Decision-making when organising facilities for a school: a participatory action research approach

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Abstract

Purpose – Public authorities are required to organise new facilities to respond to changed user demands in terms of a public-owned school. The number of pupils attending the case study school will increase in the following years, as will the number of children attending a day nursery located on the present campus. In addition, the users of the campus have complained of building-related symptoms. This study aims to understand the municipal decision-making process in organising the school's facilities, in particular, the factors used for decreasing uncertainty around a project.

Design/methodology/approach – This study is a case study undertaken through an action research approach. The researchers participated in the project planning meetings concerning the future activities to take place in the building.

Findings – Over a 13-month period, multiple stakeholders participated in the project planning meetings providing a deeper understanding of the space demands posed, current challenges and opportunities offered by the existing building. In addition, the alternative solutions generated were evaluated. The problem identification and information gathering periods lasted over nine months, which was far longer than predicted. Thus, generating alternative solutions and evaluation of the solutions also delayed. As the entire process was delayed substantially, the final decision on organising the facilities was not made during this research.

Practical implications – This research may be of practical value for a property owner and a project team for decision-making concerning changed facility demands.

Originality/value – This paper provides information about how public authorities are making decisions on facility organisation during conditions of uncertainty.

Keywords Public decision-making, Uncertainty management, Project planning, School facilities, Building-related symptoms, Facility organisation

Paper type Case study

Introduction

Public authorities all over the world must constantly make decisions on actions concerning public building stock. Currently, a large amount of a public building stock, such as school buildings, is in poor condition and needs refurbishment (Bello and Loftness, 2010; Filardo, 2016; Hopland, 2014; Lawrence, 2003; Lewis *et al.*, 2000). In addition, a multitude of building users are complaining of building-related symptoms when using the public buildings

(Åhman *et al.*, 2000; Borràs-Santos *et al.*, 2013; Patovirta *et al.*, 2004). Public decision-making concerning organisation of a facility is typically complex and needs proper information on future needs and the condition of the existing buildings, as well as careful identification of risks and uncertainties of each alternative, before the final decision is made.

In decision-making concerning a damaged building, the condition of the building plays a major role in the decision from a financial perspective, as well as in terms of the future use of the building, including space demands (Marttila *et al.*, 2016) and environmental and social factors. Often, it is necessary to make a decision concerning future functions of the building in conditions where some uncertainty still prevails (Farsäter and Olander, 2019). Typically, an overall impression of the condition of a building must be sought as the initial data is often incomplete. In addition, users' needs and demands may be unclear and change during a project.

The need to create space for an increasing number of pupils and kids, the changed demands in terms of amount of food preparation and the modified needs of a school were the factors that initiated this participatory action research. Action research is an approach that aims to both take action and generate knowledge of that action. In the process the researchers are not solving the problems for the others but with the others (Ottosson, 2003). The idea behind action research originates from Lewin (1946). As the researchers are involved in the organisation studied, they can use unspoken and unfurnished information and resolve the practical challenges of the organisation. Whereas, when using traditional research methods, researchers are standing outside the studied social system, may not see every aspects of the system and the data is often reconstructed (Ottosson, 2003). This study is proposed as a framework for demonstrating how decisions on municipal facility organisation are made in conditions of uncertainty.

Organisation of school facilities

Working with an existing building entails several uncertainties, including technical, financial, functional and project management challenges, as well as health-related factors. When making a decision concerning a building with reported building-related symptoms, management of uncertainty is important for avoiding and overcoming indoor air problems and health symptoms. Refurbishment of a building about which health complaints have been made is complex to manage and to complete successfully, and a project typically involves a high level of uncertainty (Ebbehøj *et al.*, 2002; Haverinen-Shaughnessy *et al.*, 2008; Kero, 2011). Therefore, a comprehensive understanding of the condition of an existing building, indoor air science, the moisture performance of structures, the total performance of a building envelope and sustainable renovation actions is needed to produce a healthy environment for users.

