Abstract

Purpose: This study aims to examine the development direction of fire extinguishing education based on NCS on the teaching method of fire extinguishing education in the Navy. Fire extinguishment education is composed of basic education from basic remuneration to advanced education. Especially, since the Navy is mainly formed inside the ship composed of sealed compartments, fire extinguishing education is very important because there are such phenomena as Flameover, Backdraft, Flashover, Rollover, etc. except for special cases. And also, this study is focused on the fire extinguishing education for NCS-based education on beginner courses in the navy.

Method: As a research method, the contents is developed focusing on literature review. At the same time, I work as a petty officer for 16 years and also consider the part that I actually experience as a field expert in the navy. Especially, I would like to propose an NCS-based education method that is used in most of the society in order to introduce the current fire extinguishment department in education and training.

Results: In conclusion, the lecture-oriented education is still the most frequently conducted in our military. However, in order to promote the participation of learners through systematic education and training system based on NCS and job-specific education, which can be one of the field and lecture halls, and to apply it to the elementary fire-extinguishing education in the military, it is necessary to develop the NCS-based learning module together with the teaching and learning design and the teaching and learning process plan.

Conclusion: Finally, the NCS learning module is designed to cultivate the ability to solve the job in case of exhibition or emergency. Therefore, it is effective for the students to diagnose the learning by preparing the result table and self-assessment checklist after the training and to perform grouping and individual practice according to the practice guide after the teacher provides the explanation and demonstration of the practice guide at the introduction of the class. In order to utilize the learning module effectively, teachers should thoroughly analyze the NCS to understand the contents and level of job ability required in the field work, and to have practical skills and expertise that can be used for performance evaluation. Especially, the new instructors should thoroughly analyze the contents of NCS related to the practical curriculum and prepare for the following matters in designing the teaching and learning process. The following research is to compare the satisfaction of NCS subject and NCS subject.

Keywords: Fire Extinguishment, Fire Extinguishment Education, Education Training, National Competency Standards, National Competency Standards Education Method

1. Introduction

Recently, the educational environment is changing rapidly, and especially in the government, the establishment of the National Competency Standards(NCS) is to change from theoretical education to practical education to realize a capacity-based society. The labor market has reorganized NCS-based education, training and qualification system to realize a capacity-oriented...
society through the establishment of NCS and the National Qualification Framework by creating a success model in which the job competency evaluation system linked to recruitment, promotion and compensation is settled and spread. NCS is gradually being established and activated by the efforts of the government, university and labor market for the introduction of NCS. In this case, this study started with the consideration of what efforts we should make in order to achieve NCS-based education in our military focused on the Navy[1][2][3][4][5].

Navy Education is also no exception. The main task is to the department damage control when the ship is damaged and maintain continuous navigational power to return to the home port. In addition, the part about fire extinguishment is very important in the department of damage control in the Navy.

Unlike the Army and the Air Force, the Navy is in a unit, so if a ship is hit by fire, stranding, collision, etc., all the crew members are in heavy danger. Accordingly, our navy should thoroughly train and train the measures for various accidents that may occur in the ship through education and training in advance. In this situation, I have been working in the Navy for 16 years as a senior chief petty officer the Navy's damage control. The education in the military is being carried out in accordance with the 4th Revolution and the development of new future technology, which are currently a big issue. And also, I think it’s a lot behind, of course, with the speciality of the military, and there are many restrictions on changing and developing something dramatically within the security framework[1][2][3].

In the past, education in the military was done through unconditional injection method education without needing understanding for high score. However, in these days, we are training with educational skill called action learning based on participation of all learners. And also, Intermediate or advanced courses seem to be very helpful to break creativity and existing framework in new education and training for problem solving as action learning skill.

However, for the students who have no prior knowledge of digestion within a fixed time, the infusion education is required to be done to a certain extent in order to adapt quickly to unfamiliar education, terminology and practice. Also, there is a lack of education and training time to draw the progress of the class and the evaluation results accordingly.

