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Investigating Interior Spaces in Primary Schools: A Case Study from Sulaimani City in Iraqi Kurdistan

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Abstract:

The interior design in the learning spaces especially in primary schools directly affects the behavior, mindset, and psychology of the students. Every element has it is own impact on creating a healthy interior space, from color, light, ventilation, acoustic, and materials, providing the sense of nearness to nature, and zoning (different zones, different activity), they all lead the student to feel more comfortable, active, and happy. The link between design and psychology is very important and mutual, the interior design of the classroom is somehow related to student learning performance, individuals' psychological states are influenced by their surroundings, with variations due to both physical and psychological differences, as well as personal experiences.

The research methodology is a questionnaire, graphic analysis, and checklist, participants were primary school teachers from three international schools in Sulaimani city. The results of the survey questionnaire graphical analysis and the checklist confirmed that three independent variables of interior design have a crucial effect on students' learning performance.

Keywords: Interior Design, Learning Spaces, Primary Schools, Student Behavior, Psychological Impact.

الملخص:

يؤثر التصميم الداخلي في أماكن التعلم خاصة في المدارس الابتدائية بشكل مباشر على سلوك الطلاب وعقليتهم ونفسيتهم. كل عنصر له تأثيره الخاص في خلق مساحة داخلية صحية، من اللون والضوء والتهوية والصوت والمواد، مما يوفر إحساسًا بالقرب من الطبيعة، وتقسيم المناطق (مناطق مختلفة، وأنشطة مختلفة)، كلها تقود الطالب إلى تشعر بمزيد من الراحة والنشاط والسعادة. إن الارتباط بين التصميم وعلم النفس مهم ومتبادل للغاية، فالتصميم الداخلي للفصل الدراسي يرتبط بطريقة أو بأخرى بأداء تعلم الطلاب، وتتأثر الحالات النفسية للأفراد بما يحيط بهم، مع وجود اختلافات بسبب الاختلافات الجسدية والنفسية، وكذلك الشخصية. خبرة. منهجية البحث عبارة عن استبيان وتحليل رسومي وقائمة مرجعية، وكان المشاركون من معلمي المدارس الابتدائية من ثلاث مدارس دولية في مدينة السليمانية. أكدت نتائج التحليل الرسومي لاستبيان المسح والقائمة المرجعية أن ثلاثة متغيرات مستقلة للتصميم الداخلي لها تأثير حاسم على أداء تعلم الطلاب.

الكلمات المفتاحية :التصميم الداخلي، مساحات التعلم، المدارس الابتدائية، سلوك الطلاب، التأثير النفسي.

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پوختە:

دیزاینی ناوەوە لە فەزای فێربوون بە تایبەت لە قوتابخانە سەرەتاییەکاندا ڕاستەوخۆ کاریگەری لەسەر ڕەفتار و بیرکردنەوە و دەروونی خوێندکاران هەیە. هەر توخمێک کاریگەری خۆی هەیە لەسەر دروستکردنی فەزایەکی تەندروستی ناوەوە، لە ڕەنگ، ڕووناکی، هەواگۆڕکێ، دەنگ، و کەرەستەکانەوە، دابینکردنی هەستی نزیکی لە سروشت، و ناوچەگەری (ناوچەی جیاواز، چالاکی جیاواز)، هەموویان فێرخواز بەرەو ئەوە دەبەن هەست بە ئاسوودەیی و چالاکتر و دڵخۆشی زیاتر بکات. پەیوەندی نێوان دیزاین و دەروونناسی زۆر گرنگ و هاوبەشە، دیزاینی ناوەوەی پۆلەکە بە جۆرێک پەیوەندی بە ئەدای فێربوونی خوێندکارەوە هەیە، باری دەروونی تاکەکان لە ژێر کاریگەری دەوروبەریاندایە، لەگەڵ گۆڕانکاری بەهۆی هەردوو جیاوازی جەستەیی و دەروونی، هەروەها کەسایەتی ئەزموونەکان. شێوازی تۆژینەوەکە بریتییە لە پرسیارنامە، شیکاری گرافیکی، و لیستی پشکنین، بەشداربووان مامۆستای قۆناغی سەرەتایی بوون لە سێ قوتابخانەی نێودەوڵەتی لە شاری سلێمانی. ئەنجامی شیکاری گرافیکی پرسیارنامەی ڕاپرسییەکە و لیستی پشکنینەکە پشتڕاستیان کردەوە کە سێ گۆڕاوە سەربەخۆکانی دیزاینی ناوەوە کاریگەرییەکی چارەنووسسازیان لەسەر ئەدای فێربوونی خوێندکاران هەیە.

کلیلە وشە: دیزاینی ناوەوە، فەزای فێربوون، قوتابخانە سەرەتاییەکان، هەڵسوکەوتی خوێندکاران، کاریگەری دەروونی.

Introduction

Students spend a significant amount of time in schools, where they interact with various aspects. Research on student performance and learning environments highlights the significance of interior design in these spaces and its impact on students' perception and performance. The research suggests that the locations and the surroundings where students spend a significant amount of time learning can impact their learning outcomes (Earthman, 2004). Classrooms are indoor locations with a high population density; from early infancy through adolescence, people spend a lot of time in learning environments. In educational facilities, the physical characteristics of educational facilities' interior design, such as form, texture, color, sound, and lighting, significantly influence the learning outcomes of students (Knez, 2001). These features can also enhance users' perceptual reactions by influencing their emotions. Technology advancements have boosted the use of color in both indoor and outdoor settings. By lengthening students' attention period’s, enhancing their cognitive capacities, and enhancing their perception of their surroundings. Because they have an impact on students' physiology and psyche, these spaces require high-quality design and color choices (Jin et al., 2005). Because there is a gap between quality education and interior design, and a limited number of research about this topic in Iraq. The main purpose of the research is to define the impact of interior design on student’s performance inside their classrooms.

1. Student’s Performance

Studies have thoroughly investigated how physical learning and teaching settings, such as acoustics, temperature, noise, air quality, spatial density, and seating configurations, affect student performance and attendance (Earthman, 2004; Weinstein, 1979). These conditions, in addition to student achievement, have been the main subjects of research. Moreover, technology, as a powerful instrument, engages with educational settings (Lomas & Oblinger, 2006; Montgomery, 2008; Oblinger, 2006). Brooks (2011) observed that incorporating redesigned learning and teaching environments with student engagement has the potential to enhance student performance and results. Baker and Bernstein (2012) propose that modern, collaborative, and student-centered physical learning environments improve learning processes. Earthman and Lemasters (2011) studied how physical learning settings affect student performance. They discovered that children show better

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performance when given appropriate resources, such as well-designed environmental spaces and engaging learning environments. According to Schneider (2002), creating conducive and enjoyable learning environments is essential for successful learning. Lyons' (2001) study shows that variables including temperature, heating and air quality, lighting, and acoustics have a substantial impact on student performance. Zubrzycki (2013) suggests that school architecture influences student accomplishment by ensuring equitable access to learning materials and places, enabling students to exchange successful strategies.

