The Renovation of Traditional School Buildings to Keep Pace with Innovative Education Systems

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Abstract— Since the beginning of the twenty-first century, the world has witnessed technological and economic developments that have led to changes in various aspects of life. Education is one of these aspects that has changed, as the skills required in the work environment have changed, which has affected the curricula, learning activities, and the design determinants of the learning environment. Many innovative design models for learning environments have emerged to accommodate the new innovative educational approach, and renovations of the existing traditional school buildings have also taken place according to the global trend towards sustainability and making the most of the available resources, which is an appropriate direction for the Iraqi reality, that suffers from the obsolescence of school buildings and the decline of the educational process that revolves around traditional education. Thus, the research problem emerged, represented by **"the need to know the most important design modifications that can be made to make the traditional Iraqi school buildings capable of accommodating the development of the educational process"** and the research objective was determined by **"reaching the most important design modifications that can be made to renovate and develop Iraqi schools to meet the educational requirements of the new century".** By reviewing some experiences of developed countries in renovating their school buildings, the research has reached several design modifications that can be made to make the school building more flexible, encourages cooperation and communication among students, and includes diverse spaces that accommodate the activities required to acquire higher thinking skills.

Keywords— Traditional schools, Twenty-first-century skills, Student-Centered learning approach, Flexible learning environment, Renovation.

1. Introduction

The design of traditional schools, which usually consist of separate classrooms that include a specified number of students learning the same subjects in the same way, dates back to the nineteenth century and the effects of the Industrial Revolution, which provided an incentive to educate all children to prepare the workforce in factories. The educational process focused on students' acquisition of industrial economics skills represented in reading, writing, and arithmetic, in addition to acquiring accuracy and discipline skills, as the educational process was based on a teacher-centered approach in which the teacher is the source of knowledge, so he gives lectures and directs the students, who are inactive participants as their only role is to memorize the knowledge and information provided to them. Traditional schools continued to exist during the nineteenth century and twentieth century, but the twenty-first century witnessed many developments and changes that indicated the need to develop the educational process in terms of curricula and learning activities. Perhaps the most important developments are:

• The development in technological intelligence and the subsequent development in the field of information and knowledge, their organization, and the tools to access them. As the ease of access to information and the availability of knowledge has led to a major shift in the skills required to succeed in the twenty-first century, as students need to acquire higher-order thinking skills of creativity, innovation, and critical thinking to be able to deal with knowledge, evaluate it, analyze it, and use it to solve problems, create solutions to many of the problems and challenges facing the world, such as global warming,

and epidemic diseases, in addition, to controlling the challenges and issues that may arise in the future.

• The Economic changes that affected the required workforce skills, as the knowledge-based economy has become a feature of the twenty-first century and higher-order thinking skills that include creativity, innovation, critical thinking, problem-solving, communication, and cooperation have become the main drivers of contemporary economic growth.

To acquire students the higher-order thinking skills, a shift has been made from the teacher-centered education approach prevalent in traditional schools to the student-centered learning approach linked to social constructivism theory, in which the student is the center of the educational process as an active participant who asks questions, discusses, conducts experiments, searches for information, participates in planning his learning process, and in evaluating the performance of other students and cooperates with them.

As for the teacher, his role is to provide support, advice, and guidance to students in order to achieve their educational goals, encourage students' curiosity and their motivation for learning and help them to become independent and creative thinkers by providing Experiments that develop higher thinking skills. The teacher is also responsible for evaluating students' performance and providing feedback on their educational path to correct performance. This approach includes many different learning activities and practices, which include: independent study, peer-to-peer tutoring, one on one learning with a teacher, project-based learning, design-based learning, student presentation, team collaboration, interdisciplinary study, internet-based learning, in addition to the teacher lecture. These different and varied learning practices and activities have imposed the necessity of reconsidering the design of the learning environments that encompass them.

2.   The learning environment in the twenty-first century

Several terms have been coined to designate the twenty-first-century learning environment, including Flexible learning environment, which refers to the learning environment that supports diverse learning needs and can be reconfigured to accommodate a wide range of learning practices and activities [13, 3].