In order to help the current instructors, NCS-based education methods that were learned when acquiring technical development teacher qualifications in advance were very different from those learned and learned in the military, from elementary, middle, and high school[4][5].

Therefore, this study try to introduce NCS-based education method, which is already used in the present society, to educate and train the fire extinguishment department in the current navy damage control.

2. National Competency Standards

This NCS is a standardization of the state's ability to perform duties in industrial field(knowledge, skill, and attitude). It is a system that supports NCS to train field-oriented talents by utilizing NCS for education and training and qualification[3][4].

As shown in the following <Figure 1>.
As of in 2021, 1,039 NCS have been developed, and include jobs that respond to future job changes, such as building cloud platforms, manufacturing hydrogen fuel cells, and installing smart factory systems.

2.1. The advantage in NCS utilization

Job-seekers can clearly know what kind of ability companies want to hire and can improve their job skills accordingly, thereby reducing the burden of building specs.

In the recruitment part, it is possible to develop the recruitment process design and tools (employment announcement/document/writing/interview) that can evaluate the applicant’s competence based on NCS job description. And it is possible to hire talent based on job ability (resolve mismatching of companies and applicants) and reduce reeducation costs when joining the company. In NCS utilization, job-oriented education and training system required for each position is provided in the training and education of the employees.

And systematic education and training system can be prepared, and job customized education can promote productivity improvement and worker’s participation in learning [4][6][7].

In placement and promotion, NCS in-house career development path can be developed. It can also develop a batch and promotion checklist, and it has the advantage of eliminating the inconsistency between the company’s expectations for talent and the competence of workers. In addition, the wage part can convert the annual supply-oriented wage system into a ‘job pay’ structure by analyzing the job based on NCS. And according to the job competency and ability of the worker, the system that can be paid the proper wage can be rescued.

And also, teachers (educational training institutions, teachers, professors, etc.) can systematically operate the education and training course by designing the curriculum using NCS, and through this, they can train practical talents needed in the industrial field [4][6][7][8].

Finally, the national technical qualifications are improved to job-centered (using NCS), so that people who can actually do the job can get a certificate.
2.2. The understanding of NCS learning modules

If the National Competency Standards (NCS) is a 'job request' in the field, the NCS learning module is a 'teaching and learning material' that is designed to enable NCS's ability units to be learned in education and training. The NCS learning module details the contents related to the theory and practice in order to learn the specific job. In other words, the NCS learning module details the contents related to the theory and practice in order to learn the specific job. It's teaching and learning material.

NCS and NCS learning module are connected to the connection system. The ability unit means that the ability required to perform the task successfully in a specific job is developed as a functional unit capable of training and evaluation. And the ability unit element is the ability to perform within an important range of the ability unit. In addition, the performance criteria are the criteria for performance that individuals must reach to determine whether or not they are achieving their abilities by each ability unit element.

The composition of NCS learning module consists of learning, learning contents, teaching, learning method and evaluation. First, the learning is presented using the NCS ability unit element name. Learning consists of learning contents, teaching and learning methods, and evaluation. It is based on knowledge, skills, and attitudes of each ability unit of the NCS ability unit.

The contents of the study consisted of learning goals, necessary knowledge, and performance contents. The contents consisted of materials, materials, devices(equipment and tools), and the work activities in the actual industrial field are reflected in the learning contents in various ways.

Teaching and learning methods are the activities of the instructor, teaching strategies, and activities of the learner so that interaction between the instructor, the learner, and the learner can be actively achieved to achieve the learning goal.

The evaluation suggests evaluation criteria, evaluation methods, and feedback methods for evaluation results that can confirm the learning degree of the learning module. So, the preceding studies of NCS are briefly examined as follows.

