



A Comparative Study of Experts and Key End Users' Satisfaction of Architectural Design of Educational Spaces

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Abstract

The current study compares different groups of key users perceptions and a few professionals' perceptions of architectural design of educational spaces. The population of the study included high school students of the capital, Tehran and Architectural education experts. The sample was selected based on a multi-stage cluster sampling method and 70 key end users and 15 professionals took part in the study. Both groups of participants filled in a questionnaire that expressed their attitudes about educational spaces. The data was analyzed by exploratory factor analysis and six factors were found to have a significant role in shaping the experts and key end users' attitudes towards educational spaces. While the components of attitudes were the same, they were differently ranked based on their importance and by two groups of participants.

Keywords: Architecture design, Perceptions, Key end users, Experts

Introduction

In order to interpret and utilize data extracted from any research project to establish principles of selecting an appropriate research method, comparing the opinions of experts and audiences of any discipline of study is required. Humans have always tried to study phenomena forming the world around them and throughout history have turned their efforts based on shared principles into common methods whose product is science that is generative and transitional (Tasnim, Cook, Deborah, Giacomini, Mita, 2007). Research is important in any human endeavor. Researchers must be motivated and committed to be able to contribute to the scientific community and research projects (Shaker, Lance, & Newey, 2009). Scientists know that they have to share their organizational behavior, marketing, and strategies with other researchers and specialists. Scientists of this era realize that they have to speak with theories and theories are based on science. Hence scientific statements should be verified. If the statements or hypotheses cannot be verified with observations, their scientific value cannot be confirmed (Piccinini & Gualtieri, 2003).

Research Method

In the current study first the quantitative and qualitative literature of the variables of the study has been reviewed and related differences and similarities of the experts' ideas have been taken into account. Then using a survey, the perceptions of two groups including experts and key end-users of educational spaces have been assessed. The population of the study included high school students of Tehran. The sample was selected based on a multi-stage cluster sampling method and 70 key end users and 15 professionals (educational psychologist and architectures) took part in the study. The data were gathered by a questionnaire and were entered into SPSS. The data were analyzed by factor analysis and factors impacting perceptions of satisfaction of the educational spaces were extracted.

The Procedure

In carrying out any research project, first statements and hypotheses are to be declared. Then these hypotheses or questions should be tested or answered. The research procedure guides the researcher. Therefore, the research method clarifies the way the research hypothesis is confirmed. In other words, the research method is the framework or exploratory actions used to attain the goals of the research and provide what is needed to test the hypotheses or answer the questions (Sarmad, Bazargan, & Hijazi, 2003).

There are two types of research methods: quantitative research and qualitative research. Quantitative research is based on positivist paradigm that seeks to provide explanations based on universal laws and its main purpose is to objectively measure the social world, test hypotheses and predict and control human behavior. In contrast, the qualitative paradigm has its roots in the phenomenological method, and is individualized and nature-oriented and its main purpose is to understand social life and the meaning of daily life (Sadoughi, 2008). Now, after more than seventy years, researchers and instructors of research method have attempted, based on knowledge and examination of phenomena, to establish different research methods to theorize the bases of fundamental, strategic, and applied research.

In the second half of the last century in each of the different departments of Western universities there were at least one or two people who were very active in measurement and psychometrics as well as quantitative research. The beginning of the investigation coincided with the rise of positivism in science and research during this time. Of course, as time goes by, techniques such as generalizability theory, modeling, multivariate analysis, logistic regression and probabilistic models for categorical variables and adaptive

analysis, and time series analysis, provided new possibilities for quantitative research studies. By such developments in the quantitative research (including experimental designs in large-scale, longitudinal studies, semi-experimental research, and meta-analysis) great evolution has taken place. Therefore, almost simultaneous with this vast evolution in the field of measurement and research West was drawn to the fact that quantitative measurement and research, however efficient and accurate in behaviorist studies, is not adequate for studying more complex phenomena. Therefore, from the middle of the last century efforts to expand qualitative research began and especially it reached its peak in the last quarter of the past century and became a formidable opponent for quantitative studies (LotfAbadi, Noroozi, & Hoseini, 2008).