2 Measuring Student's Performance

Evaluating student academic progress is difficult since social, psychological, and environmental factors can influence performance. Multiple economic, psychological, and environmental factors influence student accomplishment. Research studies investigate the influence of several elements, such as learning ability, on student performance. The new learning paradigm proposes that every student is capable of and should strive to attain elevated levels of learning. Race, gender, and sex can impact student performance. Research sought to clarify the direct relationship between students' academic success, financial situation, and the likelihood of dropping out of school (Goldman, N, et al., 1988). Chansarkar & Mishaeloudis (2001) investigated the impact of age, qualifications, distance from the learning site, and other variables on student performance. Students' performance on the module is not associated with variables such as age, gender, or region, but is linked to proficiency in quantitative topics. According to Walters and Soyibo (1998), student performance is strongly associated with socioeconomic background (SEB). There is a considerable correlation between the academic success of high school pupils and their gender, grade level, school type, geography, and socioeconomic status. (Kirby, Winston, et al., 2002) investigated the effects of impatience on students' academic performance, specifically with regard to their time-discounting behavior. Goethe found that when disadvantaged children are matched with individuals going through comparable academic difficulties, they perform better academically. Alexander, Gur et al. (1974) and Fraser, Beamn et al. (1977) suggest that some procedures carried out by college administrations in higher education, such as residential colleges or organized study groups, improve academic achievement. Considering all the characteristics mentioned by various experts. Teachers' classroom skills have a restricted impact on students' academic achievement.

Teacher effort does not have a significant impact on student academic performance. Students' academic advancement at public high schools can be notably impacted by variables including IQ, parental education, socioeconomic background, and personality, which vary throughout the research area. This could significantly influence students' academic accomplishment, which may explain why kids perform poorer compared to their teachers' effectiveness.

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2.1 Learning Spaces

Children spend a considerable amount of time in a school classroom where they learn crucial skills needed for success in a worldwide community. Students learn about their societal responsibilities, unique strengths, establish future goals, and get a grasp of the necessary skills to achieve them in this environment. To be an effective teacher, one must have a thorough grasp of classroom management, which significantly impacts a child's growth. For schools to adequately educate the next generation for success in society, they must create a learning environment that promotes student achievement (Moyles, 1992). The condition of a classroom mirrors the commitment of educators and administrators to the educational process (P. Helmseresht, E. Delpisheh, 2003). Students should be able to efficiently acquire knowledge and derive pleasure from the learning experience in the classroom (E. Sedigh, 2001). Several aspects impact the learning environment, such as sound, light, and color. Light is essential in educational environments since the eye is integral to the process of learning. Ensuring adequate lighting in the classroom is crucial for maintaining good eye health. Studies indicate that windows should cover at least 20% of the room's floor space to provide sufficient lighting for reading and writing. Installing adjustable drapes on windows is to properly control light levels year-round (E. Sedigh, 2001).

Important aspects for indoor lighting are proper light intensity levels, surface reflectance, light contrast, and choosing the right type of lighting. Human history has been greatly influenced by natural colors found in the environment and has incorporated them in different ways. Color is an essential communication tool that represents emotional, cultural, tribal, and national symbols. Colors impact our emotional and spiritual well-being, often resulting in disappointment and despair, which can make youngsters feel drained and disheartened (Education Organization, 2003). Studies have shown that colors affect the creativity and emotional well-being of children and adolescents, eliciting emotions including joy, sadness, fear, and pleasure (Education Organization, 2003). Students should have access to clean air in the classroom, which requires proper ventilation to ensure they can work comfortably (E. Sedigh, 2001).

3. Material and Methods

3.1 Context of the Study

An international school is a school that promotes international education in a global setting. Curriculums in international schools frequently deviate from those in the nations where they are located. Foreign students have a different educational option from what is offered by local schools in their home countries thanks to international schools. There are hundreds of international schools located all over the world, and they all have different curricula and educational programs that are intended to serve the various expat populations who live there. Because they offer children a vastly different learning environment, create classrooms in accordance with standards, and place a greater importance on student accomplishment than local schools, this study concentrated on foreign schools. The selected schools are (British, United Science, and Cambridge International schools) served as the primary case study (These three schools were the only international schools having their own building and designed for international school in Sulaimani City), and the data collected there is discussed and analyzed in detail in this section.

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3.2 Questionnaire Survey

A questionnaire is a research tool made up of a list of questions or other prompts intended to gather information from a respondent. The quality of the questionnaire's design determines whether or not there will be an adequate number and accuracy of responses. In this study, the questionnaire approach was used to obtain information for the purpose of students' psychology and its effect on their performance inside their schools by employing a variety of questions with multi-choice responses. Teacher of different lectures participated in the questionnaire survey, the participants indicated their level of agreement or disagreement with each statement using a five-point Likert scale questionnaire. The respondents were given a rating scale with five alternatives on which to indicate their level of satisfaction with the question items. Likert scale questionnaires typically use a five-point scale, with responses of "strongly disagree," "disagree," "neutral," "neither agree nor disagree," "agree," and "strongly agree" (Burns and Burns, 2008), Smart PLS Three software used of analyzing questionnaire.

3.3 Checklist

The checklist, which was created based on the same factors that were used in the questionnaires, was the second tool utilized in this study to show whether or not indicators for each of the variables were available. Each of the 3 schools under study had its interiors walked through and photographed; for more information, SPSS used for analyzing checklist. See Appendix (B)

3.4 Graphical Analysis

Observing each school, filling checklist and taking photos of classrooms, also taking the architectural plans of the schools. Analyzing them according to the variables and standards.

3.5 Research problem

The clear weakness of taking into account classroom interior design impact on students' performance in primary schools in Sulaimani city.

3.6 Research Aim

1. To investigate how learning space design can influence teachers' and students' interactions and collaboration
2. To investigate the presence of a well-designed interior design of school that can enhance students' performance.

3.7 Analysis of Case Studies

In this part we show a Graphical Analysis of Different Case Studies, focusing on the built environment of the classrooms.

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(Table 1) Different variables affect students' learning performance (researcher)

Student Performance	Indicators	Design Parameters	Items
Physical Dimension	Built Physical Environment	Lighting	More natural light (daylight) has a positive impact on student performance compared to less natural light (Tanner, 2008).
		Seating Arrangement	The arrangement of the furniture in the classroom affects student comfort and interactions with classmates and teachers (Burgess & Kaya, 2007).
Psychological Social and Dimension	Social Environment	Interaction	The extent to which pupils are engaged in their learning is also significantly influenced by social interactions and cultural norms. Class size, technology, and seating arrangement are a few factors that affect student-student and teacher-student interaction in the classroom and at school (Heron and Heward 1993).
Cognitive Dimension	Individual Factor	Comfort Active Classroom	Students ought to feel comfortable engaging in a range of activities in the classroom. In the learning environment, it is essential to include furniture such as sofas, pillows, carpets and rugs, seats, lecterns, and various kinds of tables to promote this well-being (Bautista and Borges 2013).