Previous studies on NCS have already been conducted in many ways. According to the study of Kim Dong-yeon and Kim Jin-soo (2013), despite the government's active promotion to establish the basis of the NCS, companies (55.26%) have been the most active in safety and precautions, order of performance, and performance tip. The learning contents of the learning module are based on the standardized process of the work, research in analyzing the research trends of the national incompetence standards development by subjects that have been conducted so far. The following is the order of two-year (23.68%) and four-year (7.9%) [10][11][12][13].

According to Kim Ki-yong et al. (2014), 74.7% of the surveyed colleges have experience using NCS in the curriculum of 2014, which is a remarkable increase from 36.1% compared to the survey results of 2013. This suggests that NCS is actively introduced in the curriculum in Korea. In addition, more universities are promoting NCS application in the curriculum according to the policy direction of the government's specialization college development project. The early studies of NCS-related university education include research that explored the specialization strategy of the design department of the college based on NCS, NCS-based curriculum for port logistics workers, NCS-based architecture and industry-customized college curriculum, and secretary and curriculum using NCS development techniques (Omanduk et al., 2014) [10][11][12][13].

In addition, Shingu University was actually operated through the reorganization of the curriculum. Among them, the Department of Environmental Landscape has developed and applied a new curriculum since 2010, Baekseok Culture University has operated NCS development curric-
ulum in the field of Culture 82 Sonwonil Contents(Smartphone Contents), Dongui Science University has developed a curriculum reflecting the machine(mold) field, Keimyung Culture University has developed a curriculum reflecting NCS in the textile field in 2011, and is making efforts to realize university education that is in line with human resources with on-site trade volume(Omanduk et al. 2014)[10][11][12][13].

Yoon Woo-young et al.(2015) analyzed the job based on NCS to grasp the level of demand by area, and reorganized the NCS-based curriculum necessary to cultivate the vocational ability connected with the National Qualifications Framework(NQF), to contribute to job creation by satisfying the needs of the industrial field users in the tax and accounting fields of Daegu and Gyeongbuk, thereby improving the employment rate of the department and cultivating the appropriate manpower to contribute to the regional economic development. In the study on the reorganization of NCS-based curriculum in 2016, Son Won-il and others(2016) presented the NCS-based job model that matches the type of manpower training set by considering external environment analysis, internal environment analysis, graduate career, demand forecast for manpower in Daejeon and Chungcheong area, and opinions of job experts in the field[11][12][13][14].

3. The Understanding of Fire Extinguishment in the Navy

Fire extinguishment means to turn off the fire. Our navy, which is a unit of troops, is not only a major obstacle to our mission when a fire occurs due to the nature of the military, but also directly related to our lives. And the fire in society is a little different from the fire in the Navy. And also, the surrounding environment is on the sea, and people couldn’t do empty 24 hours a day in the mission.

In addition, fire classifications A, B, C, D, E, and K are all mixed. Finally, not only petty officers in the department of the damage control, who is directly connected to the fire, but also all of the traps should act as firefighters. In other words, not only petty officers who have been trained from basic maintenance to advanced, but also the people who do not have basic knowledge of the fire should help them fire extinguishment when a fire occurs. Some people have received education related to fire extinguishment in the society before being a soldier, but there are more people who don’t[15][16][17][18].

Therefore, it is very important to educate the first education and the first education in the education from the digestive repair disease course to the beginner and intermediate level. They are also MZ generation, which is a new term of the Republic of Korea that refers to the Millennial and Z generation. They are familiar with SNS, the Internet, and smartphones, and the MZ generation lives as avatars in a virtual world called Metaverse. Just as the X generation rebelled against the conventions and cultures of the baby boomer generation and showed personality, the Z generation is more individualistic and self-centered than the Millennial generation[1][14][19].

In terms of work values, the tendency to 'leave anytime a better job' and 'want to have more leisure time than work for income' is increasing, and this view is more pronounced than the baby boomer generation. If these friends join the military and receive fire extinguishment education, they will be disappointed if they have forced education as in the past.