In Finland, decisions concerning school facilities are made by local councils, and the proposals for organising those facilities are typically prepared by municipal workers. Often, the decisions include multiple separate decisions, such as those determining whether to renovate an existing school or build a new school, and if renovating the building, what the extent of renovation will be (Wilkinson *et al.*, 2014). Farsäter and Olander (2019) reported that functionality and accessibility as well as architectural and cultural values were the main themes in the decision-making of the early stages of a school renovation study, instead technical status, energy use and indoor environment in the buildings were discussed to a limited extent. In general, municipalities face a number of challenges in managing public property, encompassing executing renovations, a lack of funding for maintenance, renovation works and replacement of facilities, unsatisfied building users and making

decisions concerning public facilities, as several authors have reported (Baadjies, 2018; Barber, 2015; Haugen, 2014; Kero, 2011; Lewis *et al.*, 2000; Vermiglio, 2011).

Decision-making in conditions of uncertainty

The decision-making process typically involves the following themes:

- generating available options;
- evaluating the options; and
- selection of an action.

The decision-maker rarely has all the information available and a limitless amount of time to make the best decision. Thus, the decisions are made in conditions of uncertainty. Uncertainty may be defined as "a lack of certainty", and may be related to cost, duration, information required or quality (Ward and Chapman, 2003). It can be classified according to the issues the decision-maker is uncertain about, including outcomes, situation and alternatives, and according to the sources of the uncertainty, including incomplete information, inadequate understanding and undifferentiated alternatives (Lipshitz and Strauss, 1997). Uncertainty can be reduced using several procedures, including collecting additional information to be processed before decision-making (Galbraith, 1974), deferring decisions until the required information is available (Hirst and Schweitzer, 1990), eliminating sources of uncertainty (Allaire and Firsirotu, 1989) and improving predictability through shortening time-horizons (Cyert and March, 1963).

Research method and material

This case study was carried out as action research by participating in information gathering and discussions at the project meetings as well as following the decision-making process. Thus, the authors could come to the closest of the studied process and were able to obtain the very deep understanding of the process. In addition, the risk of misunderstandings was reduced as researchers worked closely together with the studied organisation on a daily basis in the project. The authors gained data all the time during the process and could use unfurnished data, unspoken information and impressions in a qualitative way.

The researchers started the study in spring 2018, at the beginning of the project planning phase, and the study lasted 13 months. The researchers attended actively a total of 21 project planning meetings, observing as well as making suggestions and asking questions. The meeting dates and a summary of the issues discussed during the meetings are presented in Table 1. At the beginning of the project planning phase, the meetings were usually attended by university researchers, a representative of the building developing department, condition assessment consultants, a head teacher and a deputy head teacher, and sometimes also a chief of a maintenance department, a representative of a school committee, kitchen and cleaning experts and the chief of early childhood education. In the final stages of the phase, one or two designers hired by the municipality also participated in the meetings. The number of participants in the meetings ranged from 6 to 18.

Characteristics of the case study buildings

The case study concerns a school campus that consists of three buildings: the so called white building, the brick building and the pavilion, located in the Vantaa metropolitan area, Southern Finland. All the pupils use each of the buildings and in total there are almost 800 pupils using the campus (Figure 1).

Date	Main topics
27.3.2018	Launch of project planning and presentation of the stakeholders
6.4.2018	Structural issues, condition of systems and devices and layout of the facilities
10.4.2018	Visit to the campus
10.4.2018	Facilities and functionality, usage of the site and an extension to the day nursery
4.5.2018	Requirements associated with ventilation and adequacy of the initial data
16.5.2018	The need for a condition assessment
21.5.2018	The procurement of a condition assessment
8.6.2018	The content of the condition assessment and the repair actions executed during the summer
28.6.2018	Progress of the condition assessment and the repair actions
9.8.2018	The condition assessment task and repair actions executed during the summer
6.9.2018	The results of the condition assessment
10.9.2018	Procurement model
11.9.2018	Project planning
5.10.2018	Presentation of the results of the condition assessment
3.12.2018	The results of the condition assessment and effects of the results on project planning
3.1.2019	Visit to the buildings, review of the results of the condition assessment and general notices
16.1.2019	Commencement of the designing work
31.1.2019	The matters required related to the design
28.2.2019	Presentation of the design layouts
14.3.2019	Review and evaluation of the design layouts
28.3.2019	Review and evaluation of the design layouts