The term Modern Learning Environment-MLE goes back to the New Zealand experience where the term Innovative Learning Environment-ILE was introduced at an international level and was defined by the New Zealand Ministry of Education after adopting it instead of the first term, as "The learning environment that is capable of evolving and adapting as educational practices evolve and change – thus remaining future-focused"[20].

Despite the multiplicity of designations of the learning environment in the twenty-first century, they all refer to a learning environment designed to accommodate the various learning activities and practices necessary for students to acquire higher thinking skills, in addition to its ability to accommodate new learning activities that may appear in the future, by achieving several design characteristics. The most notable design characteristics of the twenty-first-century learning environment are:

• Flexibility: It is a widely repeated recommendation in the literature on the design of twenty-first-century schools, as it can be achieved by increasing the space specified for each student in the classroom (increasing the size of classrooms) [29], and using effective dynamic boundaries that separate spaces such as openable partitions and sliding door [3], as well as equipping spaces with flexible, lightweight furniture that can be easily moved and reconfigured to suit a variety of activities [17].

• Openness (transparency): Innovative schools are designed with fewer walls, and more glass, compared to traditional schools, to enable teachers to indirectly supervise students who work in different spaces, and to allow both teachers and students to observe and learn from the educational processes that take place in the different school spaces, thus It supports a more collaborative and participatory educational approach. Besides, transparency increases the entry of natural light, thus achieving a healthy learning environment for students while ensuring their integration with nature [16].

The innovative schools consist of various basic learning spaces that support different activities, including interactive classrooms, breakout spaces, group learning spaces, and presentations spaces, in addition to specialized spaces (workshops and laboratories) and common public spaces [14].

3.   (The reality of) Iraqi school buildings

The educational process in Iraq has suffered since the mid-eighties of the last century from neglect and stagnation, due to the politics of wars and the great interest in military force at the expense of other pillars on which states are built, on top of which is the education system, which is a fundamental factor in the development of nations [10]. Also, in the nineties, the economic blockade imposed on the Iraqi people led to the overthrow of what was left of the education infrastructure in Iraq as a result of the low percentage of government support for the education sector, which affected the ability of the education system to achieve its main goals, The lack of interest in the development of school buildings, their maintenance, the furnishing of classrooms, and the equipping of specialized spaces [11]. After it was considered one of the most advanced in the Arab region, the Iraqi education system became one of the educational systems most suffering from many problems. After 2003, the problems of education in Iraq increased at two levels:

• The backwardness of its curricula in the face of developments in the modern world, and innovative educational practices and activities. The theoretical and

practical subjects are still separated in many educational curricula, the development of mental abilities and higher thinking skills for students are neglected, and a focus on memorization ability, which is one of the lowest levels of thinking. The main teaching method is based on indoctrination, in which students memorize, remember, and repeat what they hear without going into depth. In addition to the lack of keeping pace with technological development, and the lack of use of modern education means and techniques [10].

• The great shortage in the number of school buildings stands as an obstacle to the implementation of educational plans that seek to advance the educational reality and improve the educational level of students in all Iraqi schools. This shortage is due to the lack of investment in education, and the lack of financial allocations for the implementation of construction projects for school buildings, in addition to the aging of school buildings with the lack of maintenance and renovation programs [9].

4.   Renovation of traditional school buildings

The process of renovation is intended to link physical environment changes with educational developments, by making modifications and changes to the traditional school building layout, and within the existing external envelope, to achieve a variety of educational spaces that are flexible enough to accommodate different educational practices [19]. The renovation process has emerged in recent years due to the global trend towards promoting sustainable development, making the most of the resources available in traditional schools [7], with weak financial resources and the high cost of building new schools instead of existing traditional schools, which no longer meet the requirements of the educational process in the twenty-first century. In addition to the benefits of the renovation process represented in preserving the effectiveness of existing schools, keeping pace with development, and exploring new and varied teaching methods, which leads to enhancing the academic performance of students and increasing cooperation between them, as the renovation of spaces leads to a departure from the limits of the traditional classroom area, moving to flexible spaces that accommodate cooperative activities and students' work in large and small groups [5]. The renovation of old schools is also of great significance for the society which considers them with a great deal of emotion, especially if they occupy a prominent position in it. However, some reasons favor the choice of building a new school, for the renovation of the existing building, including issues related to health and safety, or that the structure does not bear the required changes, or that the cost of renewing the building is greater than the cost of constructing a new building [4].

