Abstract

A Research on Educational Facilities Responding to Future Educational Environment(Ⅱ)

- Developing a model of future learning space -

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□ Necessity and purpose of the research

There have been researches on establishing strategies and action plans of raising the future human resources in order to respond to social changes in the future. Under this circumstance, the future educational environment should flexibly respond to the demand of social and educational changes. It also should be constructed and operated to reproduce various values by users. The necessity of model of future learning space has been increased. The model contains and effectively realizes a teaching and learning method to raise human resources in the future according to social changes and it will be used in multi-faced way.

The result of the 1st year research shows that a concrete action model with budget should be suggested.

Thus the 2nd year research limits the research area of the future oriented teaching and learning method in realizing the goal of 2015 curriculum. The model of future learning space which effectively realizes it reflects actual voices from education fields by user controlled project. It will be used for initial phase of innovation project of school space which is recently announced by the government and provide the base of calculate and secure financial scale. It is very meaningful to support expertise in planning stage and suggest concrete action plan.

□ Contents and methods of the research

This research is about developing a model of future learning space which responds to changes of future educational environment. Thus this research deduces capability which is required for future talented person among social changes causing changes of future educational environment, direction of education which raises them and six necessary roles of school space. Using it to baseline teaching and learning activities which are suggested by 2015 curriculum are divided into 58 types according to a required space unit and using user controlled future learning space project which is divided into 3 phases the user initiatively plans the future teaching and learning process and suggests the learning space for complete realization. The researchers and experts examine it and finally 12 space model including 4 classroom types and 5 hub types with budget are suggested. Such research methods as literature review, focus group interview, users(teachers and experts) initiated workshop, Delphi method, policy forum are applied and there are 5 policy proposals for constructing safe future learning space.

☐ Understanding of future educational environment

The future education environment can be summarized as followings in terms of educational direction and school space according to social demands. First in terms of social aspect future talented person is required to have problem solving ability under the unprocedural complex circumstance, amicable and productive social interaction, skillful ability to use form and tools with knowledge, critical thinking of judge quality, self-regulation capability and social and emotional features and controlling ability. Thus the future education has such directions and characteristics as learner centered learning which has a deep relation with personal life(Problem-based learning-PBL, project learning), education using technology(action learning, mobile inquiry learning, flipped learning, simulation based learning), sensitivity and amalgamative thought education(education play, amalgamative education). Thus the school space is required to play such roles as securing easily collect and approach data, supporting face-to-face interaction, discussion and debate, establishing instrumental inquiry and creative experiment environment, play environment which is freely chosen by learners, work activities and play activities.

☐ Unit space according to the type of teaching and learning and creating status

In order to analyze teaching and learning methods per school class which are suggested by 2015 curriculum in terms of required facilities 73 literature materials including 26 of primary school level, 12 of middle school level and 35 of high school levels are collected from 2015 revised new teaching and learning data. In detail firstly various teaching and

learning methods which are mentioned and explained on teaching and learning materials are deduced and classified by contents of teaching and learning activities based on activity similarity. In order to answer the purpose of this research which re-structures learning space according to teaching and learning method the teaching and learning methods based on basic function which is installed in existing school are classified. Secondly, based on basic function of each classroom the teaching and learning method which demands complex space function is sought and classified secondly. For example, using music room for such activities as after listening music as a group expressing feelings in writings, drawings and gestures is a primary class activity, but in terms of whole process of teaching and learning activity it is necessary to have additional spaces such as a group worktable and dancing room. The teaching and learning methods of 2015 curriculum do not restrict one activity but by applying various teaching and learning methods in phases and complexly it is confirmed that there is active fusion between subjects. Thirdly, based on the type of teaching and learning methods which are understood through previous two phases, space feature which is demanded from each teaching and learning is grasped and the teaching and learning method according to feature of required space is finally classified. Irrespective of subject classification the teaching and learning activity is classified focusing on having relatedness of required space. As a result, the teaching and learning activities are classified by 58 types according to required unit space. And they are divided into ‘collecting and using data, instrumental investigation and experiment, expressing activity, gaming, discussion and playing’. Going through these phases a draft of required unit space model on each type of detailed teaching and learning activity is made. They are revised and compensated by planning workshop where current teachers are participating in.

□ User driven future learning space project

Since the learning space is the biggest learning tool for teachers and learning and living environment for students, this research investigates and analyzes the model of future learning space as following phases. The first phase is to set users' awareness and direction. It also deduces teachers' awareness on school space and major spaces and based on these deduction this phase sets direction of reconstruction of user driven learning space. Thus there are two workshops on March and May. On May 40 voluntary teachers who are interested in space innovation participated in the workshop. On March 150 teachers(principal, chief of administration, teacher and school inspector) from schools which are selected by Ministry of Education as 2019 space innovation project school. The second phase is to suggest a planning of future learning space through planning procedure of future teaching and learning. A workshop is held on August for 60 teachers who teach gifted students and they are recommended by municipal ministry of education. In this workshop required unit space model is used. On October there is a document investigation in which 12 voluntary teachers participate. They are participants in planning proposal. It is done before examining the model which is made by researchers based on proposals. The third phase is investigation on field cases which have educational usefulness and representativeness of learning space reconstruction. The document investigation is carried out by 5 teachers. They changed space responding to user's demands and experienced advantages and disadvantages of educational usefulness taking advantage of school hours. It is done before school space innovation project(2010~2018) which was conducted by Ministry of Education.

