

## Utilization Plan of School Facility Data to Improve the Educational Environment

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### 1. Summary

The goal of this study analyzes various data related with school facilities and develops tools for analyzing current status of educational environment by deciding index and criteria of improving educational environment which have a strong influence on education and life of students. It also suggests policy proposals of data related to status of facilities in order to expand the school facility and improve educational environment by using facility(improving) index which can calculate index and its value of improving educational environment.

The main contents are concept of improving educational environment, its current status, development of index of improving educational environment and management items, analyzing current status of educational environment by index analysis, proposal of how to use current data of school facilities for improving educational environment. The research methods are literature review, Delphi analysis, data analysis and survey by statistical analysis and case analysis.

The summary of main research results are as follows.

### 1) Concept of improving educational environment and current status of school facilities

In general improving educational environment means improving of wornout facilities and improvement of structural and functional capabilities. Separating from projects of establishment, addition and improvement, education office pushes ahead with the project of improving educational environment. The improvement of educational environment in the wide sense of the term which is defined by improving educational environment according to the policy project includes improvement of wornout facilities and that extension and changes of facilities for optimal conditions. The projects of addition and improvement and reconstruction of space are examples.

In this study the concept of educational environment is limited to physical school facilities. The improvement of educational environment includes not only the project of improving wornout facilities but also expansion of facilities for example addition and improvement and the investment in facilities for improving educational function.

According to usage data for school facilities owned by Eduvill elapsed year of school buildings across the country shows that 15.2%, 147,600,000m<sup>2</sup>, of entire school buildings are 16 to 20 years old and 14.8% are 11 to 15 years old and 11.7% are 6 to 10 years old. In general time for practical maintenance

of more than 20 years old buildings is 50.3%, 48,740,000m<sup>2</sup>, of entire school buildings which is more than half of them. About 30.9%, 29,960,000m<sup>2</sup>, are more than 30 years old buildings. 40 years old buildings which are supposed to be entire remodeling and rebuilding is about 14.6%, 14,110,000m<sup>2</sup>. Thus since it requires big budget for maintenance and improvement of facilities, it is necessary to analysis of target buildings, set up criteria for improvement and have a long-term investment plan.

Eduvill which possess the greatest number of data related to school facilities manages site, buildings, space and particular facilities. It also manages such evaluation standard as unit price of facility and various standards for executing the project of improving educational environment. However, standard unit in national level and common unit price of facility are not controlled. The size per space which can be used for judging appropriate size of facility and standard criteria of facility in national level and criteria per city are not supervised. In order to take fully advantage of data of school facilities including Eduvill and use them to decide facility policy and business direction in national and regional level, it is necessary to set up and manage criteria for using the judgement of excess or deficiency of facility and needs in improvement. For this purpose, it is necessary to set standards which are practically applicable in consideration of national and regional conditions by Ministry of Education and each province and city. It is also necessary to develop the function which can analyze status of facilities by up loading these standards and it leads in capable of setting up mid and long term policy for unit project, facility projects in regional and national level.

## 2) Setting up index of improving educational environment

Necessity items for using data of improving educational environment are

decided and indexes which have a decisive effect on improvement of educational environment for suggesting measures to use related data are set up. The criteria for calculating value of index are also set up. Specified criteria per index for analyzing current data of improving index of educational environment and suggesting methods to use are set up. If data related with index for improving educational environment are not managed, additional management items are suggested.

In this study direction and scope of developing index of improving educational environment are set up as follows.

Firstly, the indexes of improving educational environment are to understand expansion of facilities, necessity and size of improvement of facilities which passed several years after construction. It is not for evaluating performance, condition and quality of overall school facilities.

Secondly, since the indexes are to understand condition for improving educational environment by investment of facility improvement, the object is limited to current condition of facilities within school boundary. Thus, educational environment related to human and institutional condition is excluded.

Thirdly, since the aim of the indexes is to judge necessity of improving facilities, the targets are elements and items which can be set up by objective facility standards. The target is the objective index with objective current status of facilities and if a subjective index is needed, an item will be suggested with a following project.

Fourthly, the overall condition of facilities for improving educational environment is a target and facilities for responding to curriculum and improving wornout facilities are mainly dealt.

Fifthly, in this study only indexes related to improving educational environment will be developed. The comprehensive indexes or standards considering various

indexes will not be developed. If it is needed, the related project will be followed.

Sixthly, if it is necessary to decide the criteria of facility size and degree of wornout for calculating value of index per index of improving educational environment, standard criteria will be established and used through Delphi of experts based on existing facility condition and status.