Qualitative research began by anthropologists in the late nineteenth and early twentieth centuries, and after some decades (the 1930s and 1940s) other researchers gradually started using this approach. In fact, from the qualitative research was systematically applied. Since traditional approaches of quantitative research relied too much on views and opinions and attitudes of researchers and research participants, their ideas did not attract enough attention and thus some researchers studied a new approach, called 'natural research or constructivism', which was offered to eliminate the deficiencies of the quantitative research method (Jokar, 2004). Accordingly, Guba and Lincoln offered normal research approach instead of the traditional quantitative approach (Guba, 1970). More simply, quantitative data are always qualitative data that fit the theme for a quantitative scale and become a number.

Quantitative data are usually collected using a questionnaire. In a questionnaire, a Likert scale can be used to convert sentences and questions of the researchers to numbers and by choosing the right option, respondents give researchers numbers to come to a conclusion. In the qualitative method, data are not in the form of numbers but sentences, signs and symptoms, colors, movements, facial expressions and behavior of individuals. These data have the potential to become a smaller number that is why they can be analyzed immediately as they are gathered. More qualitative data are used by researchers in anthropology and monographic studies. Some researchers think that those who state that quantitative methods are false and should be replaced with qualitative methods rely on three basic assumptions. The first assumption is based on either-or approach, implying that only one of these methods can be applied in a given research project. The second assumption is that qualitative method of research is superior and preferable to quantitative methods. The third assumption is that to solve complex problems of human sciences only qualitative methods should be used (Arizi Samani, 2007).

A researcher who chooses quantitative research methods, assumes that understanding can be reached by studying the issue objectively. Moreover, in this point of view, another assumption is that by forming a hypothesis, composing scientific questions, using descriptive research methods or by researching in a controlled environment an essential understanding can be gained. But it should be noted that all phenomena considering organizations and management, especially phenomena that are involved with human behavior, cannot be completely studied objectively. Furthermore, controlling unwanted variables is extremely difficult (Bazargan Harandi, 2008). In addition, instead of challenging quantitative research, researchers are now focusing on how to implement qualitative research studies. Simultaneously with these attempts, issues regarding qualitative methods and techniques were examined. Strauss and Corbin talked about how to perform qualitative research using 'background theory'; Maxwell presented various approaches to qualitative research plans and Klandynyn and Connolly showed the framework of implementation of narration method (Strauss & Corbin J, 1990).

Another aspect which was considered in qualitative research was a cooperative and supportive operation to pay special attention to people with various cultural backgrounds and to the socially disadvantaged.

Researchers who employ this supportive approach do not consider themselves impartial and without any political affiliations, or socially and culturally neutral. Dnzyn and Lincoln regarded qualitative research as the responsibility of citizenship, and moral discussion and social means to make changes are considered necessary (Denzin, & Lincoln, 2006). Qualitative researchers believe that enriched descriptions of the social world are valuable, while quantitative researchers with legal characteristics of superficiality payless attention to such details (Sieber, 1998). The differences between quantitative and qualitative researches are presented in Table 1.

Table 1: Differences between quantitative and qualitative research (Ntakos, 1998)

Differences Axis	Qualitative	Quantitative
Research Approach	Deductive	Inductive
Ontological View	Multiple Realities	Causal Relationships
Nature of Truth	Rooted in Real World	Hypothesis Test
Epistemological Perspective	Objective	Subjective
Researcher position	Internal	External
Research Plan	Unstructured, Spontaneous, Special for Researcher	Structured, Systematic, Repeatable
Research Center	Discussion Centered on Research	Research Variables
Selective Testing	Non-Random	Random
Data Representation	Contextual	Numerical
Analysis Method	Axes Discussed	Statistical Analysis
Results Representation	Explanatory & Descriptive	Tables and Statistics Charts
Researcher Voice	First Person, Active Tone	Third Person, Active Tone
Reflection of Real World	Part of Living	Represent and Alternate

Delphi Technique

One of the methods used to obtain knowledge is Delphi. Using the Delphi method is mainly aimed at discovering innovative and reliable ideas and to provide appropriate information for decision making. Delphi method is a structured process for collecting and classifying knowledge among a group of experts in order to receive responses and comments through questionnaires distributed among them and obtaining controlled feedback (Ziglio, 1996). In other words, Delphi method gathers guesses, judgments, and inspirations in a scientific way. The approach of Delphi method is based on dialect; the opinion or thesis (a belief or opinion), anti-opinion or antithesis (opposite ideas and doctrines) and finally synthesis (new consensus and agreement) is formed so that a new theory is created. Helmer believed that, the Delphi method is a useful communication tool among a group of experts that makes the formulation of the ideas of the members of that group easy. Wissema(?) stressed the importance of the Delphi method as a way to “an exploration of univariate” to anticipate future technologies. He added that the Delphi method is designed with the aim of making discussions possible among experts, in order to prevent anything created by social interactions in the discussions, block the way of reaching the conclusion. Baldwin believes that in terms of inadequacy of existing knowledge among decision-makers, we need to make decisions with direct perceptions or ideas of the experts.