Thus, we find that the renovation process is necessary to the Iraqi schools' reality, which suffers from the backwardness of the educational process, and the lack of school buildings, in addition to the lack of financial allocations for construction projects. As the renovation process works to maintain the effectiveness of the existing school buildings, and keep them at pace with development.

5.   Research Objective and methodology

The research aims at reaching the significant design changes that can be made to renovate and develop the Iraqi schools to enable them to accommodate the educational developments of the twenty-first century, by reviewing experiences of some countries in the field of renovating their existing schools.

5.1   *New Zealand experience*

The New Zealand experience is exemplified by the reference design options developed by the Ministry of Education for the renovation and development of traditional classrooms into flexible learning spaces. They are part of a strategy to enable the wider adoption of innovative learning environments with flexible spaces. These reference designs help demonstrate the development methods of traditional schools and emphasize the possibility of renovating their spaces to accommodate student-centered learning practices. Reference designs include the renovation options of several standard classroom blocks that New Zealand adopted in the 1950s, 1960s, and 1970s for school buildings. These include the Avalon block typical for primary schools, and the Nelson two-story block for secondary schools, as follows:

5.1.1   *Avalon Block (1955-1962)*

A typical Avalon block is a one-story building with four classrooms of (70) m^2 each and cloakrooms running along the back of the classrooms. The cloakrooms provide access to the toilets at the rear of the building. Note **Figure** (1), which shows the elevation and plan of the existing 4-classroom Avalon block.
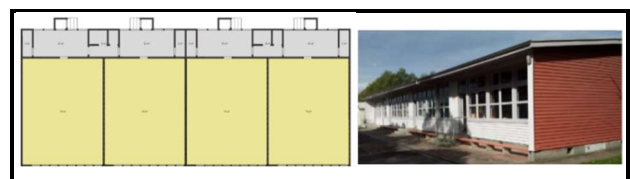

Figure 1: Front view and Plan of existing typical 4-classrooms Avalon block [21].

A development proposal represents the changes that can be made to achieve interconnected learning spaces that can contain collaborative learning practices, where part of the walls between the classrooms have been removed - to form openings wide (3.7) m and height (2.7) m - and to change the use of some cloakrooms into breakout spaces for the work of small groups or the work of faculty members, in which glazed sliding partitions can be added to achieve the sound insulation required while maintaining indirect supervision. Since this block is used for the elementary grades, in which students perform most of the activities inside the classroom, there is no need for specialized learning spaces such as laboratories, but rather a wet service area is provided at one end of the block to separate the noisier activities that are related to the practical projects that take place near the wet service area, and allowing the quieter Learning activities, such as presentations, or lectures, to occur at the other end of the block (that is, the use of the distance indicator and the layout of activities to control the transmission of noise), in addition to the possibility of using a movable screen to the acoustic separation between different learning activities and groups of students.

To achieve the link between the internal and external spaces, which is one of the basics of transparency in the innovative schools, sliding glass doors were used [21]. The internal treatments include the use of Sound absorbent ceiling tiles (0.85 NRC), covering the floor with absorbent tiles, and using acoustically absorptive pin-board over the walls (0.4 NRC) [18]. Note **Figure** (2) and **Figure** (3).
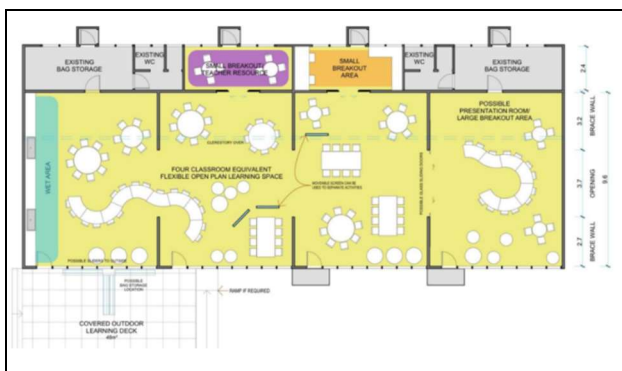

Figure 2: Proposed renovated plan of Avalon block [21].