Table 1.
Project planning meetings and the main topics discussed

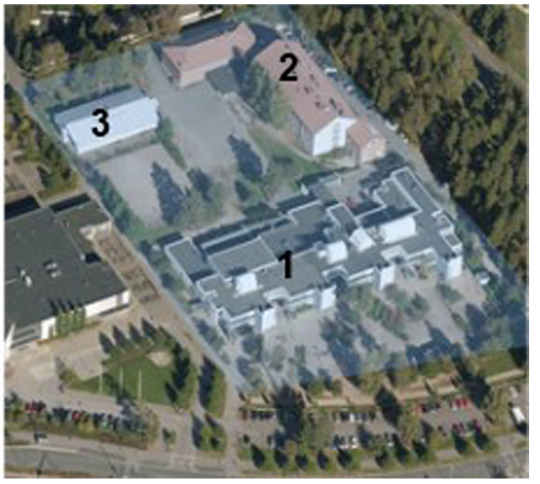

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Figure 1.
The case-campus is light-coloured and the numbered buildings are (1) the white building, (2) the brick building and (3) the pavilion

The white building is currently a primary school with a day nursery. This two-storey building with a total heated floor area of 4,620 m^2 was built in 1997. Currently, the building has places for approximately 400 children in a primary school and places for 42 children in a day nursery. In addition, 50 faculty and 14 staff members work in the building. The building features a kitchen and a dining room, conventional classrooms and some classrooms equipped for more demanding activities, such as rooms for timber and metal work. In

addition, the pupils also use lobbies when studying. The staff have complained for several years about symptoms and an unpleasant smell in the white building. In a survey concluded in 2017, 41% of the staff reported experiencing symptoms, such as repeated and persistent respiratory disorders, eye irritation, headaches, allergic symptoms, coughs and fatigue, when using the building. In addition, a significant number of pupils have also suffered from various symptoms, such as nasal congestion, rashes and other skin symptoms.

The three-storey brick-framed building "the brick house" was built in 1955. Currently, the school's capacity is about 300 pupils, and the total heated floor area is 4,261 m^2. Most classrooms are conventional rooms with natural ventilation. Some rooms have been refurbished to be special classrooms, such as home economics and physics. Local exhaust ventilation is built into those rooms because of more demanding condition requirements. However, these ventilation systems disturb the natural ventilation and, thus, the special classrooms are not suitable for the brick house.

The timber-framed pavilion, with the total heated floor area of 611 m^2, was built as a temporary building in 2001 and it is being strongly considered for demolition in the foreseeable future.

History of the buildings

The white building has had a number of problems from a very early stage. There have been several water leakages and the users have complained of building-related symptoms for many years. Multiple repair actions have been carried out in the building because of the failures, and the roof has been replaced. During summer and autumn 2018 and winter 2019, several measures were carried out in the building, including addition of an epoxy membrane coating on the concrete floor; replacement of the floor coating and sealing rooms to be air tight.

The brick building still has many of its original systems, components and structures. However, it has undergone small-scale renovations multiple times, for example, some of the windows have been replaced. There is natural ventilation in most of the classrooms, and the rooms are perceived as stuffy, while the temperature during winter is too cold and during summer is too hot. The condition of the buildings as well as the executed condition assessments and refurbishment actions executed are presented more widely in a previous study (Uotila *et al.*, 2019).

Action research process

The first project planning meetings focused on describing the initial situation of the school and the day care centre, as well as elaborating with a feasibility analysis and a project target. In addition, the users' views and experiences were explored in depth. There is a need for a day nursery with 192 places, and the number of pupils on the campus will rise by 150 pupils in the coming years. In the surroundings, there are no usable plots for a new day nursery building, according to the municipal authority. In addition, the serving capacity in terms of lunches will be increased on the campus as the school also provides lunches to other pupils in the area, and the numbers of pupils in nearby schools will increase as well.

Some problems and requirements of the facilities were defined in the feasibility study, but the targets and current challenges were still elaborated on in these meetings. In particular, the users of the school presented challenges they currently face in the buildings. The main targets and current problems presented at the meetings can be summarised as follows:

Targets:

- Organising facilities for 192 children in a day care centre.
- Organising facilities for 950 pupils on the campus.
- Organising facilities to make 1,800 lunches per day.
- Providing disabled access into all the classrooms.
- Ensuring the learning spaces are compliant with the new curriculum.