Sampling of experts

There is no explicit rule on how to choose and the number of professionals. Their number depends on the following factors: the homogeneity or heterogeneity of the samples, the aim of Delphi or extent of the problem, the quality of the decision team's management ability in organizing the study, domestic and foreign credit, time and resources available for data collection, the scope of the problem and the criteria to accept the answers. The number of participants usually is less than 50, and often 15 to 20 people, but in homogeneous groups 10 people are enough. Some investigators note that, usually 30 people are enough to provide sufficient information as with bigger numbers no new information is obtained but the same old replies will be repeated (Ahmadi, N., 2009).

Consensus of specialists' ideas in research

Consensus means to reach an agreement about an idea and then try to identify the differences. Consensus does not mean finding the right answer, but merely participants' agreement at a particular level about a subject. Of course reaching one hundred percent agreement is not possible, because of the differences in people's political, social, economic and scientific backgrounds. It also is not an alternative way for scientific review of the scientific reports and articles. Among the criteria representing the consensus, the percentage options are considered as the most common response pattern and interpretation based on the opinion of experts. Most articles, consider gender and type of criteria used to define consensus as an interpretation of the samples. Basically a decision about a consensus is made when a specific percentage of votes has reached a certain level, although some consider using percentage inadequate and recommend using a more credible method to determine the stability of the answers. There are also no standards for consensus. In the results of studies, a different range of 51 to 100 percent from the consensus has been reported (Ahmadi, 2009). Now the question is how these experts' opinions are used and especially how to mix the views of a group of experts' to develop a beneficial statement. From the standpoint of the Delphi method, human judgment is legitimate and a useful input to make predictions. Sometimes individual experts can be at the risk of unilateral revision. While a group of experts, under the influence of trends of a leader, are exposed to reluctance of reviewing previous ideas. To overcome this occasional stutter, the Delphi method was developed with theoretical and methodological guidelines during the 50s and 60s in the Rand Institute (RAND). Delphi technique is based on the fact that experts and professional ideas are most accurate in predicting the future. Therefore, unlike survey research methods, the validity of the Delphi method is not based on the numbers of the participants, but on the scientific validity of the experts taking part in the study.

Characteristics of professionals

Identifying professionals in the survey is an important point, as reaching the goals is highly dependent on careful selection of participants. The group surveys focus on extracting comments from professionals in a short time and results depend on expertise skills in the intended knowledge, quality and accuracy of answers, and their continued cooperation and conflict in the course of the study. In other words, the success of this activity is related to sample selection. An expert's knowledge on the subject should be sufficient, he/she should become involved in arguments and affect the outcome of the process; however, unprofessional and interested people are also included. Respondents should be fairly neutral as collected data reflects their knowledge and understanding. In addition to the interest and commitment of the participants to the subject, continuous involvement in all courses is also required; however, group voting and respectful discussions

provide interest and involvement in participants(Ahmadi, 2009).Among the professionals' characteristics the followings can be mentioned:

1. Scientific qualifications related to the subject of research
2. Knowing the method and procedure of the target research
3. Appropriate mental capabilities for checking the contents
4. Lots of patience and tolerance to answer questions
5. Avoiding love and hatred for uncovering the truth
6. Serious, critical and in-depth vision for coming to a solution
7. Courage in expressing the scientific and technical opinions
8. being honest and trustworthy in data management

In other words, having a sense of trust is one of the most important features of the measuring devices in this research process. When a measuring device shows the same size in multiple applications, it is said that it is a reliable measurement tool. For example think of balance. Every time it measures the weight of a certain object, it implies a certain outcome, even if the weight is not naturally possible it is said that the measuring device is reliable. Thus, having reliable scientific support and professionals' reliable comments will be invaluable.

Shahid Motahari's view on real researchers' characteristics

Some scientists are like ants that gather seed from out of their formicary and act like a cassette player. Some are like a silkworm cocoon making glaze weave extracted from within and do not earn anything from outside. But real scientists are like bees that suck out the sap of flowers and make honey out of it.