Figure 3: Interior perspective in renovated learning spaces of Avalon block and the most important indicators of internal acoustic treatments [19].

Since the building has a Lightweight timber framing Construction, the renovation process must include strengthening the structure by installing wooden lintels across the openings in the classroom walls and installing new bracing walls throughout the structure [1].

5.1.2 *Nelson two-story block (1959-1975)*

The construction of the Nelson block began at the end of the 1950s and continued until the mid-1970s. The two-story block contained general and specialist learning spaces with different areas ranging between (52 - 78) m^2 [22], distributed in a central block that includes classrooms, a space for faculty members, and a movement space that includes students' lockers. The two sides of the central block are connected by a group of classrooms that form an (H) shape [2]. Note **Figure** (4) which shows the existing elevation and plans of the typical Nelson block.
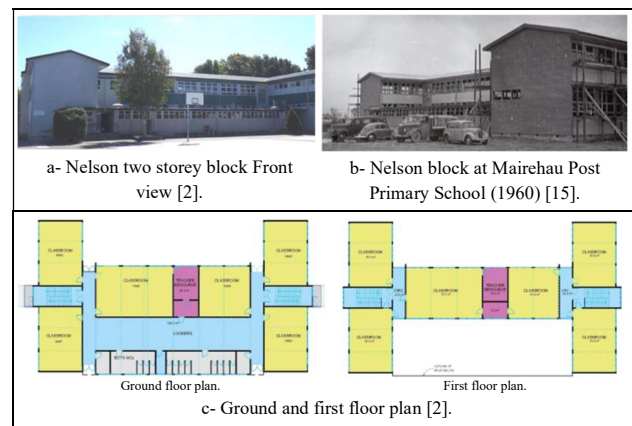

a- Nelson two storey block Front view [2].   b- Nelson block at Mairehau Post Primary School (1960) [15].

Ground floor plan.   First floor plan.

c- Ground and first floor plan [2].

Figure 4: Existing typical Nelson two-story block and some models executed during the 1960s.

The process of renovation' aims to increase openness between spaces and to achieve the flexibility necessary to accommodate the various learning activities, through:

• The partial removal of the internal walls separating the classrooms in the central block to create a flexible learning space with sufficient area to allow for theoretical collaborative learning practices in the middle of the block. The partial removal of walls imposes some acoustic treatments aiming to provide good acoustics performance within the flexible space, by using highly absorbent ceiling tiles and covering the walls (partially or completely) with absorptive pin-board in addition to covering the floor with good sound absorbent tiles to reduce the general level of background noise with the possibility of using glazed sliding partitions that provide acoustic insulation and visual privacy between different learning areas, as well as the use of movable screens to ensure the availability of additional levels of sound insulation within the flexible space while maintaining its flexibility.

• Modifying the circulation space and using it to create a space for the work of the faculty members, and breakout spaces that include individual or small group activities, with the possibility of adding glazed sliding partitions to provide acoustic separation and visual privacy from the rest of the learning area.

• Using classrooms at the end of the building as specialized spaces (laboratories) or presentation spaces.

• Improving circulation and accessibility to both floors by adding an elevator to the upper floor with dimensions (1.5 ×1.8) m.

• Utilizing the front outside space as an external learning space linked to the flexible internal learning space through sliding glass doors [22]. Note **Figure** (5).
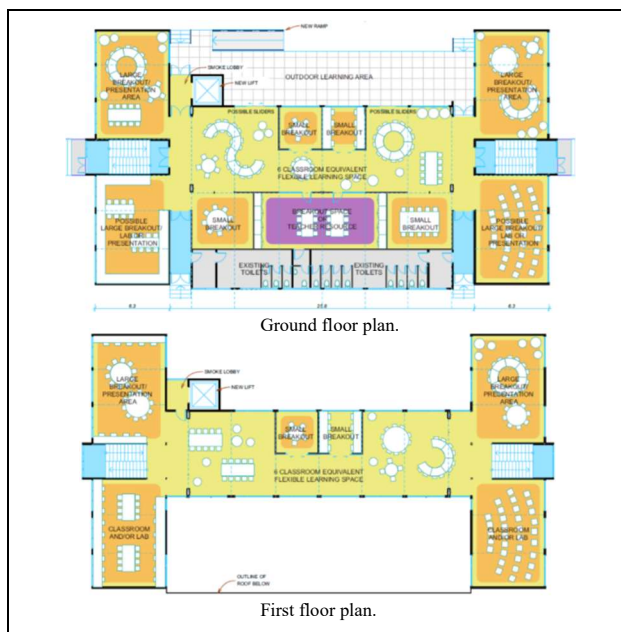

Ground floor plan.