6.3 Framework of Analysis

The case study involved the observation at each school, filling checklist and taking photos of classrooms, also taking the architectural plans of the schools. The physical qualities and environmental affordances of each school setting surveyed were analyzed. The checklist and Survey questionnaire defined the indicator that will be worked on in the graphical analysis, plans of each school with photos of classrooms are used in this part.

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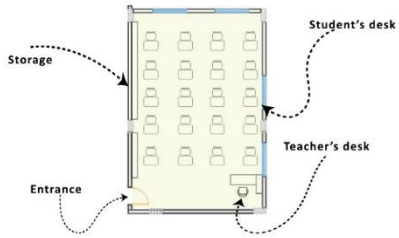
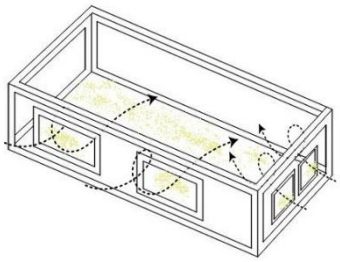
Table (2): Graphical analysis, Project S1 (Source: Researcher)

<table>
<tr><td colspan="2">Project Name</td><td>Code</td></tr>
<tr><td colspan="2">United science International School</td><td>S1</td></tr>
<tr><td colspan="3">Description: This School located in Qaiwan heights in Sulaimani city, it has 527 students</td></tr>
<tr><td colspan="3">   </td></tr>
<tr><td colspan="3">Figure(1): United Science exterior and interior</td></tr>
<tr><td>Indicators</td><td>Design Parameters</td><td>Graphical analysis for indicators</td></tr>
<tr><td rowspan="3">Physical Built Environment</td><td rowspan="3">Lighting</td><td>Plan of a classroom</td><td>The perspective of the classroom</td></tr>
<tr><td> 
</td><td>  </td></tr>
<tr><td>Analysis</td><td>Detailed plan of a classroom</td></tr>
</table>

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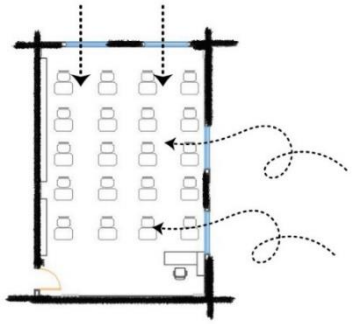
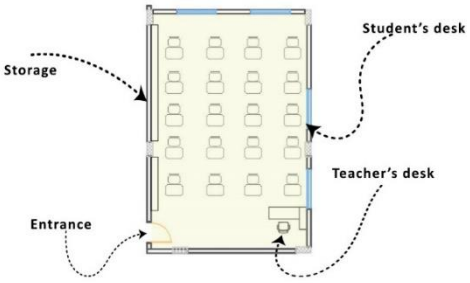
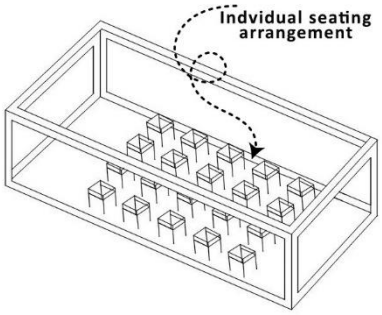
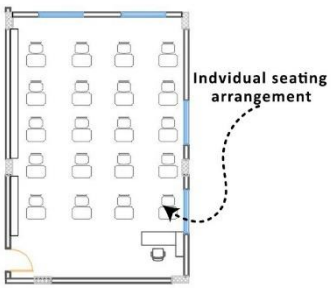
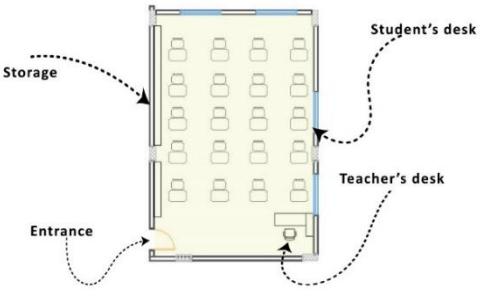
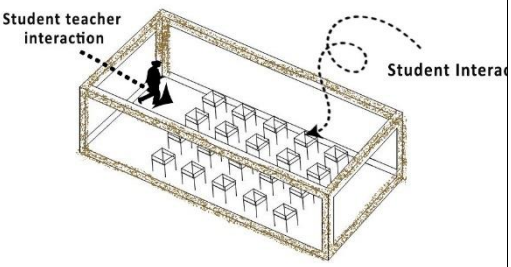
		Having big and a good number of windows to provide natural light to the classroom, the natural light according to the classroom size is good and help the student to feel comfortable in the classroom and enjoy the natural light.	
	Seating Arrangement	Plan of classroom	The perspective of the classroom
			
		Analysis	Detailed plan of classroom
		Seating arrangment is indvidual, each student has it is desk and chair, this help them have their own space, but it is hard for group work.	
Social factor	Interaction	Plan of classroom	The perspective of the classroom
			

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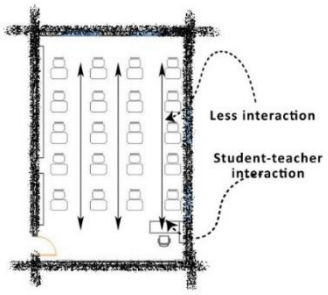
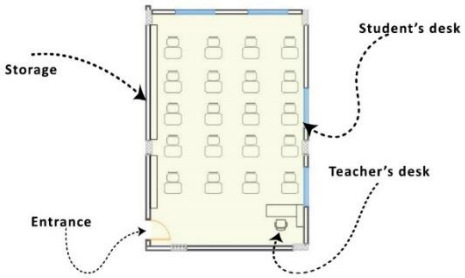
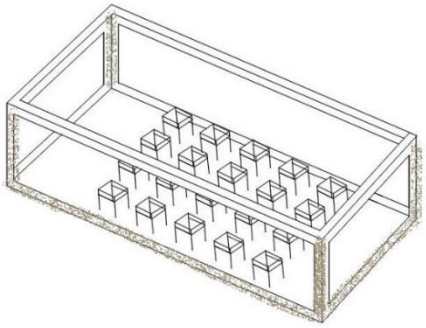
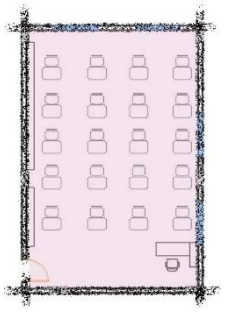
		Analysis	Detailed plan of classroom
		The individual seating arrangement decreases the chance of interaction between the students, and the class size decreases the chance for interaction between the students and teachers.	
Cognitive factor	Comfort Active Classroom	Plan of classroom	The perspective of the classroom
			