Specialists' and addressees' opinions

The question at issue in this area is to determine the value of the opinions of a few specialists against the opinions of many addressees; and if, relying on the opinion of the majority leads the researcher toward truth or not? The Holy Quran has condemned the numerous cases of multiplicity; therefore, from a Quranic perspective the criterion of right and wrong could not be the majority of society, but to be wrong or right in nature (good of action) to logic and the doers motivation (good of subject) is the criterion of right or wrong. So if a society is polytheistic, an action in accordance with that society cannot be done. The Holy Quran says (Anaam, verse, 116): "If you obey most of those people on the earth, they will mislead you from Allah's way; they just benefit from their own conjecture for making guesses and opinions". In this regard, the following points can be concluded from the above verses:

1. Given that the life of a human being is full of guesses and estimations; without trust in suspicion and talent the estimate is not sustainable, so humans cannot be prevented to obey the majority in these matters.
2. In matters relating to human prosperity and basic education, only knowledge and certainty can be relied upon; because estimation can lead to misguidance in these matters, and because most of the people would follow guesses, they should not be obeyed.

The majority's idea about the issues regarding the divine laws and teachings is not the criteria for right and wrong, and the minority who obey the divine rules should not be afraid. (Al-Ma'idah (S.5), verse; 100): "Say unclean and clean are not equal, and although the multitude of the unclean may amaze you. Oh wise people, you shall succeed if you have piety in God". In order to interpret this verse, Allameh Tabatabai writes: Allah states in this verse an example for the evolution of traits that are caused by the rules of the

religion, that phenomena in the universe, Purity and evil, surely have influence on one's happiness and misery, regardless of how much. Good is good, although it is small, and bad is bad although it is major. According to Allameh Tabatabai, opinions and ideas of the majority against the minority cannot always be right, however, in accordance with the reality, it is truth, and if it is not in accordance with reality, it is not truth (Tabatabaei, 2016).

Reliability of the majority according to the Quran

Since the guided majority on the basis of a correct logic and thinking can solve the problems of human society as much as possible, and the unguided and immature majority of the society can lead the society towards failure and degradation, the Quran values the guided majority based on the same obvious and rational principal (Mousavi, 1982).

Originality of the specialists' ideas against the addressees' ideas

Recognition of the originality of programs, codes and certain guidelines against specialist's compatible models is important in this regard. The majority is always facing the risks that may cause destruction, collapse or misalignment (Karimpour Gharamaleki, 2015).

Regulation and floating of the extracted opinions

Another important matter discussed at this stage is that the extracted opinions should be considered without a flexible and non-floating point of view or they can be meant to be inaccurate, unclear and ambiguous (floating). What is clear is that if the opinions collected from the qualified professionals are suitable, intermediate digital opinions and floating phase mode will emerge in the resulted opinions.

Evaluating the study results in a case study

Regarding the above issues and research results obtained from the physical factors affecting the improvement of the quality and satisfaction of students' education in middle schools of Tehran the following contents will be discussed.

Research method

Considering the goal, this research can be classified into fundamental research studies, and considering its nature, it can be categorized into quantitative-qualitative methods. Survey method was used to collect data. The data is a combination of quantitative and qualitative information. The goal of the study was describing the actual behavior of the society on the one hand, and detecting factors involving this phenomenon and their features as well their influence.

Participants and sampling

Due to the very large size of the statistical population, multi-stage clustered sampling was used to select the sample. In this way, the sampling unit is group, instead of individual. So researcher's have chosen two groups of people. The first group included educational facilities professionals, educational scientist's and architectures; the other group was the users of learning facilities that are high school students. Two

educational districts of Tehran were chosen randomly. Then, in each selected district, a girls' high school was randomly selected.

Instruments

Data collection was carried out in two phases. The first step was to collect information by reviewing the literature in which the articles, monographs, theses, and books related to the topic were used and reviewed. Then in the second stage the attitudes of teachers and students in the selected district were gathered. This stage consists of two parts: a). Designing the research instrument. The preparation and implementation of the questionnaire among students and teachers: estimating the reliability and validity of the questionnaire, preliminary analysis, data analysis and extracting the main variables effecting the study, by factor analysis; b). Data analysis that is necessary to derive the environmental factors involved in students' satisfaction. It should be mentioned that the questionnaire was an important source for collecting information about the study group. Therefore, by using results and information obtained from them the researchers were able to judge the relationship between the physical environment and satisfaction.