Challenges:

- The spaces are not large enough for an increased number of pupils and day care attendees.
- The kitchen is too small to increase the service capacity.
- Complaints have been made of building-related symptoms in the white building.
- Several failures in the white building have occurred over the years, such as water leakages.
- The problematic route for service traffic through the yard is problematic.
- The yard is fairly small for the number of pupils and children at the day care centre.
- The present classrooms are fairly inefficient in terms of space usage.

Currently, the space usage of the brick building and the pavilion is fairly inefficient. For example, the target space demand for a secondary pupil is 8.5 m^2 and the current space per pupil is 13.17 m^2. On the other hand, the rooms of the white building are used more efficiently and, for example, corridors are also used during the lessons.

The day nursery definitely requires a larger space, but the school also has needs related to the characteristics of the rooms. The present dining room is noisy and impractical, the room for woodwork needs modernising and more safe spaces, and the gym should be more multipurpose. In addition, the classrooms should generally be more adaptable to be more appropriate for a new curriculum.

Gathering information

During the spring and early summer 2018, all the existing materials related to the building condition, including 30 reports covering condition assessments, surveys, hazards, audits and repair measures carried out, were collated and scrutinised by the authors. In addition, the authors made a map of the investigations: each survey was pinpointed on a plan and the results were presented briefly. The aim of the map was to help those involved visualise the surveys of the building implemented and to sum up the results of those studies. The scrutiny highlighted that the white building has been subject to a broad range of investigations, but some omissions in the data on the condition of the building were found. The brick building has also been studied a lot, but the investigations were somewhat outdated and generally more limited. To establish more precisely the condition of the buildings and the needs for future repair measures, the municipal authors hired condition assessment consultants to survey the buildings. The surveys were carried out between May and October 2018. The condition assessment consultants also attended the majority of the project planning meetings until the end of the study.

The most recent survey and the earlier surveys reported multiple failures and hazards in the white building, as well as the building's renovation needs. The surveys reported the following failures and observations, among others: water leakages from the roof and the

skylight windows, blocked sewers during heavy rainfall causing water to flood the floor, moisture damaged partition walls because of splashing of water near the taps, microbes in the insulation of the partition walls, poor ventilation and a poor standard of cleaning. Therefore, multiple structures are in need of renovation measures but the building is also in a need of more careful maintenance. The brick building also has multiple needs for renovation. In particular, the base floor of the basement is in need of replacement and multiple other structures have been damaged over time.

Identifying the uncertainty in relation to the case buildings

During summer and autumn 2018, the project participants tended to identify the uncertainty concerning the buildings and the entire project. The condition assessment consultants focused in particular on uncertainty related to technical issues, and the users on uncertainty associated with functionality. The uncertainties were freely pointed out in the project planning meetings. The authors documented the following challenges and uncertainties identified concerning the white building:

(1) The uncertainties concerning the most recent repair actions:
   - *Sealing work in the classrooms:* The condition of the external walls was unknown, it is possible that some of the external walls that underwent sealing contain microbes, and gradually these microbes will spread into the indoor air.
   - *Epoxy-membraned floor:* The moisture performance of the structure will change, and the epoxy membrane prevents moisture rising up from the concrete floor. Therefore, some of the moisture content of the concrete floor may rise. The areas under the partition walls were not epoxy membraned, and there is a risk of moisture rising by capillarity into the partition walls and leading to moisture damage.

(2) Construction failures.

(3) Failures in the roof.

(4) *Challenges with maintenance of the roof:* The access hatch is at almost the same level as the roof and during winter, snow sometimes drifts against the hatch and prevents access to the roof. The drifting snow may also let water into the structures of the external walls from the joint in the access hatch.

(5) *Vandalism:* Trespassing on the roof is quite common, and people on the roof have damaged the structures, which has probably contributed to water leaks. If access to the roof cannot be prevented, there is a high risk that acts of vandalism will continue to occur and also cause water leaks in the future.

(6) *Technical uncertainty related to the floor surface:* The floor surface is almost at the same level as the surrounding ground-level in several locations.

(7) *Microbes in structures of the white building:* High levels of microbes and spore cases were found in several structures and multiple locations.

(8) The learning environment is noisy.

(9) The yard is unsafe for children and pupils.

(10) There are not enough car parks.

The uncertainty concerning the most recent repair actions can be responded to by revealing the success of the renovation. The success and the consequences can be tracked in multiple ways: changes to the moisture performance of the structures can be tracked by continuously

monitored sensor data, and air-tightness can be monitored by smoke tracer testing. However, of greatest importance is monitoring the symptoms exhibited by the users.