		Analysis	Detailed plan of classroom
		There are no elements in the classroom that help the student to practice activities in the class room like pillow, carpet, and couches	

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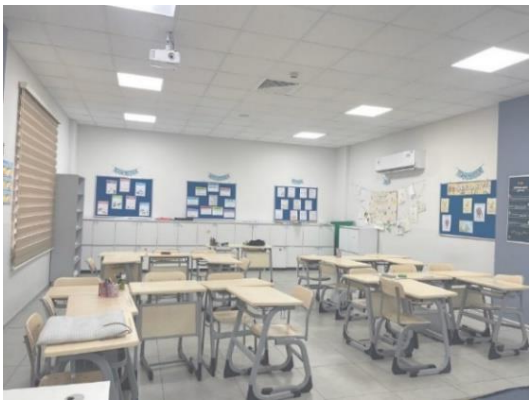
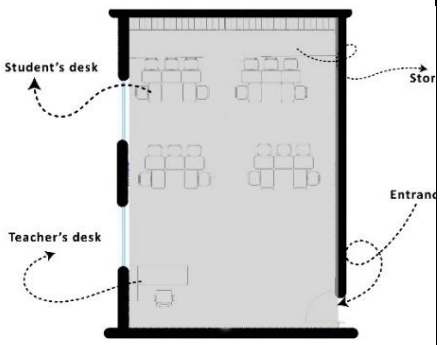
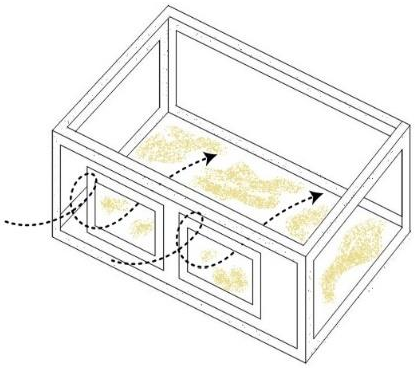
Table 3: Graphical analysis, Project S2 (Source: Researcher)

<table>
<tr><td colspan="2">Project Name</td><td>Code</td></tr>
<tr><td colspan="2">British International School</td><td>S2</td></tr>
<tr><td colspan="3">Description: The British International school located in Sulaymaniah Heights</td></tr>
<tr><td colspan="3">   </td></tr>
<tr><td colspan="3">Figure 2: British International School building and class. (Source: Researcher)</td></tr>
<tr><td>Indicators</td><td>Design Parameters</td><td>Graphical analysis for indicators</td></tr>
<tr><td rowspan="4">Physical Built Environment</td><td rowspan="4">Lighting</td><td>Plan of a classroom</td><td>The perspective of the classroom</td></tr>
<tr><td> 
</td><td>  </td></tr>
<tr><td>Analysis</td><td>Detailed plan of a class room</td></tr>
</table>

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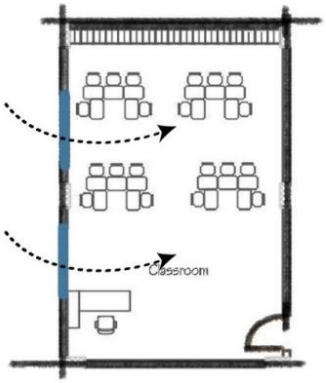
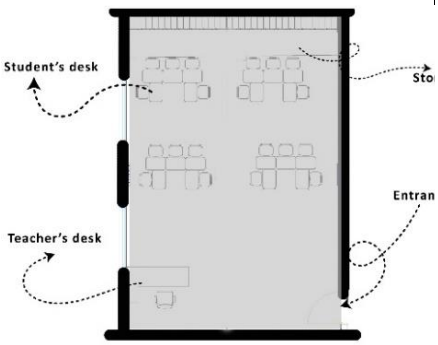
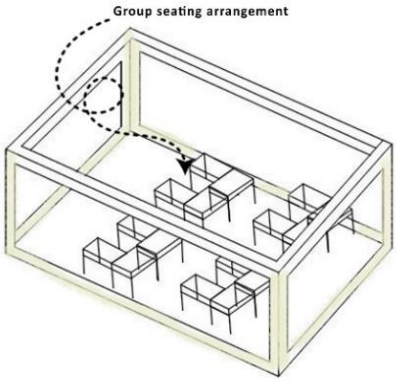
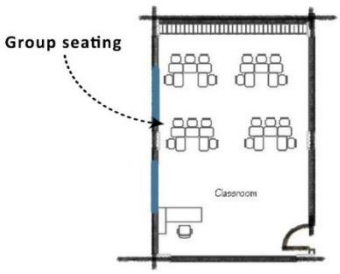
		Having big windows in the classrooms according to the standards. providing natural light inside classrooms. Having big windows in the classrooms according to the standards.	
	Seating Arrangement	Plan of classroom	The perspective of the classroom
			
		Analysis	Detailed plan of classroom
		The seating arrangement is based on international standards, which is group seating, to help the students interact more with their teacher.	
S o	I n t e r	Plan of classroom	The perspective of the classroom

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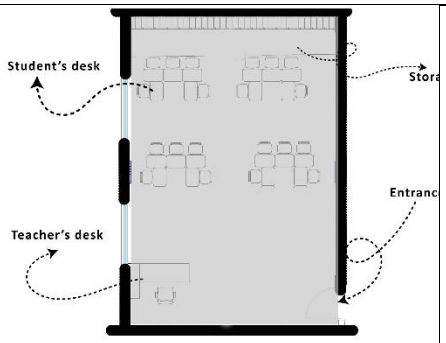
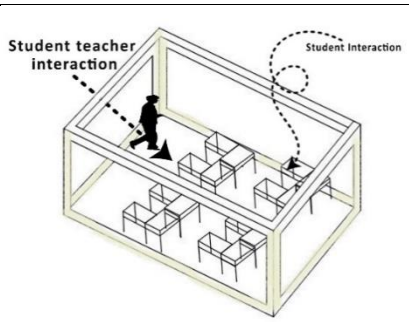
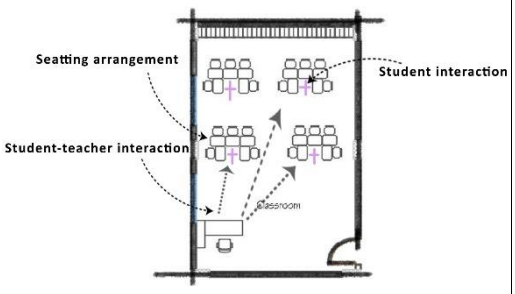
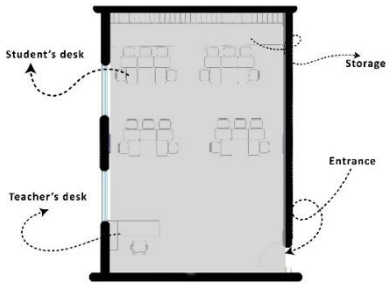
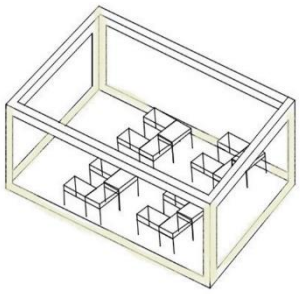
			