It is not easy to create a conservator who can suppress fire in a ship as a soldier in a given environment and time; all the direct divisions of the Navy will do so. However, our conservatives who execute survival training for human life and maintain their fighting power and viability in the ship must somehow know and master the basic abilities and core principles and send them to practice. In the past, when I was educated in early 2000, it was a lecture-oriented education.
and a lecture-oriented education focused on essential memorization. It wasn’t fun, it was a must-do education, and there were people who didn’t work hard, but everyone was an essential one, so they were forced to follow. Since 2010, education has changed to a way in which teachers educate alone and discuss and participate in the education of the infusion type. And in the second half of 2010 and now, individual opinions based on creativity are also important and they are doing the way to solve problems together.

However, it is hard to make the MZ generation effective and follow well in a fixed time. The contents of the textbook should be delivered within a fixed time, and the contents are a little far from the general goal presentation and the field of the military field. The evaluation was a knowledge assessment of the contents of the curriculum and was used as an evaluation result for the performance management of schools and instructors. The instructor was the messenger of the subject and the instructor’s ability to convey these contents was important.

In addition, the number of people who are unable to concentrate on the development of personal skills of students and the number of students are also. When I talk about the problems and experiences that can happen in practice, the contents of the class are getting distant or lacking in time. As time and results are pursued, progress must go out and essential results must be derived, so it is a reality that it can only serve as a messenger of blind educational knowledge. In other words, most of the instructors who apply the teaching method of the lecture are the instructors.

Of course, there are advantages to lecture education. First, it is economical to systematically deliver the learning contents to many learners in a short time. Second, it is easy to achieve low-level cognitive goals. Third, supplementation, addition, and deletion of the subject contents are easy. Fourth, if teachers have strong linguistic expressiveness, they can stimulate learners as strong. Third, it is difficult to reflect the characteristics of individual learners(ability, knowledge, experience). Fourth, it is difficult to meet the learning needs when the characteristics and abilities of the learners are various. Fifth, it is difficult to expect the creativity of learners.

Our current learning materials account for 90% of the guidelines and teaching plans, and of course, we use to introduce and educate many new technologies of other countries, overseas cases, and external companies. However, in order to achieve the goal in a fixed time and to perform the mission as a soldier in practice, it is a reality that it does not meet all the expectations of the working staff.

4. The Development Direction of NCS Based Fire Extinguishment Education

I still think that the lecture-oriented education is the most often done in Navy. Therefore, we try to apply it to the beginner(first step) fire extinguishing education in the Navy by promoting the participation of learners through systematic education and training system based on NCS and job customized education.

NCS is a Korean Employment Classification of Occupations(KECO) type to present the core abilities required for all occupations(11,655) in Korea, and consists of 24 large classifications, 77 middle classifications, 227 small classifications, and 857 sub-classes as of 2015. The classification system refers to the job and NCS is developed in the classification unit. The subdivision consists of the basic component of NCS, the ability unit, which consists of the ability unit classification number, ability unit definition, ability unit element(performance standard, knowledge, technology, attitude), application range and work life, evaluation guidelines, and job basic ability.
In order to establish NCS-based curriculum, we should first review the curriculum and surrounding environment of our technical administration school and select a learning module that suits the training of excellent talents and core personnel. In order to prepare for the application of the learning module, it is necessary to find common points between the current curriculum and NCS subclassification(job)[4][13][14][15][16]. Also, the class should be designed by analyzing the level of ability unit, element, ability unit and ability unit element, and necessary training time. In other words, it is necessary to develop a teaching and learning design and a teaching and learning process plan by finding NCS learning module related to fire extinguishment <Figure 2>.

Figure 2. NCS learning module refined process applied to the navy.