The scale

For extracting the importance of each variable pair, thirteen specialists were asked to determine the importance of the physical environment components relative to each other to determine the learning facilities satisfaction. Therefore, the range of the answers on the Likert scale was between one and nine based on the importance from very low to very high. An Analytic Hierarchy Process (AHP) was used. The method of paired comparisons is the basic of decision making. The decision maker by providing a hierarchical tree shows the compared factors and evaluated competitor statement. Then a series of paired comparisons are performed. The value of each factor in comparison to competing candidates is evaluated by the decision. The logic of AHP of paired comparisons combines the matrix that makes the decision optimal (Qodsi Pour & Seyed Hassan, 2002).

In AHP any necessary calculations to determine the priority of each element is determined by using pairwise comparison matrix information. To sum up, the mathematical operations involved in this step, the sum of the numbers in each column of the matrix is a result of calculation of paired comparisons. Then each element divided in the column by the sum of the numbers of columns and the sum of each column would be one, so the new matrix that is obtained in this way will be called, 'normalized comparison matrix'. Then we calculate the average of every row in a normalized comparison matrix. This average shows the relative weight of elements of decision with rows of the matrix. To rank the options of decision, the relative weight of each element should be multiplied by the weight of the higher element, so that the final weight that is achieved.

By carrying out this process for each variable, the value of final weights will be obtained. Almost all calculations related to AHP are based on the judgment of the decision maker which is in the form of a matrix of paired comparisons, any errors and inconsistency in comparing and determining the importance of the options and indexes derived from calculations would strongly affect the final result. To determine the compatibility and show how much priorities derived from comparison can be trusted, inconsistency rate is used. Experience has shown that if the inconsistency rate is less than 10, then the compatibility of comparisons is consistent and acceptable, otherwise they should be revised (Mehregan, & Mohd, 2004). Researchers have used a researcher-made questionnaire to assess teachers and students' opinions.

The reliability of the questionnaire

By using the internal consistency method, the reliability coefficient of the questionnaire was estimated and a reliability of .89 was obtained. The rate shows the internal consistency and reliability of the scale. After performing the test and determining the validity and reliability of the questionnaire, 70 questionnaires were distributed among the students. Factor analysis was conducted on the results taken from the questionnaire with 29 questions using a Likert scale. After factor analysis, the main factors of the questionnaire have been identified (Table 2).

Table 2: Factors Affecting the Questionnaire

Effective Factors	Questions
Environmental Comfortability	1-5
Flexibility and spatial dimensions	17-18-20-21
Readability and accessibility	24-26-28-29
Spatial beauty	8-13-16-19-22-23
The scope and participation	6-9-25

The validity of the questionnaire

To verify, three methods were used; formal validity, content validity, and construct validity of the instrument. The formal validity has been set by professionals' opinions and expert professors. To evaluate the content validity the target-content table is used, construct validity is studied by using factor analysis (according to Table No.3 as below).

Table 3: Standard deviations and error rate

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		000.630
Bartlett's Test of Sphericity	Approx. Chi-Square	656.403
	df	406.000
	Sig.	000.000

Analysis of research data

The gathered data were entered into the SPSS 20 and were subsequently analyzed.

Research data analysis

The results of the specialists' questionnaire

Based on the implementation of factor analysis, six factors and components belonging to each factor were determined. Thus, among the main factors influencing people satisfaction, physical comfort is the first priority with the highest degree of importance. Then, psychological security ranked second. The third priority is attractive environment and a sense of belonging to the space, flexibility and environmental perceptions, respectively, were the next priorities. In other words, it can be concluded that in people's perspective, physical comfort and psychological security has a priority. Another factor is environmental attraction. A sense of belonging and carrying out activities in a flexible environment is the next priority. And environmental perception is the last priority) Table 4).

Table 4: Main factors that influence satisfaction in order of importance from the viewpoints of professionals

The main components	Grade and Prioritize
Physical comfort	The first priority
Psychological security	The second priority
Environmental attraction	The third priority
Sense of belonging	The fourth priority
Flexibility	The fifth priority
Environmental perceptions	The sixth priority

The results of the addressees' questionnaire

To be fluent and comprehensible, the questionnaire of the addressees was prepared by focusing on a series of microfactors and after responding the variables are assigned to each factor. At this stage, it is expected that some variables belong to one factor and others to other factors. A preliminary extraction of factors does not specify what variable belongs to which factor. Generally many of the variables can belong to many factors and some factors are almost always related to all variables. Therefore, for a more comprehensible interpretation of the factors, we should enter the third stage that is called factor rotation. Ideally, the goal of the rotation is to reach the factors that only some of variables would cause.