In this research there are two times Delphi survey of experts for deciding indexes of improving educational environment. Except several indexes which lack of content validity among indexes of improving educational environment in terms of quantity, there are such 43 quantitative indexes as appropriateness of total floor area, appropriateness of general classroom and appropriateness of multi-purpose hall. There are also such 34 qualitative indexes as securing of seismic performance, wornout degree of fire extinguishing facilities, wornout degree of restroom and wornout degree of finishing materials. And there are such 11 operational indexes as the amount of energy used and user satisfaction. In sum there are 88 indexes for improving educational environment.

### 3) Establishing facility criteria and improving criteria for setting up index value

Among indexes of improving educational environment facility standards per classroom are decided with consideration of curriculum of each class and facility standards of each education office and reference in order to decide index value related to facility size and decide norms for facility standards per classroom. It leads to calculating number of classroom(space program). The calculated facility criteria is used for deciding index value on related items of above mentioned indexes of improving educational environment.

The facility criteria which are suggested in this study are examples which can be used as application plan of facility size related data by using indexes of improving educational environment in national level. Each municipal ministry

of education separately decides reasonable facility criteria regarding local situation and it can be used as calculation of index value, grasping demand and policy.

There are two ways of calculating facility criteria for planning size of school construction. One is a plan for space related to regular courses which are suggested by curriculum and the other is a plan for support and managing space which are not directly related to space plan of each subject which are suggested by regular courses. In this study the facility criteria of curriculum are based on most recent 2015 revised completion unit and support related facility is based on related reference and facility criteria of each province. What is important in deciding facility criteria is deciding module which corresponds to size of general classroom, existing general module(local union) is used. The deciding facility criteria related to supporting facility is based on suggested principles of architectural planning which come from criteria of number of user and area per person. The research papers and facility criteria of each city are also considered to suggest calculating methods of standard facility criteria which can be used by size of classroom.

The calculated facility criteria and improved criteria are used for calculating index value of index for improving educational environment. Based on them plans to analyze actual data and use data are suggested.

#### 4) Proposal of how to use data of current status of school facilities

In this study a direction of using data of school facilities for improving educational environment is decided and application plan with examples of analyzing data of school facilities are suggested with quantitative and qualitative data.

Based on above mentioned indexes of improving educational environment

concrete plans to use data of school facilities is suggested into LCC analysis method which can be used such decision making of plans for improving facilities as demand for facility expansion, assuming surplus classroom, assuming demands for improving facility and plan for improving facility. The concrete application plans are as follows.

Firstly, along with continuous decreasing numbers of students the assumption of demand for facility expansion and surplus classroom sets up indexes related to size of school facilities according to demands for new educational facilities and space and demands for facilities related to local community and welfare. They respond to increasing small-size schools, increasing surplus classroom of existing schools, changes of future education and increasing of social demands. The facility data related to indexes of each school are analyzed. And understanding of securing appropriate facilities and potential of transforming existing facility is carried out for judging possibility to expansion, transform and improving of facilities.

For this purpose among indexes of improving educational environment mainly indexes related to size(number and area) of classroom or space are used for data analysis. Especially data per each space use should be correctly managed. In case analysis after deciding how to use data along with analyzing floor map of actual school other than input data actual data application plan and case analysis are suggested.

Secondly, since there are constant demands for improving facilities which satisfy wornout degree of elapsed school buildings after construction, social requests and legal conditions assuming demand for improving facilities decides quality improving indexes of replacing and repairing school facilities and analyzes current data of each school. They lead to understanding time for improving facility and quantity of improving facilities. Through this it will help to set the plan for quantity of improving school facility, upcoming quantity

of improving facility, mid-long term plan of improving facility in local or national level.

For this purpose among indexes of improving educational environment it is necessary to analyze data which are mainly related to improvement(repairing) cycle. The size and materials of each facility, year of establishment and quantity related data should be accurately managed. Based on them precise demand analysis for improvement can be done.

Thirdly, the LCC analysis for deciding a plan of improving facility shows that there is necessity for have a large scale of improving project by reconstruction and remodelling if school building passes elapsed years and worn out seriously. Since in Korea many school buildings which were built for responding to increasing numbers of students in 70s and 80s are facing life expectancy, there are burning problems of planning improvement, assuming demands and related policies. Thus, among indexes for existing school facilities indexes of improving buildings should be used for deciding improving plan for the building with using data. For this purpose it is necessary to have information on repairing cycle of each facility item for deciding index value, year of most recent repairing of school buildings. Especially it is additional necessary to have information on base price of each facility. Since this study does not include base price of each facility separately, plan for using data and case analysis are carried out based on existing research papers and base price of facility by municipal ministry of education.

Finally, the operational indexes which are suggested in this study are indirectly related to improving school facilities. Since there are difficulties in providing how to use related data and concrete case analysis, this study tries to provide conceptual ways of using data and managing data.