First floor plan.

Figure 5: A proposal plan for the renovation of a typical 12-classroom Nelson two-story block [22].

A large proportion of New Zealand school buildings, including the Nelson Unit, have a wooden frame construction structure [1], which despite its good performance against earthquakes, but its structural structure must be strengthened during the renovation process [2].

5.2 *The American experience*

In the United States of America, some architectural institutions specializing in educational buildings have renovated many school buildings, including the Fielding Near International firm, which is a global leader in education consulting, planning, and architectural design.

Established in (2003) in the United States of America. It provides a wide range of educational and architectural advisory services to local, regional and global governments. Its directors have published dozens of books and important publications, including (School Design Language: Design Patterns for 21st Century Schools) and (School Redesign for Student-Centered Learning) [8]. Fielding Near International firm has worked on many projects to renovate and develop school buildings to suit the student-centered learning approach. The renovation process was based on transforming the classroom-corridor plan into a small learning community that represents an integrated educational unit comprising a variety of internal and external spaces, accommodating theoretical and practical educational activities.

Figure (6) shows the model of the small learning community adopted in the American experience when renovating traditional classrooms. Each small learning community consists of four to six interactive classrooms accommodating approximately 20-24 students, presentation spaces, breakout spaces, and a teacher's workspace. These spaces are opened into a common space located in the small learning community center. The common space represents a multi-purpose social center that allows students' movement between spaces and accommodates cooperative practical activities as well as student lockers. Each learning community has its entrance and has a connection to outdoor spaces [26] [6].
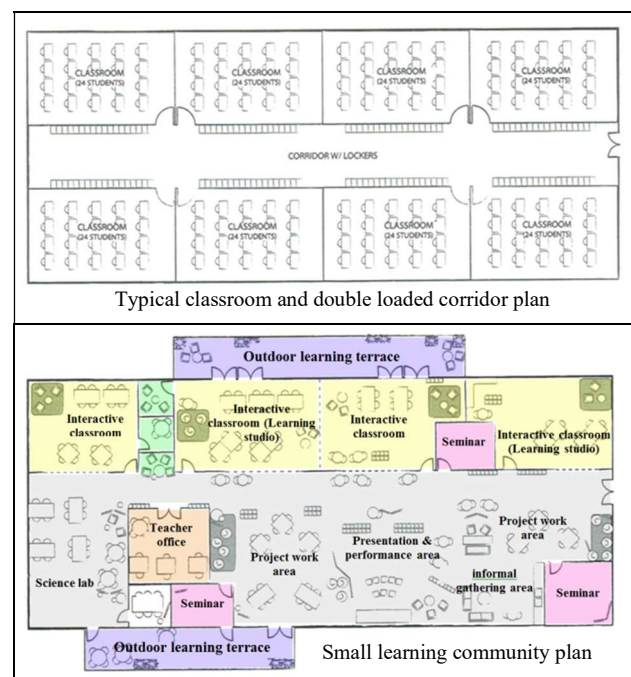

Typical classroom and double loaded corridor plan

Small learning community plan

Figure 6. A model of renovating traditional classrooms into a learning community (for the secondary level) in the American experience [23].

One of the renovation projects that have been carried out is the renovation project of (Hillel Academy of Tampa) Middle School in Florida, Where the school administration sought to explore the possibilities of improving and renovating the school building and traditional classrooms, so Fielding Nair International was called. Due to the lack of financial capabilities that would enable the renovation of the entire school building, the school resorted to the partial renovation (to start small), which is the best option in exchange for not undertaking any renovation, So the school wing that includes the first and second primary grades was renovated, which has been remodeled into an advanced professional small learning community that includes four interactive classrooms each accommodating 20 students, a common space for the entire learning community, a space for presentations, a space for teachers' work, specialized space for practical activities, and an outdoor space linked to the interior spaces through sliding glass doors, in which children can do a range of learning activities in the fresh air, and enjoy nature instead of staying in the interior spaces most of the day.