		Analysis	Detailed plan of classroom
		This type of seating arrangement provides more interaction between the students, and lets them communicate more, also increasing the interaction between the students and the teacher.	
Cognitive factor	Comfort Active Classroom	Plan of classroom	The perspective of the classroom
			

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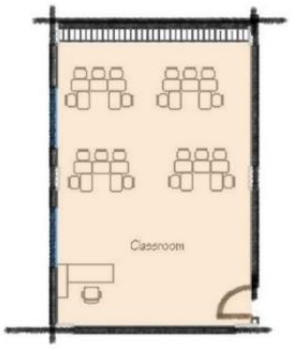
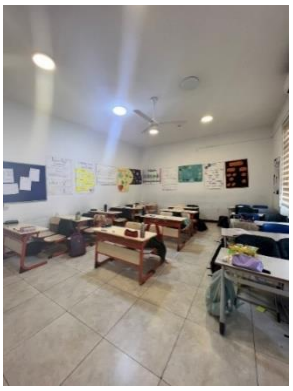
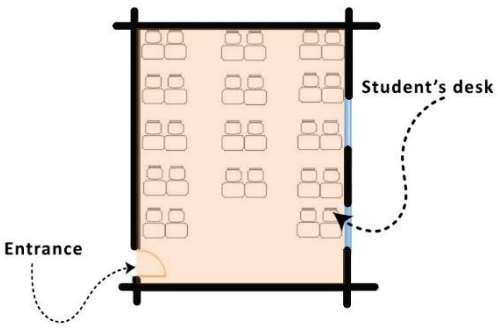
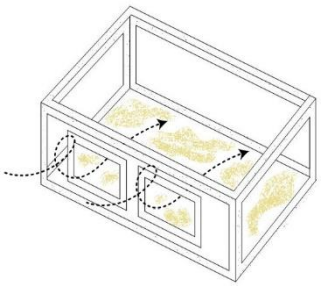
		Analysis	Detailed plan of classroom
		There is no element in the classroom that support the comfort of the students, to do different activities, elements like pillows, carpet, and couches.	

Table 4: Graphical analysis, Project S3 (Source: Researcher)

Project Name	**Code**
Cambridge International School	S3
Description: Cambridge International School located in Pasha city in Sulaymaniah City	
 	
Figure3: Cambridge International School building and class. (Source: Researcher)	

Indicators	**Design Parameters**	Graphical analysis for indicators	
Physical Built Environment	Lighting	Plan of a classroom	The perspective of the classroom
			
		Analysis	Detailed plan of a class room

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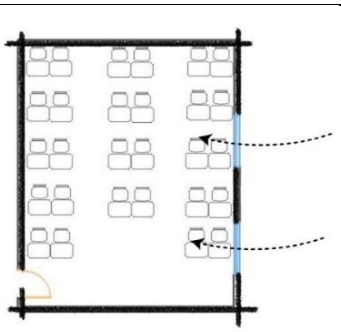
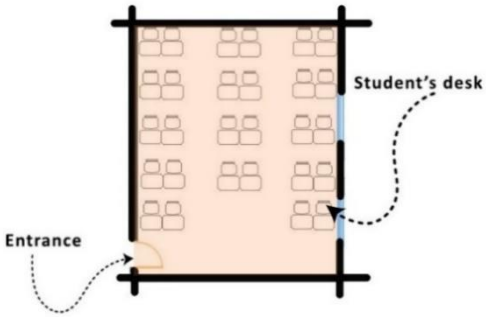
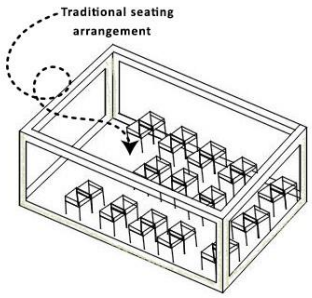
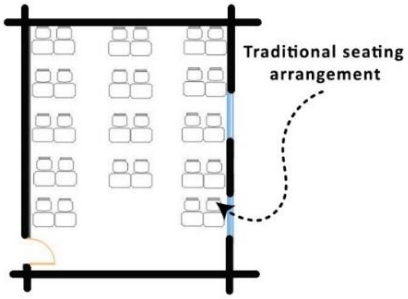
		The windows are very small and they are not bringing enough amount of sunlight to the class	
	Seating Arrangement	Plan of classroom	The perspective of the classroom
			
		Analysis	Detailed plan of classroom
		The seating arrangement are in traditional way, and comparing to the classroom size there is a lot of desks inside the class.	
S o	I n t	Plan of classroom	The perspective of the classroom

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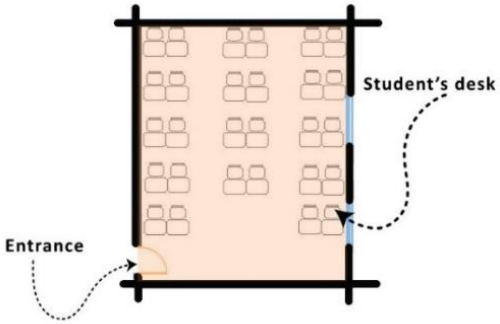
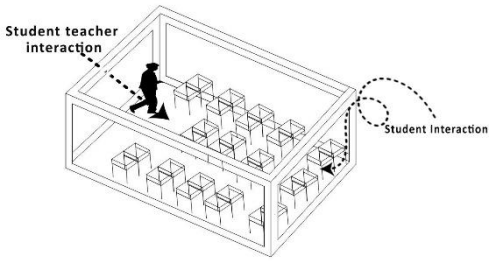
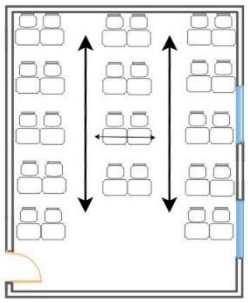
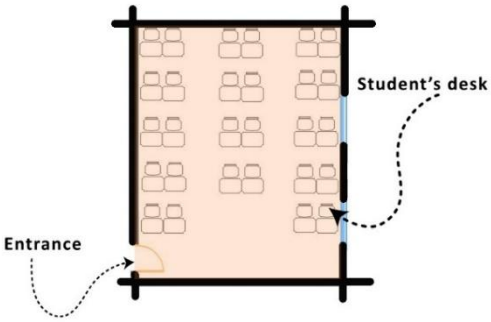
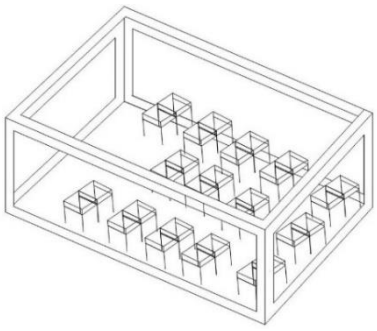
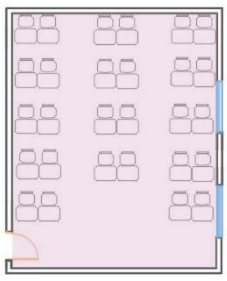
			