□ Model of future learning space

Based on establishing unit space according to type of teaching and learning and analysis of current status and results of future learning space project, 3~6 unit extra classroom is used for the classroom of 4 models(M room, S room, A room, L room) where independent class is available and 1 unit classroom is used. They are located between regular classrooms or extra classrooms. Suggestd 8 hub models(a~h room) are divided into hub connecting to class and hub for rest which can be used during a school hour or non-school hours.

Teachers reorganize, rearrange and additionally draw the space of unit learning space which is suggested in chapter 3. It is suggested as comprehensive one space. Thus, when it is applied to real situation, it should be chosen and optimally transformed according to status and condition(characteristics of school curriculum, financial status, demands from members) of each school. The focus of plan per space is as followings.

In case of classroom type, first 'classroom type S' can be applied to 3 unit extra classroom on the 1st floor and it is connected to outside classroom. It has a supporting place for observation and storage for long time such as incubation and nurturing in the middle. On the left side there are 2 collaborative class spaces where water can be used. On the right side there are digital based group discussion space, supporting place of STEM education which connects each room and outside work place(half-outside). Secondly, in case of 'classroom type M' it can be applied to 3.5 unit extra classroom. It is connected with corridor space. On the left there are storage and workshop room which needs dust chamber. In the bottom digital group design room is located. In the middle resting shelter and sharing space are placed if necessary(presentation

and exhibition), folding door will be open and can be used as big space. Detailed composition is as shown on the picture.

[Picture 4] Composition plan of classroom M and its example per space

Thirdly, in case of 'classroom type A' it can be applied to 3.5 unit extra classroom. There are music and dancing room for individual practice, separated storage for related tools, practice room, theater with small stage. It is suggested to support comprehensive arts education where music, dance and indoor physical trainings and play are available. Fourthly, in case of 'classroom type L' it is suggested to use 6 unit of extra classroom, 3 unit from 2 floor. It is a complex library model which directly connects to the class. It also can be used non-school hours and after school hour, freely. On the 1st floor there are digital learning center, vacant resting area and on the 2nd floor there is a learning center with bookshelves in the middle and on the left classroom connected to

library is planned. Basically it is located at the end of the building and natural lighting come through 3 different sides for bright place.

In case of hub type it is suggested to use 1 unit extra classroom. It is located between classrooms and it is accessible between rooms and it is open to corridor. Hub(a~f room) connecting to class and rest hub(g~h room) are divided. First, 'Hub type a' is planned to personal data research and use which are related to class theme. It is composed with 'hub type b' according to status of extra classroom in each school. And it can support comprehensively to individual data collect and research. Secondly, while hub type a is planned to support personal data collect and research, the main goal of 'hub type b' is group data collection and research activity and suggests digital based round table and writable walls. Thirdly, 'hub type c' is suggested to support such various small group meetings as 1 person, 4 person, 8 person and face to face interaction. Writable wall and monitor are installed and space is divided by glass wall. It secures easiness of managing students. Thus, it can be used for group activities and meetings of students during between classes or after school hours and meetings of teacher and parents. Fourthly, 'hub type d' is suggested to support such activities as experiments which need observation for long time and activity related to outside. There is a discussion space with storing experimental tools. Fifthly, 'hub type e' is an amphitheater with beam projector. It is a multipurpose space to support such activities as presenting and sharing learning outcomes related with class, watching movie during non-school hours, free play, resting place. Sixthly, 'hub type f' is gallery space where school shares outcomes of class with school members(between grades, between teachers and students) and local community and promotes the school. It is suggested to be placed in easily accessible location for community members like main entrance. Seventhly, 'hub type g' and 'hub type h' is

living space for students' rest which reflects the demands from teachers rather than space with directly related to teaching and learning. In case of former one, it can be applied to extra classroom adjacent to library and can be used as resting space. When it is connected to reading room with bookshelves, it is suggested to be used as personal reading and meditation. In the latter case, it can be applied to extra classroom adjacent to cafeteria where students can rest and wash their hands while they are waiting for meal including sanitary space. In order to effectively compose suggested future space of learning space policy proposals are suggested as followings.