Studies suggest that to create a sense of belonging in people, using beautiful interiors and pleasant patterns, involvement of people in customizing the interiors and pattern of the school as their homes is useful. To create an attractive environmental a number of factors, such as suitable outdoor space, suitable view of outer space, spatial diversity and flexibility of public space, special colors and patterns, beautiful and desirable interiors, making fountains and gardens, etc. could be used. Studies suggest that to achieve environmental understanding, effective components such as considering the standard size of the spaces for educational activities, readability and spatial perception and accessibility can be used (Table 5).

Table 5: The main microfactors influencing satisfaction components in order of importance

Main microFactors	Prioritization	Details
Beautiful interior and pleasant patterns	1st priority	microfactors affecting Sense of belonging In order of importance
Involvement of people in customizing the facilities	2nd priority	
School pattern similar to home and a need to customize the environment	3rd priority	
Suitable outdoor	1st priority	microfactors that influence environmental attraction In order of importance
Good view of the outside	2nd priority	
Spatial diversity and flexibility of public space	3rd priority	
Special colors and patterns, the interiors that are beautiful and desirable	4th priority	
Waterfront building and planting to soften the air	5th priority	
Due to the size of standard spaces	1st priority	microfactors that Influence environmental understanding In order of importance
Educational and training activities	2nd priority	
Readability and spatial perception	3rd priority	
The accessibility	4th priority	
Processing space by person	1st priority	microfactors affecting flexibility In order of importance
Size of furniture and educational equipment	2nd priority	
Interior design and furniture	3rd priority	
Flexibility in layout and architectural space design	1st priority	microfactors affecting physical comfort In order of importance
The environmental temperature	2nd priority	
Considering convenient and natural lighting	3rd priority	
There is enough space for people needs	4th priority	
Vision and perspective	5th priority	
Noise Pollution	1st priority	Microfactors affecting psychological security In order of importance
The concentration of people needs,	2nd priority	
Avoid tight and narrow corridors	3rd priority	
Privacy of spaces	4th priority	

To have a flexible space, noticing the dimensions of furniture and educational equipment, privacy and distance of the furniture, flexibility in furniture arrangement, and architecture in space and function of each arrangement is important. In order to achieve physical comfort, attention to microcomponents such as temperature, suitable and natural lighting, enough space, landscape and noise pollution is important. Factors affecting the psychological security in order of importance are the density of people, avoidance of tight and narrow corridors, privacy and control over spaces and using desirable colors. Rotation of microfactors matrix shows that five microfactors derived from the research are highly in favor of components and questions designed for the model of the research. Finally, based on questions related to each factor, according to experts for reclassification of the factors, it was agreed on five factors including: 1) flexibility and spatial dimensions, 2) readability and accessibility, 3) beauty of space, 4) environmental comfort, 5) the territory and participation of individuals.

Factor of flexibility and spatial dimensions

To achieve the flexibility and spatial diversity desired, creating diversity in spaces and the ability to change the arrangements have a paramount impact effect of 0.56 and followed by the ability to use a variety of

tables and chairs with an impact factor of 0.44, enough open space to work in schools and effective space between the tables and chairs has a lower impact effect on flexibility (Table 6).

Table 6: Factor of flexibility and spatial dimensions

Factor	Factor Loading	Items
Flexibility and Spatial Dimensions	0.56	20. The diversity of spaces and the ability to change the layout of the spaces when I am with my friends, encourages me to attend the school.
	0.44	17. When I can use a variety of tables and chairs I want to study.
	0.40	21. To have enough open space in schools to work is pleasant for me.
	0.29	18. To have a lot of space between tables and chairs is pleasant to me.

Factors of readability and accessibility

In terms of readability and accessibility factors, the distraction caused by seeing the outer spaces of school from the classroom, had an impact effect of 0.56 and that individuals have the ability to rapidly determine suitable spaces for their activities had an impact effect of 0.53 and the accessibility of school spaces and the clarity of use has an impact factor of 0.33 (Table 7).

Table 7: Factor of readability and accessibility

Factor	Factor Loading	Items
Readability and Accessibility	0.56	24. If I can see the outer space of school, I would be distracted.
	0.53	29. I would like to know where to go to do any activity when I am at school.
	0.33	28. I like school spaces to be easily accessible and not to be confusing

Factor of beauty of space

Using special colors and patterns in the class have an impact factor of 0.49 and 0.42 on the beauty of the classroom. Using fountains and beautiful plants outside of the building and variety in the color of the walls in the classrooms and hallways have the impact factor of 0.39. Beautiful stencils and pleasant interior beauty and elegant design have an impact factor of 0.38 and 0.37 on the beautiful space (Table 8).