		Analysis	Detailed plan of classroom
		This type of seating arrangement provides interaction between two students but not a group, and the crowdness of the class is decreasing the interaction between the students and the teacher.	
Cognitive factor	Comfort Active Classroom	Plan of classroom	The perspective of the classroom
			
		Analysis	Detailed plan of classroom
		There is no element in the classroom that help to provide comfortness for the student, such as pillow, carpet, and couches	

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4. Results and Discussions

This part demonstrates the analysis of the information gathered for the study using a questionnaire survey and checklist. In addition to thorough analyses being provided as an appendix, the collected results were examined and explained in tables and figures. In order to produce results that are supported by evidence and that help to evaluate the study hypothesis and provide answers to its queries, the analysis included various statistical components. Analysis and Discussion of Results**:** This section contained the findings from each of the questionnaires and checklist used in this study. The purpose of the questionnaire survey examination is to measure the effect of interior design of classrooms on students' performance in primary schools. The questionnaire survey was filled by 88 teachers at primary schools. The collected data converted into numeric results using Statistical Package for the Social Sciences (IBM SPSS Statistics) software (V: 26). The analysis of the questionnaires is divided in to five-parts: the first part includes the information about the demographic background respondents.

4.1 Demographic Background of Respondents

Typical demographic questions about the respondents were asked in the first section of the survey questionnaire, which includes: age, gender, and teaching experience, See Appendix for more details. Based on an analysis of the respondents' age average 58(65.9%) are between 20-30 years old, 28(31.8 %) are between 30-40 years old, and 2(2.3%) are between 50-60 years old. The respondent are 44(50%) female, and 44(50%) male. About their experience 15(17%) are their first year as a teacher, 22(25%) have 1-2 years of experience, 30 (34.1%) have 3-5 years of experience, 15(17%) have 6-10 years of experience, and 6(6.8%) have 16-20 year of experience.

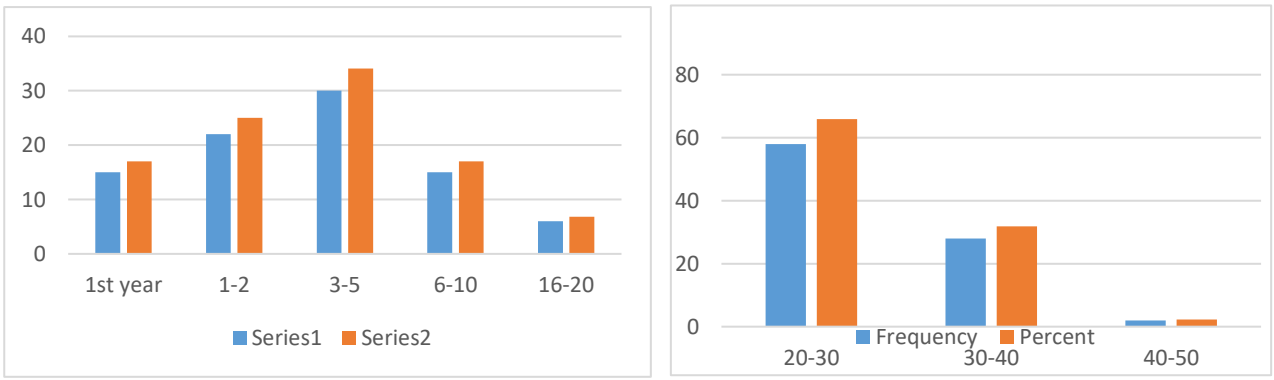

Figure 6 A.Years of experience of respondents. B. Age of respondents (Source: Researcher)

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4.2 partial Least Square Test Result

Using a two-step process, the partial least squares (PLS) strategy reduces the large number of predictors to a manageable number of uncorrelated components. Then, it does a least squares regression on these components. Components as opposed to the raw data. In light of the fact that the components are significantly rectified inside each component but not between them, the procedure minimizes the dimensions of the data. The partial least squares method is a practical one when the sample size is limited, as is widely known (Chin & Newsted, 1999). For a sample size for PLS, 10 times must be answered for each question if they are formative constructs, In all other circumstances, a sample size of 70 is adequate for PLS (Barclay et al., 1995). If not, 70 is a sufficient sample size when employing PLS. In our instance, 88 answers were suitable for PLS to be used. Initially, the suitability of the mode measurement was evaluated using internal consistency, item reliability, and discriminant validity (Barclay et al., 1995). In the model, there were 43 items under four dimensions, and they were tested using the Smart PLS software (Table 5). The loadings of the items were chosen to show the reliability of each particular thing. The value of an item must be high enough for a construct to accept it. We took into account (Igbaria et al., 1995) advice that the elements need to hold a minimum 0.3 loading value in order to be thought of as significant. Additionally, things with a loading value of 0.4 or higher were regarded as substantial, and items with a loading value of 0.5 or higher were regarded as highly significant. As a result, we decided to choose 0.4 as the cutoff point for items that fall inside the relevant dimensions. All objects falling under the relevant dimensions had loading values over 0.4, according to the model's findings. Each item's t-value was over 2.58, thus we regarded it as significant with its constructs for all of them. Second, we examined the latent variables' internal consistency using the method proposed by Fornell and Larcker (1981), which states that consistency should not be less than 0.7. The thresholds were surpassed, according to the findings of Cronbach's Alpha and composite reliability (CR). Ultimately, for every latent variable, the average variances extracted (AVE) were more than 0.5. The latent variables were therefore regarded as dependable. Details are provided in (Table 6).