The purpose of the NCS learning module is to cultivate the ability to solve the job by oneself in the event of exhibition or emergency. Therefore, it is recommended that the teacher should provide the explanation and demonstration of the practical guidebook at the introduction of the class, and then make the training or personal practice according to the practical guidebook.

In the past, students were often bored because the teacher prepared all the practice and conducted the classes in the order of theoretical explanation, demonstration practice and student practice. The class using NCS learning module is expected to be able to perform the role of applicants and assistants enough to systematically present the lesson from tool preparation to the actual practice so that students can do it themselves according to the learning module. Therefore, teachers will need patience to wait for students to complete the course in the learning module, and they will need measures to give the task to the students who have completed the training. In the existing class, many students complained of many difficulties in the middle and it was not easy to evaluate both the process and the result. Since the class using NCS learning module has a performance order in the learning module, most of the students can systematically evaluate the confidence and the process and result of learning that they can solve the task with their own strength even if it takes some time. Especially, the practical training guidebook will be able to improve the ability of students to redefine themselves by looking at the practical training result table and to accurately talk about what they did in this class by writing the practical training result table, the job performance ability self-diagnosis table, and the job basic ability self-diagnosis checklist[1][4][13][14][15][16][17][18][20][21][22][23].

In the existing classes, teachers set up tools and equipment and lead to practice after demonstration, so there were many students who did not perform the class process properly, but according to the practical guidebook applying the learning module, the number of students who did not concentrate
on themselves would decrease, and all students actively participated in the study, so that the learning achievement would be improved and the time to ask and answer among students would be increased. In order to utilize the learning module effectively, teachers should thoroughly analyze the NCS to understand the contents and level of job ability required in the field work, and to have practical skills and expertise that can be used for performance evaluation. Especially, the new instructors should thoroughly analyze the contents of NCS related to the practical curriculum and prepare for the following matters in designing the teaching and learning process.

It is necessary to produce auxiliary materials including practical requirements, various regulations, and regulations besides NCS learning module and also, it is the content and level of related ability units (individual learning modules) and ability units (sub-learning units of learning modules) appropriate for our students. And instructors should consider the faithfulness and suitability of the contents of the class while checking whether there is any shortage or not. Our instructors in the Navy will need patience to wait for all learners to complete their training.

5. Conclusions

The naval fire scene can be primarily a warship; the form of the explosion that occurs at this time can vary, such as gas leaks, various cylinders, and explosions of tanks. Because the warship is a sealed structure, it can be difficult to supply smooth oxygen to the origin of the fire, it is necessary to educate NCS based on the theory and practice that can be one from the time of education in the classroom. The fire may simply evolve according to the initial action of the first discoverer, or on the contrary, if the initial action is not taken, the entire ship may be dangerous. If a small fire is not suppressed within at least five minutes, it can spread to a bigger fire.

The NCS learning module is designed to cultivate the ability to solve the job in case of exhibition or emergency. Therefore, it is effective for the students to diagnose the learning by preparing the result table and self-assessment checklist after the training and to perform grouping and individual practice according to the practice guide after the teacher provides the explanation and demonstration of the practice guide at the introduction of the class.

In order to utilize the learning module effectively, teachers should thoroughly analyze the NCS to understand the contents and level of job ability required in the field work, and to have practical skills and expertise that can be used for performance evaluation. Especially, the new instructors should thoroughly analyze the contents of NCS related to the practical curriculum and prepare for the following matters in designing the teaching and learning process.

This study proposes education that can train human resources required in the field through the introduction of NCS in the naval school education field. This study is meaningful in that it is effective education for the students and the educational contents that can be applied to the field at the same time if the expectation effect and operational possibility of NCS in the education field are already sufficient in society and these advantages are combined with our naval fire extinguishment education. The following research is to compare the satisfaction of NCS subject and NCS subject.

6. References

6.1. Journal articles


6.2. Thesis degree


6.3. Books


6.4. Additional references


7. Appendix

7.1. Authors contribution

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