The uncertainty concerning the brick building was discussed more briefly. However, the following uncertainties were identified:

- microbes and other impurities in the basement;
- unpleasant conditions during lessons; and
- accessibility problems.

As it was assumed that the pavilion is to be demolished, the uncertainties considering that building were not discussed.

Generating alternative solutions and evaluating the alternatives

In December 2018, the municipal administration hired consultants to design solutions for organising facilities. As it was assumed that the brick building was not having a notable negative effect on the health of users, the starting point of the design was to keep the frame of the building relatively unchanged and create an extension into the white building. In February 2019, the designers presented three alternative procedures for responding to the new space demands.

Evaluation. The project planning participants gave feedback on the alternatives presented during the project planning meeting. The authors created an evaluation of the design alternatives presented in the meetings, and summary of the alternatives and the evaluation is presented in Table 2.

As all three alternatives have many disadvantages and challenges, the project team decided that the designers would create a new alternative, in which the feedback given would be taken into account.

Alternative four. In the middle of March, the designers presented a new design, where an extension, connected to the existing building with a walkway, would provide a new kitchen, a dining room and day care facilities. Again, the project team commented on and evaluated the design at the project planning meeting on 13 March 2019.

The alternative four (A4) has many advantages compared to the previous designs, but it also has significant downsides. The children and accompanying parents arriving to the day care centre need to enter the building from the inner courtyard as this is where the playground for the children is, and they will leave their shoes near those entrance doors. The walking distance from any nearby car park or bus stop to the entrance from the inner yard is relative far. Therefore, accompanying the children takes a long time; this also means that some nearby car parks will be occupied for a longer time, which may cause traffic congestion.

The A4 features an entrance from the inner yard and from outside into the walkway between the extension and the existing building. The authors and condition assessment consultants established that previous experiences have shown that an external wall, which would be inside the building following the extension, has caused indoor air problems several times. The risk can be minimised by planning the extension to be separated from the original building and connecting it to the building, for example, with a separate walkway. This solution has advantages as it simplifies the access to some rooms significantly, but also complicates the idea of a school where users do not have to put shoes on to move from one area to another. In any case, the safest solution is to build the new extension entirely separated from the existing building, as this means any potential air impurities cannot be transferred into the extension. However, the majority of the municipal employees wished to

Characteristic	Alternative 1	Alternative 2	Alternative 3
Facilities the new extension comprises	Facilities for a day care centre	Facilities for fine art, handcrafts, home economics and natural sciences	New kitchen facilities, a dining hall and facilities for natural science and home economics
Area of extension (Gross floor area, m^2)	1,812 + ventilation engine room	2,284	2,233
Technical level of the extension	*	**	***
Cost	*	**	***
Advantages	Functionality of the day nursery facilities Minor renovation needs in the existing classrooms The yard of the day nursery is quieter than the current yard as it is further away from the road, and particle emissions levels are lower	Functionality of the natural sciences, home economics, handcraft and fine art facilities Possibility of building demanding facilities in a way that offers better moisture performance than currently	Practical and safe service transport Functionality of the natural sciences and home economics classrooms Possibility of building demanding facilities in way that offers better moisture performance than currently
Downsides	Delivery of the lunches to the day nursery The service vehicles often drive through the yard, where the pupils spend time Another kitchen and dining room in the extension	Particle emissions and noise in the yard of the day nursery Loud noise from the dining hall being conveyed into the facilities of the day care centre The service vehicles often drive through the yard, where the pupils spend time Five units of day care instead of the required six units. The five units would cover the area of six units, but requires increasing the number of children in every unit	Delivery of lunches to the day nursery Particle emissions and noise in the yard of the day nursery Five units of day care instead of the required six units
Risks		High financial losses if the refurbishment to eliminate the symptoms does not produce successful results as when the kitchen is refurbished, the room layout will be significantly modified and new staff facilities built	Financial losses if the refurbishment to eliminate the symptoms does not produce successful results, as the room layout will be significantly modified and new staff facilities built

Table 2.
Evaluation of alternatives 1, 2 and 3

persist with the idea of connecting the new spaces to the existing building. This would allow the users to move between the extension and the present building quicker and without putting their shoes on. The walkway option presented was felt to be inconvenient as there is no space for a cloakroom for outdoor clothes.