□ Policy proposals

Proposal 1: Establishing governance related to urban regeneration and life SOC projects

It is necessary to establish governance which connects school space innovation project, urban generation project and life SOC project. It generates synergy effect. Recently schools were constructed when number of students increased. Most of school buildings are getting old and are in period of decline due to decrease in population and population migration in urban and rural areas. Since schools have potential for generating synergy effect of local education and enhancing life quality by sharing facilities which are highly accessible rather than any public facilities. Now school space innovation project and urban regeneration project operates independent organizations such as project team or center for supporting urban regeneration. They are working on process for participation of users. Thus it is necessary to seek for draw synergy effects by establishing governance of school innovation project. Each

project organization connects each other to share infrastructure, program and management know-how. It is also necessary to establish interactive governance with life SOC project, composite project agent or organizations.

Proposal 2: Establishing preemptive mid-long term plans of local unit

It is necessary to establish procedure and regulations in order for having preemptive mid-long term plan on school space innovation of local unit. Due to aging of many school facilities it is time to improve environment or remodel and reconstruction. Now many schools are planning to undertake. However, school space innovation of local unit is now based on public application of each school without planning of a comprehensive master plan. It will be an obstacle when space innovation on entire school facilities by large scale of remodeling or reconstruction. It is advisable to decide the project according to priority after reviewing such elements as will of school members and users, utilization of learning space according to curriculum and overall space innovation plan. It should be done under the framework of a systematic and comprehensive master plan. The master plan touches on when and which schools are going to reconstruct or remodel, by when remodeling or safety action respond and how to use each space of the school in order to form interactive relationship with local community and rationally carry out the school space innovation project. Especially since there is a chance to overlap some of the project for improving aged environment and the school space innovation project, contents of each project should be viewed together and it is necessary to prevent violation of right for learning from double investment and frequent construction. Appropriate

evaluation criteria which would select preferred investing schools and buildings should improve educational environment which are comparatively worse than others and enhance educational quality.

Proposal 3: Making and distributing manual and casebook of research based school class and level

It is necessary to provide manual or casebook which contain school innovation direction and planning elements per school and school type. Since now school space innovation project carries out all over the country simultaneously, there is possibility not have enough qualified experts. In order to compensate it, it is necessary to develop and disseminate various manuals and guidelines based on professional researches on planning procedure of projects and project participants, direction of planning and technique elements. This research divides and suggests future learning space into a classroom type and a hub type. It is composed to support the teaching and learning method which is reflected on 2015 curriculum of elementary, middle and high schools which can be used for reconstruction of school space. The future study considers physical capability, emotional capability and cognitive ability of other students according to class level, educational objectives, teaching and learning methods. With considering them it is necessary to provide students centered effective school space by thinking of more various reconstruction ways of school space and reviewing suitability of standards size and shape of the classroom. It is necessary to develop and disseminate various directions and models of school innovation according to class level and space type in order for respond to various educational environment such as free-semester, credit system of high school and apply appropriate model per situation of each school. It reflects

utilization plan of extra classrooms which are caused by continuous declining in school age population and local features.

Proposal 4: Reviewing and enacting related regulations for school space innovation

It is necessary to provide regulations on minimum space size, planning standards, required budget and process for the school space innovation. School carries out the facility project based on School Facilities Projects Promotion Act and Foundation and Operation Regulation of Every School(hereafter Foundation and Operation Regulation) under high schools. They were made when schools were in the period of expanding school facilities. However, since now it is time for enhancing quality of educational facilities rather than quantitative expansion, it is necessary to make and modify various regulations for school space innovation and stable operation.

School Facilities Projects Promotion Act is to shorten process of new construction and extension and alteration of building. Thus, it should be amended for focusing on management or enact new regulations. The scale criteria of Foundation and Operation Regulation was based on criteria of past time and it does not reach to currently required facility standards. It is also necessary to prepare new criteria which reflect increase budget for the school space innovation, that is, the criteria of required budget for extension and improvement of facilities. It can be used for calculation standard of special grant and standard for compilation of the budget. Since previewing system by Ministry of Land, Infrastructure and Transport, evaluation of central investment by Ministry of Education, reviewing of school space innovation project are likely to be overlapped, it is necessary to examine comprehensively and make rational procedure.

Proposal 5: Enhancing educational effectiveness by reviewing in advance and post evaluation

It is necessary to develop tools for preliminary evaluation and post evaluation which are for reconstruction of school space or effectiveness of the school space innovation projects and their planning directions. Ultimately the school space innovation project expects educational and emotional effects which impact on students. Related guideline says that designated procedure should be done within curriculum and it is very reasonable. The school space innovation project is in initial stage and its effectiveness needs to be examined. It is necessary to analyze in-details which educational effects are caused by improved school space with massive investment of educational finance comparing to previous school space. If examining and reviewing process on which parts and which planning elements positively impact on students and which effects we can get are accompanied, it is possible to have more successful school space innovation.

❑ **Key words**: teaching and learning space, user driven plans, innovation of school space