Figure (7) shows the school wing plan before and after the renovation, in which we note that the development process included removing parts of the partitions separating classrooms and corridors (opening some classrooms to corridors) and removing parts of the walls separating the classrooms. This increases the area and flexibility of the spaces, as well as expands the corridor to accommodate several informal learning activities.

The renovation process also included the use of movable partitions and sliding glass doors that achieve the flexibility of the spaces, the possibility of reconfiguring them according to learning needs, as well as ensuring the availability of sound insulation between the various activities, to achieve good acoustic performance in the active learning environment where attention is paid to the use of sound-absorbent materials as it covers the ceiling and floors, as well as the use of sound-absorbent wall pin-board. Note **Figure** (8) and **Figure** (9).

As the application of student-centered educational practices became essential to the success of the renovation process, the school worked on professional development for teachers who wish to teach collaboratively to prepare them to work in a cooperative environment, and spaces were developed in consultation with teachers who would work in the new space, as the role of the teacher is a key factor in the effectiveness of educational spaces and the achievement of efficiency of use [24].

Figure 8: Student-centered learning practices in Hillel school renovated learning spaces.

Figure 7: Hillel Academy of Tampa school primary grades wing plan before and after renovation [23].

a- School corridor before and after the renovation [24].

Sliding glass doors separate the classrooms from the corridor, achieving transparency and indirect supervision while providing sound insulation.

Absorptive pin-board over the walls

Cover the floor with sound-absorbing materials

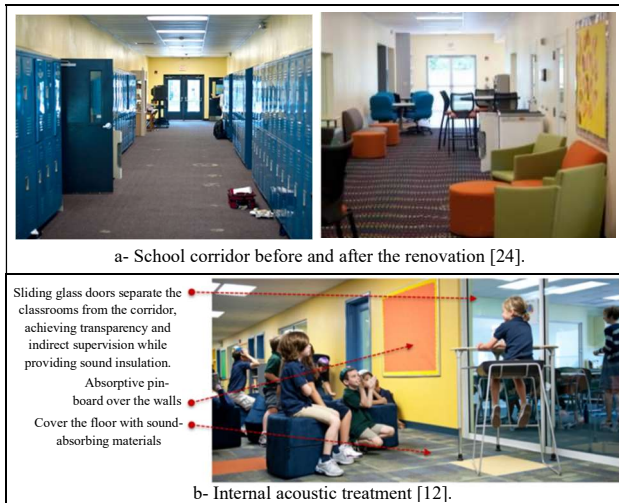b- Internal acoustic treatment [12].

Figure 9: The Renovation of the corridor to be used for a variety of activities.

In the US state of Rhode Island, the (Middle Town) county includes three schools, an elementary school, a middle school, and a secondary school, where the schools enrol in a total of about (3000) students. In the year (2006) AD, the district municipality decided to evaluate its school buildings, and the results of the evaluation showed that all schools do not meet the requirements of teaching and learning in the twenty-first century. Therefore, it set out to develop a master plan to determine what needs to be renovated or replaced according to the standards of the new century. Since the costs exceeded the capacity of the small district, the provincial administration began to put forward a development program based on the principle of the gradual renovation of schools, which has become one of the leading low-budget pilot projects. The first renovation project started at Forest Avenue Elementary School. And in it, Fielding Nair International was called to plan the innovative project. The school's wing, which houses the first and second primary grades, which dates back to the early sixties, was chosen to develop into an innovative small learning community with six interactive classrooms, which open to each other through sliding glass doors, achieving the flexibility of spaces, a space for teachers' work, and a large common middle area that captured the space previously used as corridors.