Alternative five. On the basis of the feedback, the designers created alternative five (A5), which was commented on at the meeting held on 28 March 2019. The extension proposed in A5 provides a new kitchen and a dining room as well as day care facilities. The rooms in the existing building remain generally unmodified. The extension is connected to the existing building but the risk of the indoor air problems caused by external walls occurring inside the new building is minimised by demolishing the external wall between the extension and the existing building. At the meeting, in particular a passage through an entrance hall into the dining hall was perceived as unpractical as the children walk barefoot. In addition, the entrance into the day care was criticised.

Choice of solution

At the end of March, when the action research ended, new significant information concerning the conditions and symptoms of the users of the brick building was received. Thus, more solutions continued to be generated after March, and the final decision on organising facilities was not concluded during this research.

Discussion

Over a 13-month period, the project participants aimed to create a solution to organise facilities for a day care centre, a school and a kitchen. The decision-making did not strictly follow any scheme as the process proceeded quite informally. However, from the process, the following phases can be observed: identifying the problem and the target; gathering information; generating alternative solutions; and evaluation of alternatives.

The uncertainty of the decision-making could be reduced by means of a proper investigation of the existing building, identifying the uncertainties and evaluating the alternatives generated. As multiple participants attended the project planning meetings, the demands of the users, the project targets, the condition of the existing buildings and the refurbishment needs were properly established. Consequently, the problems and the targets were properly identified, and a significant amount of information was gathered. However, the collected information, the problems and the targets were not succinctly documented and similarly understood among the project participants, which complicated the decision-making process.

Figure 2 shows the stakeholders involved in the decision-making process, and their relationships with one another. The Real Estate Centre is responsible for the development and acquisition of municipal properties and spaces, and the Real Estate Centre's Building Unit is responsible for renovation investment projects. The local council approves their proposals.

Decision-making process of the alternative designs

The designers created the alternative designs on the basis of the information they received. Then, the design solutions generated were evaluated and commented on freely during the project planning meetings, and multiple advantages and downsides of the design alternatives were pointed out. However, during the evaluation process, the matters displayed were not weighed. Therefore, some good solutions might have had rejected because of a relatively small impediment. By attaching weight to the matters displayed, the evaluation could have been made more realistic. In addition, this phase was prolonged as a design solution that would have satisfied all the demands was not found. Typically, the decisions must be made under limited time, budget and data (Farsäter and Olander, 2019); therefore, the decision-making is mostly reaching a compromise instead of aiming for a perfect solution. In the case study, the compromises were difficult to find as stakeholders'

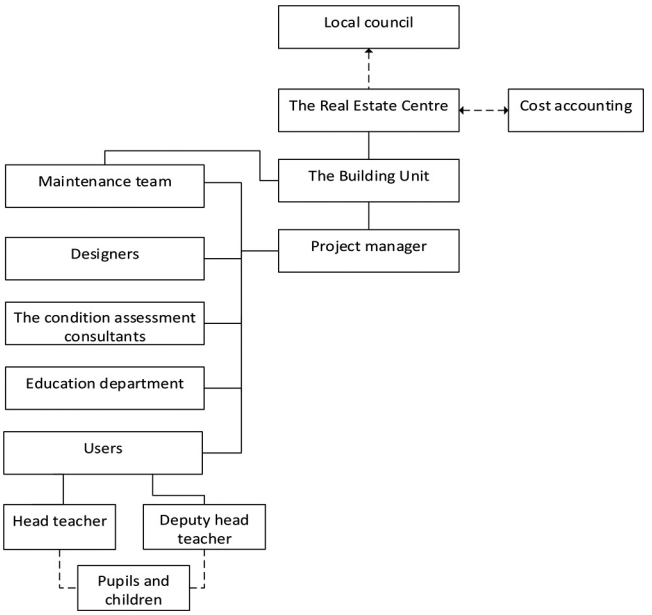

Figure 2.
Decision-makers organising the school facilities

priorities varied significantly, and common perceptions of the priorities were not created. Hence, the evaluation criteria created in advance could have simplified the decision-making and accelerated this phase. In addition, some limits, such as project budget, were unclear.