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(Table 5) Reliability and validity items (Researcher)

Dimension	Items	Loading	Cronbach's Alpha	Composite Reliability	Avarage Variance Extracted
Student Performance	A1	0.788	0.76	0.812	0.695
	A10	0.78			
	A2	0.767			
	A3	0.735			
	A4	0.722			
	A5	0.713			
	A6	0.761			
	A7	0.762			
	A8	0.855			
	A9	0.816			
Physical Needs	B1	0.788	0.782	0.856	0.705
	B2	0.744			
	B3	0.703			
	B4	0.763			
	B5	0.897			
	B6	0.873			
	B7	0.743			
	B8	0.685			
	B9	0.755			
Social and Psychological Needs	C1	0.798	0.65	0.712	0.549
	C10	0.897			
	C2	0.886			
	C3	0.763			
	C4	0.73			
	C5	0.869			
	C6	0.759			
	C7	0.764			
	C8	0.798			
	C9	0.786			
Cognitive Needs	D1	0.789	0.66	0.702	0.555
	D10	0.863			
	D2	0.721			
	D3	0.712			
	D4	0.769			
	D5	0.765			
	D6	0.746			
	D7	0.897			
	D8	0.817			
	D9	0.773			

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(Table 6) Correlations among the constructs (Researcher)

	Cognitive Needs	**Physical Needs**	**Social and Psychological Needs**	**Student Performance**
Cognitive Needs	0.833			
Physical Needs	0.470	0.840		
Social and Psychological Needs	0.613	0.697	0.740	
Student Performance	0.523	0.527	0.633	0.745

Discriminant validity of the latent variables was evaluated based on Fornell and Larcker (1981) recommendation. The correlations between the other variables should be below the square roots of AVE. The numbers in the matrix's off-diagonal are a representation of the correlations. In addition, the diagonal values show the square root of the extracted average variance. According to the technique, the correlations' values must be less than the AVE's square roots (Barclay et al., 1995). The findings demonstrate that each latent variable is a legitimate and distinct entity.

Tables 7 and 8 show direct and indirect effects of different independent variable on dependent variables based on the suggested hypotheses. It was observed that although most of the hypotheses were supported.

Physical needs did not directly affect student performance, as its t-statistics was 0.939, while psychological needs significantly affected students' performance as its t-statistics was 2.271, moreover, cognitive needs, and social need had a significant impact on psychological needs.

Based on the analysis, physical needs indirectly effected student performance psychological needs. This shows that physical needs did not have a direct impact on student's performance unless it was during psychological needs. Secondly, it was observed that cognitive needs had a significant indirect impact on student's performance over psychological needs. These results show that psychological need is a good mediator between physical needs, cognitive needs, and student's performance. The results in (Table 8) show that physical needs had an indirect impact on student's performance over one dimension: psychological needs. As physical needs did not have a significant impact on student's performance directly, it was mediated as psychological needs. It was also observed that psychological needs mediated physical needs, cognitive needs, and student's performance.

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(Table 7) Results of Hypotheses tests (Direct effects) (Researcher)

Independent Variables	Dependent Variables	Hypotheses	Standardized Coefficient (T value)	Significance of Hypotheses
Physical needs	Cognitive needs	H1	0.470 (5.073)	Yes
Physical needs	Psychological needs	H2	0.525 (4.023)	Yes
Physical needs	Student Performance	H3	0.149 (0.939)	No
Cognitive needs	Psychological needs	H4	0.366 (3.051)	Yes
Cognitive needs	Student Performance	H5	0.207 (1.364)	No
Psychological needs	Student Performance	H6	0.402 (2.271)	Yes

Table 8 Hypotheses results (Indirect effects) (Researcher)

Independent Variables	Mediator	Dependent Variables	Hypotheses	Standardized Coefficient (T value)	Significance of Hypotheses
Physical needs	Psychological needs	Student performance	H1a	0.157 (1.97)	Yes
Cognitive needs	Psychological needs	Student performance	H4a	0.211 (2.159)	Yes

Tables 7 and 8 present the direct and indirect effects of KM's determinants on student performance it was initially observed that physical needs and cognitive needs had a significant impact on psychological needs.

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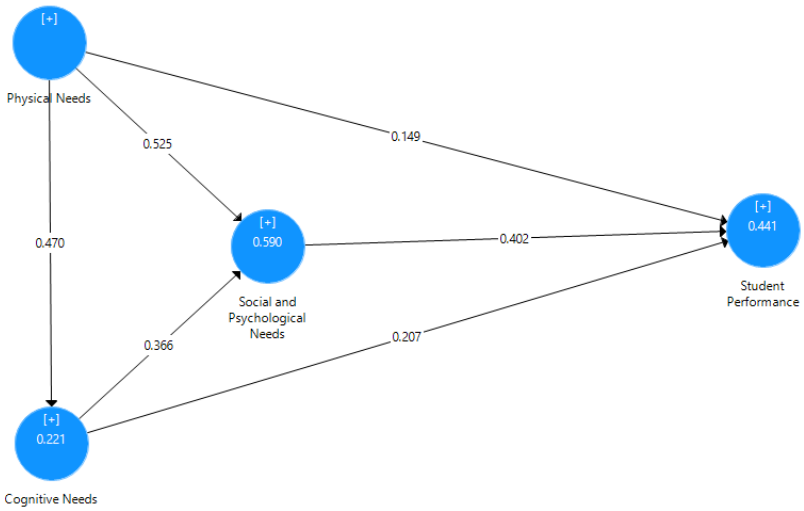

(Figure 5) Model of the result (Researcher)

4.3 Checklist

Checklist is one of the tools that have been used in this research, the checklist has been designed based on the same variable of the questionnaire, to illustrate the availability or non-availability of indicators for each of the variables, and it was done through the walk-through and photography of the interior spaces of classrooms of each three schools.

4.3.1 One-Way Anova (Analysis of Variance) Test Result

Another objective of this study is to make a comparison between the cases studies depending on the checklist to identify the schools' interior design and it is effect on students' performance. This comparison uses one-way ANOVA, which uses descriptive analysis to identify the variables and includes sample size, mean, standard deviations, standard errors. The tables below show the results of the one-way ANOVA test in this study (Table 4.5) (Table 4.6) (Table 4.7). From thirteen physical aspects (Table 4.5) majority of them were seen that (British International School, United Science International School, and Cambridge International School) they are not significantly different from each other, they are similar but different in some points like, the size of classrooms and laboratory in British International School to be conducive to group work and having contact between students and teachers, is better than United Science International School and Cambridge International School.