Note **Figure** (10) which shows the plan of the school wing before and after the renovation, and Figure (11) which shows the transformation of the double-loading corridor into a public cooperative space in which all students of the learning community participate by removing the walls (partitions) that define the corridor while preserving the structure. Since the opening of the school wing in September (2008), the learning community has proven its success, which led to the completion of the school building renovation project in the district [23].
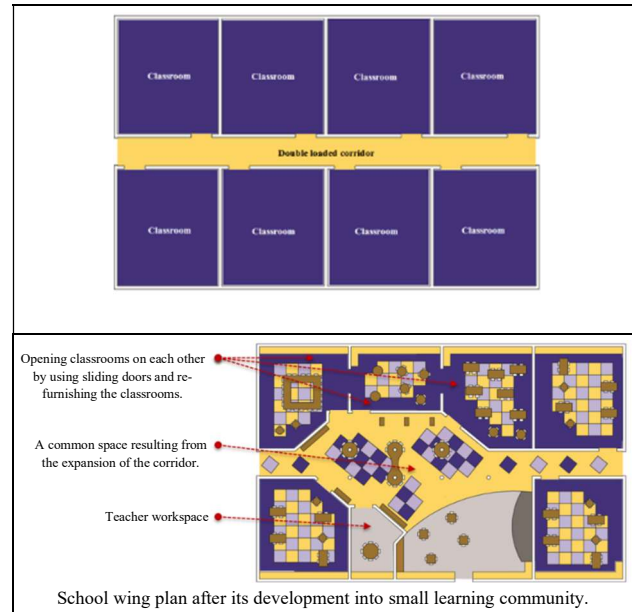

Opening classrooms on each other by using sliding doors and re-furnishing the classrooms.

A common space resulting from the expansion of the corridor.

Teacher workspace

School wing plan after its development into small learning community.

Figure 10: Plan of Forest Avenue Elementary School wing before & after the renovation [28].

Figure 11: Renovation of double loaded corridor in Forest Avenue Elementary School wing [28].

6. Results

Technological and economic developments in the twenty-first century led to changing the skills required in the new century and maximizing the learning activities and practices that are necessary to acquire them, which in turn affected the design of school buildings, which became more open and flexible. Because of the high cost required to build new schools instead of the existing traditional schools, which no longer meet the requirements of the educational process in the twenty-first century, and due to the global trend towards promoting sustainable development and making the most of the resources available in traditional schools, many countries have worked to renovate their school buildings. By reviewing New Zealand and American experiences in renovating its educational buildings, we find that the renovation process included making a number of modifications and changes in the traditional school building plan and within the limits of the outer envelope as an attempt to achieve the most important design characteristics that support the student-centered learning approach such as flexibility and openness, which encourage cooperation And communication between students and achieve flexible

learning spaces that accommodate the multiple learning activities required to acquire the skills of the new century, and as follows:

1- Achieving flexibility to accommodate various learning activities through:

• Removing parts of the partitions separate the traditional classrooms to break the isolation between them, as the partitions are an obstacle to flexibility.

• Removing some partitions separating classrooms and corridors to widen the corridors and create common public spaces for students that represent informal learning areas that encourage cooperation and social interaction among students.

• The possibility of using movable partitions and sliding glass doors as a boundary between spaces that achieve adequate sound insulation between classrooms or between classrooms and common public spaces (formerly corridors) while maintaining flexibility.

It is worth noting that although removing part of the partitions is a relatively small architectural change, however, it has a significant impact on the educational process as well as on the acoustic performance, as these changes must be matched by acoustics treatments seeking to meet the required acoustics standards. These treatments include using partitions with appropriate sound insulation values and emphasizing the use of absorbent materials, as removing the walls means a larger space and an increase in the reverberation time, which must be balanced by covering the ceiling and parts of the walls with absorbent materials in addition to the use of sound-absorbing floor finishes such as carpet tiles.

• Replacing the fixed furniture used in traditional classrooms with flexible and easy-to-move furniture that can be easily reconfigured to suit different learning activities.

2- Achieving transparency and increasing openness between the internal spaces and between the internal and external spaces to achieve indirect supervision of the students involved in the various learning activities in the different external and internal spaces of the school, and that was done by:

• Replacing the solid partitions and doors with glass partitions and glass sliding doors separating the classrooms and the common public spaces.

• Using sliding glass doors to separate the internal and external spaces as a developmental attempt to integrate nature with the overall interior learning spaces, and increase the entry of natural light which would achieve a healthy learning environment.