Identified uncertainties and challenges of the project

The project participants identified multiple uncertainties concerning the project, as well as encountering several factors that complicated and delayed the decision-making. A significant challenge was positioning the day care facilities, school facilities and facilities for a kitchen also providing meals to other schools and day care centres, on the present campus. As the site is relatively small, not all of the facility demands and requirements could be met to a high level. In addition, some risks identified could not be responded to because of site limitations. For example, logistics regarding the food preparation are impossible to organise without detriment to passage to the campus or activities in the yard. Furthermore, current land-use planning created limitations that could not be overcome within the schedule of this project planning phase. Therefore, more adaptable or far-reaching land-use planning could facilitate preferable outcomes.

The municipal maintenance team attempted to eliminate building-related symptoms caused by the white building by repairing some structures between summer 2018 and February 2019. However, the success of the actions could not be ensured during the project planning phase as the refurbishment was implemented so recently. Therefore, a risk of a continuance of the building-related symptoms of the users of the school remained. In the project planning meetings, most of the municipalities tended to ignore the scenario of continuance of the building-related symptoms, and underlined their need to be able to trust that the refurbishment actions implemented would be successful. The refurbishment was mainly based on condition research carried out in 2017 and early 2018. However, the condition research implemented during the project planning phase found even more

seriously damaged structures and microbes than the previous research, as well as reporting on several high-risk structures and executions. In addition, the condition assessment consultants pointed out that the condition of some structures, including external walls, was still unknown. Therefore, the risk of continuance of the building-related symptoms is still relatively high, even after implementing the most recent refurbishment.

The project schedule was delayed, which is fairly common in municipal building projects (Bourn, 2001). The information-gathering phase lasted approximately eight months, which was far longer than predicted. The condition assessment proceeded relatively slowly because the municipalities did not enter into a contract with the condition assessment consultants. Furthermore, the additional surveys were extended as the studies suggested were not officially ordered even though they were agreed on verbally with the municipalities and the condition assessment consultants. In addition, the refurbishment actions in the progress over summer impeded the survey. The project manager changed twice during the project planning phase, which might have delayed the project, as it took time for the new project manager to absorb all the information generated. In addition, tacit knowledge might have disappeared during the reshuffle.

The main discussions during the meetings concerned the location of the extension rather than the different options for organising facilities on a broader scale. However, potential outcomes and future condition possibilities that Wilkinson *et al.* (2014), for example, have presented, had been considered before the project planning phase. Technical aspects such as the condition of the building were discussed at great length contrary to school renovation study of Farsäter and Olander (2019). However, the costs of the alternatives were not discussed to any great extent. A forecast of the total costs was left until later in the process, at which point, a cost accountant will estimate the costs of the chosen alternative. This complicates the comparison of the alternatives and decision-making as the decision must be made on the basis of insufficient data.

There were two different types of needs to resolve in the project: the need to create more space for day-care attendees and pupils, and the need to eliminate building-related symptoms. However, the decision-making was focusing largely on resolving the space requirements. Generally, decision-making is a process of selecting an option from a set of alternatives. The project participants did not manage to find alternatives to resolve the problem of building-related symptoms, but alternatives for space requirements were easier to find. This was probably the reason the project participants dismissed the topic of building-related symptoms in decision-making and concentrated only on solving the space requirements.

Conclusions

Public authorities all over the world are tackling modified needs for public facilities. In addition, a large proportion of the public building stock is damaged and in need of refurbishment. Therefore, the public authorities are constantly under pressure to make decisions concerning facility organisation. The decision-making is typically complex and each project has own characteristics, therefore, the public authorities cannot use the same plan for each project without adaptation.

This study presented the action research of a project planning process concerning a decision on organising facilities for a school and a day care centre. The decision-making process entailed the phases of identifying the target and the current problems; generating alternatives; and evaluating the alternatives. The project needed more accuracy concerning some sources of uncertainty, as one of the school buildings was significantly damaged. Therefore, the uncertainties were also identified in several phases of the project. In addition,

establishing evaluation criteria for alternative designs in advance could have simplified the decision-making process.

This study is based on one case campus; however, other projects have similar characteristics to this research. The findings may provide insights that could be useful in the other public projects, and may increase project stakeholders' knowledge of decision-making in terms of organising facilities, and offer practical value for owners of a damaged building.

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