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(Table 9) ANOVA test to Comparer means for Physical Environment factor (Researcher)

Parameters	Case Study		Mean Difference (I-J)	Std. Error	P Value
Physical 1	United Science School	British College	1.000	0.707	0.439
		Cambridge College	0.000	0.707	1.000
	British International School	United Science School	-1.000	0.707	0.439
		Cambridge College	-1.000	0.707	0.439
	Cambridge College	United Science School	0.000	0.707	1.000
		British College	1.000	0.707	0.439
Physical 3	United Science School	British College	0.000	0.408	1.000
		Cambridge College	-0.500	0.408	0.518
	British College	United Science School	0.000	0.408	1.000
		Cambridge College	-0.500	0.408	0.518
	Cambridge College	United Science School	0.500	0.408	0.518
		British College	0.500	0.408	0.518
Physical 4	United Science School	British College	-1.000	0.816	0.518
		Cambridge College	-1.000	0.816	0.518
	British College	United Science School	1.000	0.816	0.518
		Cambridge College	0.000	0.816	1.000
	Cambridge College	US Colleges	1.000	0.816	0.518
		British College	0.000	0.816	1.000
Physical 5	United Science School	British College	0.000	0.408	1.000
		Cambridge College	0.500	0.408	0.518
	British College	United Science School	0.000	0.408	1.000
		Cambridge College	0.500	0.408	0.518
	Cambridge College	United Science School	-0.500	0.408	0.518
		British College	-0.500	0.408	0.518
Physical 8	United Science School	British College	-1.500	0.408	0.047
		Cambridge College	0.500	0.408	0.518
	British College	US Colleges	1.500	0.408	0.047
		Cambridge College	2.000*	0.408	0.033
	Cambridge College	US Colleges	-0.500	0.408	0.518
		British College	-2.000*	0.408	0.033
Physical 10	US Colleges	British College	-1.500	0.408	0.047
		Cambridge College	-1.500	0.408	0.047
	British College	US Colleges	1.500	0.408	0.047
		Cambridge College	0.000	0.408	1.000
	Cambridge College	US Colleges	1.500	0.408	0.047
		British College	0.000	0.408	1.000
Physical11	US Colleges	British College	-1.500	0.408	0.047
		Cambridge College	0.500	0.408	0.518
	British College	US Colleges	1.500	0.408	0.047
		Cambridge College	2.000*	0.408	0.033
	Cambridge College	US Colleges	-0.500	0.408	0.518
		British College	-2.000*	0.408	0.033

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Physical 13	US Colleges	British College	-1.000	0.816	0.518
		Cambridge College	-1.000	0.816	0.518
	British College	US Colleges	1.000	0.816	0.518
		Cambridge College	0.000	0.816	1.000
	Cambridge College	US Colleges	1.000	0.816	0.518
		British College	0.000	0.816	1.000

*. The mean difference is significant at the 0.05 level.

The view from the classroom window that overlooks the surrounding landscape e in United Science schools and British International are nearly similar, while Cambridge International School has less access to the outdoor view.

Classroom lighting is inadequate in Cambridge International School, while it is adequate in both United Science School and British International School.

The result of having excessive noise in classes are nearly similar in British International School and Cambridge International School, but it is less in United Science School.

The furniture is more varied and comfortable in British International School more than Cambridge International School and United Science School.

(Table 10 ANOVA test to Comparer means for psychological factor (Researcher)

Dependent Variable			Mean Difference (I-J)	Std. Error	P Value
PSoc5	US Colleges	British College	-0.500	0.408	0.518
		Cambridge College	0.500	0.408	0.518
	British College	US Colleges	0.500	0.408	0.518
		Cambridge College	1.000	0.408	0.042
	Cambridge College	US Colleges	-0.500	0.408	0.518
		British College	-1.000	0.408	0.042
PSoc6	US Colleges	British College	-0.500	0.408	0.518
		Cambridge College	-0.500	0.408	0.518
	British College	US Colleges	0.500	0.408	0.518
		Cambridge College	0.000	0.408	1.000
	Cambridge College	US Colleges	0.500	0.408	0.518
		British College	0.000	0.408	1.000

*. The mean difference is significant at the 0.05 level.

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(Table 10) ANOVA test to compare means for Cognitive factor (Researcher)

Dependent Variable			Mean Difference	Std. Error	P value
Cog	US Colleges	British College	-1.000	0.816	0.518
		Cambridge College	0.000	0.816	1.000
	British College	US Colleges	1.000	0.816	0.518
		Cambridge College	1.000	0.816	0.518
	Cambridge College	US Colleges	0.000	0.816	1.000
		British College	-1.000	0.816	0.518
Cog2	US Colleges	British College	-1.000	1.000	0.626
		Cambridge College	-0.500	1.000	0.877
	British College	US Colleges	1.000	1.000	0.626
		Cambridge College	0.500	1.000	0.877
	Cambridge College	US Colleges	0.500	1.000	0.877
		British College	-0.500	1.000	0.877
Cog3	US Colleges	British College	-1.500	0.577	0.155
		Cambridge College	0.000	0.577	1.000
	British College	US Colleges	1.500	0.577	0.042
		Cambridge College	1.500	0.577	0.042
	Cambridge College	US Colleges	0.000	0.577	1.000
		British College	-1.500	0.577	0.042
Cog4	US Colleges	British College	0.000	0.408	1.000
		Cambridge College	0.500	0.408	0.518
	British College	US Colleges	0.000	0.408	1.000
		Cambridge College	0.500	0.408	0.518
	Cambridge College	US Colleges	-0.500	0.408	0.518
		British College	-0.500	0.408	0.518

*. The mean difference is significant at the 0.05 level.

The outcome shows that meeting the physical needs of students in British International School and United Science School are nearly similar. While Cambridge school had lower mean levels of meeting physical demands. Also meeting the psychological and social needs of students in British International School and United Science School are nearly similar. While Cambridge school had lower mean levels of meeting physical demands. And meeting cognitive needs of students in British International School and United Science School are nearly similar. While Cambridge school had lower mean levels of meeting physical demands.

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5. Conclusions

The interior design of classrooms in basic schools directly and indirectly has impact on students learning performance. The research analysis shows that there is a positive and strong relationship between classrooms' interior design and students' learning performance, that is whenever the interior design of the classroom creates a healthy environment, it provides for students' needs, and makes them feel they belong to the school and learning performance of the students increases too. The physical need, cognitive need, and social/psychological needs effect the students' performance. The students are enjoying, supporting, and feel belonging to their school, in most of the selected cases. There is a strong relationship between the students and their teachers who helps the students to ask for their needs in the classroom. Designing a healthy learning environment, according to the standards enhance students' learning ability inside their classrooms. There is a positive correlation between students' learning performance and (physical, cognitive, social) needs. Psychological/Social needs have the greatest impact on student performance. Followed by physical needs, which have a greater impact than cognitive needs. At the same time, it shows that psychological need has greater effect on student performance. Additionally cognitive needs are greatly affected by social and psychological needs. Each physical and cognitive needs indirectly have effect on student performance through psychological needs. Students at each school have varying degrees of performance since each school may meet a portion of their physical and psychological needs. Students in Cambridge International School perform less compared to British International School and United Science International School. This due to Students in Cambridge International School claim that their physical needs are not being met, which leads to issues with their social and cognitive needs as well, result in disengagement. British International School seating style is according to the standards, as they seat like a group, while in United Science International School and Cambridge International School they still use the traditional style (row seating style), group seating style help the students interact with each other and this will increase their learning performance. The classrooms are the places where the student can express all their three dimensions of performance, as they can decorate it the way they want by hanging posters, and their drawings, all the three schools, British International School, United Science International School and Cambridge International hanged their students work inside their classrooms. Classroom's interior design directly affect the performance of the students in a positive and negative way, designing according to standards will improve the quality of studying and student's learning performance.

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