee: Focusing on Masan City. Fire Sci. Eng., 23: 49-54.

Bang, C.H., K.Y. Chung and Y.J. Lee, 2006. A study on the fire safety awareness level of early childhood teachers. Fire Sci. Eng., 20: 15-22.

Chang, H.J., 2012. The causal relationships among the in-firm certificate holders' motivation for certification and the effect variables of the certification on human resource development. Ph.D Thesis, Seoul National University, Seoul, South Korea.

Cho, S.H. and D.M. Choi, 2006. A study on the recognition of the students of technical high school on fire safety: Focusing on skills student in the seoul metropolis. Fire Sci. Eng., 20: 107-112.

Choi, S.J., D.G. Lee and S.E. Park, 2003. A study on the qualification of technology market experts. J. Korea Technol. Innovation Soc., 6: 401-409.

Hyun, S.H., J.M. Cha, Y.S. Song and K.H. Park, 2009. A study on the measures for activating the fire fighting safety education of elementary school students-focusing on the fire fighting science class of Gyeonggi-Do Goyang fire station. Fire Sci. Eng., 23: 67-77.

Joe, S., 2011. The Principles of Soft Economics. 9th Edn., Yulgok Book Publishing Co., Seoul, South Korea, Pages: 340.

Kim, D.H., 2002. A study on the adverse selection and moral hazard in insurance business. MBA Thesis, Yonsei University, Seoul, South Korea.

Kim, S.A., 2011. A study on the revitalization for the fire safety education: Focusing in the system of fire safety educator. Master's Thesis, Mokwon University, Daejeon, South Korea.

Kim, Y.S. and G.H. Wang, 2009. Microeconomics. Pak Young Sa Publishing Co., Seoul, South Korea, Pages: 886.

- Kim, Y.S., 2000. Strategy and Inforemation-an Approach Based on the Game Theory. Pak Young Sa Publishing Co., Seoul, South Korea, pp: 290-296.
- Lee, S.C. and S.J. Kim, 2012. An impact of teacher's experience of fire prevention education and incident on children's safety education. *J. Korean Inst. Plant Eng.*, 17: 49-50.
- Lee, S.Y. and W.K. Son, 2012. Childcare teacher's concept map analysis about early childhood safety educational contents. *Korean J. Childcare Educ.*, 8: 67-87.
- Lee, W., S.Y. Kwon, S.H. Kang and Y.C. Nah, 2015. Research for the experience of fire fighting aafety education and living safety consciousness of department of noncommissioned officer in college students. *J. Korean Soc. Safety*, 30: 159-167.
- Lee, Y.H., 2011. *Microeconomics with Explanation*. Yulgok Book Publishing Co., Seoul, South Korea, Pages: 147.
- Lee, Y.J. and S.Y. Oh, 2009. A study on the fire safety awareness level of young children's parents: Focusing on Seoul, Daegu and Yeongju. *J. Korea Open Assoc. Early Childhood Educ.*, 14: 421-421.
- Park, J.Y., 2014. Recommendations with the theoretical analysis of elementary school fire safety education: Focusing on adverse selection theory. Master Thesis, Kyungil University, Gyeongsan, South Korea.
- Park, S.S. and C.H. Lee, 2010. Influence of elementary school students' safety consciousness upon risk recognition of accidental type. *J. Korea Acad. Ind. Cooperation Soc.*, 11: 2152-2160.
- Shim, G.S., 2011. *Microeconomics*. Bumhan Books Co., Seoul, South Korea, Pages: 759.
- Shin, B.H., 1999. *Microeconomics*. Pak Young Sa Publishing Co., Seoul, South Korea, Pages: 702.
- Shin, Y.U., 2011. The necessity of strengthening fire safety education. *Disaster Prev. Insurance*, 1: 17-19.
- Son, J.S., 2007. *The Principles of Soft Economics*. 9th Edn., Moonyoungsa Publisher, Seoul, South Korea, pp: 228-234.
- Son, O.G. and S.M. Lim, 2016. Effect of safety and science integrated educational program on safety consciousness of middle school students with special educational needs. *J. Spec. Educ. Theor. Pract.*, 17: 143-143.