7. Conclusion

The renovation process is necessary to the reality of Iraqi schools, which suffers from the stagnation and backwardness of the educational process and the lack of school buildings, in addition to the lack of financial allocations, as the renovation process works to maintain the effectiveness of the existing school buildings and keep pace with the global development in the educational process. By reviewing some countries' experiences, we find that the process of renovating Iraqi school buildings can include the following:

• Conducting a survey of the school building to determine the efficiency of its structure and its ability to withstand modifications in the building, examining issues related to health and safety, as well as calculating the cost of renovation against building a new building.

• Achieving flexibility that supports the building's assimilation of a student-centered learning approach by removing parts of the partitions separating the traditional classrooms and some partitions separating classrooms and corridors and replacing the fixed partitions with removable ones, and re-furnishing the spaces with flexible furniture that is easy to move, as furnishing is an important factor in designing a flexible learning environment.

• Achieving openness and transparency by increasing the use of glass in the partitions that separate the interior spaces and by using sliding glass doors between the interior and exterior spaces.

• Improving the external spaces by linking them to the internal spaces and making them an extension of the educational process that takes place inside.

• Finally, it should be noted that these design changes should be accompanied by professional development for the educational staff, as they must be prepared to work in the new cooperative learning environment, which differs from the traditional classrooms in which they are accustomed to working.

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الخلاصة ــ شــهد العالم منذ بداية القرن الحادي والعشــرين تطورات تكنولوجية، واقتصـــادية ادت الى احداث تغييرات في مختلف جوانب الحياة. ويعد التعليم احدى المجالات التي طرأت عليها التغييرات، حيث تغيرت المهارات المطلوبة في بيئة العمل والتي اثرت في تغيير المناهج، والانشـــطة التعليمية وصـــولا الى مواصـــفات بيئة التعلم في القرن الحادي والعشـــرين. وقد ظهرت العديد من النماذج التصـــميمية المبتكرة للبيئات التعليمية وبما يحقق اســـتيعابها للنهج التعليمي المبتكر الجديد، ورافق تصـــميم الابنية المدرســـية الجديدة المبتكرة عمليات تجديد للابنية المدرسية التقليدية القائمة في ضوء التوجه العالمي نحو الاستدامة وتحقيق الاستفادة القصوى من الموارد المتوفرة والذي يعد توجه ملائم للواقع العراقي الذي يعاني من تقادم الابنية المدرسـية، وتراجع العملية التعليمية المتمحورة حول التعليم التقليدي. وبذلك برزت مشــكلة البحث المتمثلة بـ "الحاجة الى معرفة اهم التغييرات التصــميمية التي يمكن القيام بها لجعل الابنية المدرسية العراقية التقليدية قادرة على اســـتيعاب تطور العملية التعليمية"، وتم تحديد هدف البحث بـ "التوصـــل الى اهم التغييرات التصـــميمية التي يمكن القيام بها لتجديد وتطوير المدارس العراقية لتلبية المتطلبات التعليمية للقرن الجديد" وذلك عن طريق اســـتعراض بعض تجارب الدول المتقدمة في تجديد ابنيتها المدرسية. وقد توصل البحث الى عدة تغييرات تصميمية يمكن القيام بها لجعل المبنى اكثر انفتاحا ومرونة يشجع التعاون والتواصل بين الطلاب ويضم فضـاءات مرنة، ومتنوعة تستوعب الانشطة المطلوبة لاكتساب مهارات التفكير العليا وتشمل: ازالة اجزاء من الجدران الفاصـلة بين الصـفوف الدراسـية التقليدية، وبين الصـفوف والممرات والتي تقف عائق امام المرونة، واسـتخدام الابواب الزجاجية المنزلقة والقواطع المتحركة كحدود ديناميكية تفصـل بين الفضـاءات، اضـافة الى اعادة تأثيث الفضـاءات بأثاث متنوع، ومرن يمكن اعادة تشـكيله بسهولة ليلائم الانشطة المختلفة.

الكلمات الرئيسية ــ مدارس تقليدية، مهارات القرن الحادي والعشرين، نهج التعليم المتمحور حول الطالب، بيئة تعليمية مرنة، تجديد الابنية المدرسية.