Table 8: The beauty of space factor in the classrooms

Factor	Factor Loading	Items
Beauty of Space	0.49	19. In classes with special colors and patterns, I feel good.
	0.42	22. In a beautiful classroom, I can study well.
	0.39	23. It is enjoyable for me if an exterior fountain and beautiful plants are used.
	0.39	13. variety in the colors of the walls in classrooms and hallways is pleasant and attractive.
	0.38	8. Beauty of interiors and the nice and pleasant stencils will encourage me to attend school.
	0.37	16. If the class is well and beautifully designed, it motivates me.

The environmental comfort factor

Class temperature in terms of environmental comfort factor has an impact factor of 0.20 and good natural light has an impact factor of 0.19 (Table 9).

Table 9: The environmental comfort factor

Factor	Factor Loading	Items
Environmental	0.20	1. The temperature of the class affects my concentration performance.
Comfortability	0.19	5. In natural and suitable light it is more comfortable to study.

The participation and territorial factors

For the individual to be able to operate in spaces that have been designed based on their tastes with their friends has an impact factor of 0.51 and having a role in customizing the design of the class space has an impact factor of 0.32 and to feel like home has an impact factor of 0.30 (Table 10).

Table 10: The field and contributing factors

Factor	Factor Loading	Items
Field and Contributing	0.51	25. I would like to work with my friends in a place that is decorated to my style.
	0.32	9. I want to be involved in shaping the class space with the participation of my friends.
	0.30	6. It is pleasant to feel like I'm at home while studying in school.

The matrix resulting from the rotation is shown in Table 11. This matrix is essential in interpreting the results of factor analysis and any component that is used more than once for a factor belongs to that factor.

Table 11: The Rotated factors matrix

Factors	Rotated Component Matrix ^a								
	Data of Component Ratio								
	1	2	3	4	5	6	7	8	9
Q20	.748	.065	.312	-.187	.113	-.195	.185	.013	.037
Q19	.705	.225	.175	-.016	-.321	.199	.019	.265	-.039
Q22	.650	-.084	-.080	.046	.111	.207	.213	.484	.107
Q21	.644	.277	.121	.024	.039	.000	-.051	-.154	.140
Q06	.552	.013	-.174	.213	.450	.077	.432	.117	.002
Q18	.544	-.096	.129	-.073	.110	.084	-.118	.030	.080
Q05	.446	.234	.227	.208	.319	.387	-.186	-.299	.148
Q29	.096	.736	.189	-.145	.389	-.031	-.070	.066	-.126
Q25	-.001	.729	.060	.086	.087	-.016	.004	.109	-.007
Q27	.163	.706	-.007	-.100	-.106	.173	.030	-.424	.285
Q23	.139	.639	.232	.256	-.298	.117	-.065	.093	-.056
Q28	-.047	.585	.068	-.404	-.014	-.007	.210	.162	.383
Q09	.306	.574	.244	.367	.216	-.199	.056	-.120	-.175
Q15	-.016	.232	.786	.257	.022	-.078	.033	-.099	-.133
Q17	.251	-.059	.672	-.243	-.051	.349	.021	-.114	.229
Q13	.378	.062	.625	.124	-.200	.209	.166	.192	.324
Q08	.437	.152	.620	.039	.087	-.072	-.165	.141	.136
Q16	.154	.333	.614	-.258	.280	-.154	.223	.289	.077
Q11	-.046	-.005	.048	.841	-.063	-.114	-.016	.093	.001
Q10	-.078	.490	-.047	.522	-.200	.137	-.083	.158	.066
Q14	-.144	-.083	-.085	.169	-.749	-.009	-.057	-.227	-.244
Q04	.340	.148	-.085	.125	.499	.450	.229	-.192	.014
Q03	.127	.037	.013	-.049	.009	.827	-.077	.032	-.046
Q12	.201	.075	-.049	.335	-.501	-.515	.036	.109	.272
Q26	-.006	.156	.177	.075	.041	-.264	.765	-.206	.056
Q24	.062	-.155	-.065	-.185	.059	.074	.751	.045	-.180
Q01	-.169	.058	.161	.411	-.035	.380	.454	.141	.222
Q07	.120	.159	.079	.157	.078	-.033	-.113	.724	.132
Q02	.282	-.007	.175	.047	.206	-.094	-.146	.124	.766
Extraction Method: Principal Component Analysis.									
Rotation Method: Vari-max with Kaiser Normalization.									
a. Number of Rotation for converged was in 17 iterations.									

Results

Micro extracted factors based on users' opinions is in fact a confirmation of the major elements extracted by experts; as indicated in the tables' category all the micro factors refer to the experts main factors. The only distinction is in the prioritization and the importance of each factor. As shown in Table 12, there is a 65% inverse correlation between experts and addressees and 42.25% overlap. So none of them can be definitely considered as a reference; the result reveals that unlike parallel or similar studies, if the role of the experts is reduced in modern researches it will be much more effective. Therefore, in the new studies and new areas of study, the role of experts will be more effective and would reduce the research deviations and energy consumption at least 42% to 65%.

Table 12: Correlation between two groups with prioritizing the main factors

Correlations between the main factors			VAR00001	VAR00002
Spearman's rho	VAR00001	Correlation Coefficient	1.000	-.657
		Sig. (2-tailed)	0.0	.156
		N	6	6
	VAR00002	Correlation Coefficient	-.657	1.000
		Sig. (2-tailed)	.156	0.0
		N	6	6

In addition, the overlap of audience comments and specialists is shown in Figure 1.

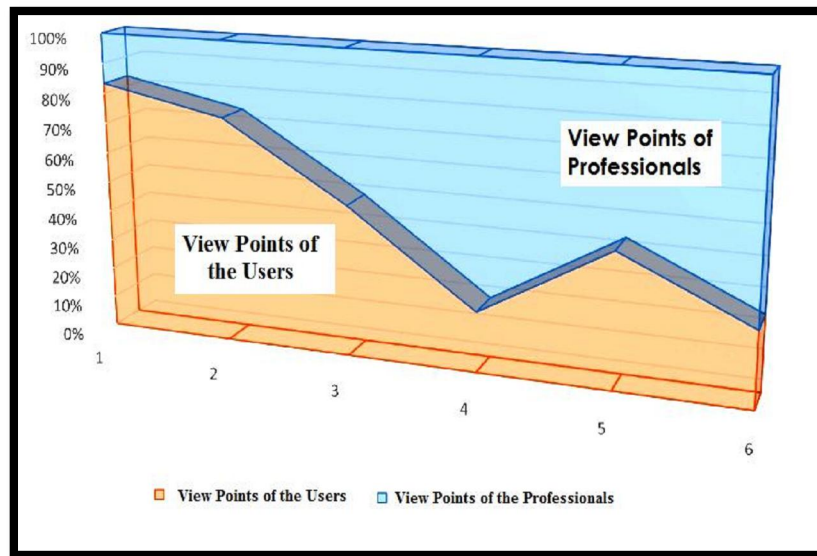


Figure 1: The amount of overlap and alliance of the experts and users' opinions, prioritized based on the main factors of the research.

Conclusion

Using the Delphi method, in quantitative and qualitative research mainly aims at discovering innovative and reliable ideas to provide appropriate information for decision making. Delphi method is a structured process for collecting and classifying knowledge in the group of scientists and experts in a specific scientific territory through questionnaires (distributed among the people), controlling feedback and checking on the responses and comments received. When we can have the correct result of a study, specialists and experts' opinions can be collected with the consensus method, therefore they should be chosen from different fields of study and should be professionals in their fields.

So the Delphi technique is a priority if it is considered as a method or mean of supporting studies and if the data is completed with other tools and techniques. According to this new research technique, the role of specialists is very effective and can reduce the research deviations and energy consumption up to 42% to 65%. One of the ways to assure this method is carried out correctly is to use a limited number of questions

so that experts do not refuse to take part in the results analysis. On the other hand, enough time for experts to think deeply about the issues should be considered; also to avoid people leaving the program, interested and professional experts should be selected. It is also notable that, right qualitative and quantitative information, should have replicability. As God has created the universe with fixed laws events are replicable. The use of Delphi method in any research not only omits the effect of annoying and distracting factors from the main direction of research; but also increases the richness of the interpretations yielding scientific and reliable results. In this way, using a few professionals as the basis of a survey research and then using the opinions of a large statistical society, to achieve reliable results by regarding the rate of agreement and indicators of compatibility of the derived elements in favor of the professionals' opinions would make the results of a study more functional and reliable

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