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The Research Based Learning (RBL) of Architecture in Some Important Institutions of India

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Abstract

Research based learning may be considered as group of activities which develop the skills in a learner towards a systematic exploration of a topic, its impact on individuals or society or organization, problems and challenges faced during this quest, finding ways towards resolution of the problem, the benefits of the piece of work done (in the form of documents, models, formula, hypothesis etc.), presentation of his findings and suggestions for the furtherance of the work to be carried out by him or others. The understanding of the students doing B.Arch. regarding the significance and impact of research based subjects increased from B. Arch. 1st year to B.Arch. 5th year. The ability of the students doing B.Arch. regarding to overcome the challenges in the research based subjects increased from B. Arch. 1st year to B.Arch. 5th year. The findings revealed that students often involved in the research topics that didn't match their interest and thus they are to be motivated by additional beyond class hours counseling for the novelty and significance of their work. It seems that more teacher taught interaction in discussing the research based subjects is needed.

Keywords: Research Based Learning (RBL), Architecture Curricula, Significance, Challenges

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1. Introduction

Architectural creations especially in the form of buildings are believed to be the symbols and arts of a particular culture and the past civilizations are generally recognized for their creativity by the existent architectural masterpieces developed by them. Architecture may be perceived as the art and the science of designing buildings as well as non-buildings and the inter-relationship among the principles of art, science, engineering, technology and human society with respect to architecture. The term "architecture" may also be attributed to the process of planning, designing and constructing buildings as well as other physical structures. Sustainable architecture is also an important topic in contemporary architecture besides urbanism, eco-cities, smart cities etc.

An architect may be perceived as a person providing professional services in connection with the design and construction of buildings or other built environments from micro-level (interior design and working details) to macro-level (town planning, recreational architecture etc.). An exceptional

architectural creation must have durability, utility and beauty and therefore an architect has to strive for. An architect has to do planning, designing and resolving often conflicting requirements besides imparting functional, technical, social, environmental and aesthetic aspects to the architectural creations with the help of creative manipulations and coordination of available materials, technology, light and shadow. The architect has to develop the efficient and logical construction management and cost estimation besides producing drawings, plans and technical specifications. In the light of the present scenario and available state of art, a researcher in the field of architecture is required to first develop the curiosity for a problem pertaining to architecture followed by investigations in order to finalize the objectives. In the light of the objectives of the problem selected for research, the architecture researcher must develop a sequential planning of activities to achieve the aims and objectives of the selected research problem. The outcome of the research needs to be tested and cross-checked in the light of the works of other researchers in the field of architecture. The similarities and differences should be discussed in the light of other's works while new findings must be clearly highlighted for their verification in due course of time. All this exercise is done

not only because it is an integral part of curricula but for the quest of knowledge and practice in architecture.

The need of performing research in the field of architecture begins from the effective programs and teaching methodologies that helps graduate students to learn the basics and application aspects of architecture for the need based delivery. Research in the field of architecture helps graduate students to understand the significance, the challenges and resolution of a problem faced in the field of architecture in much better and easier way leading to the emergence of newer problems to crack. The search for the answers of those problems will lead to learn and develop newer theories.

Also, the advent of newer technologies is affecting the research processes in the field of architecture education in the prevailing circumstances where evidence-based policies and practices are the essential requirements. Research methodologies give architecture students the tools to analyze and make informed decisions about their profession for future oriented inventions and innovations designed to benefit learners as well as the researchers. Besides, the research in the field of architecture education during the present days of tough competition should answer the one basic question "how to make the architecture education more productive?"

Like in other disciplines, teachers of architecture also have a challenge to produce architects of high integrity and professionalism. Teachers can co-ordinate the research plan on the basis of individual needs of their students as they are accountable for their pupils. The performance of teachers and their students may be observed by their publications and research findings. The use of newer theories and technological advances by their pupils and transferring the experiences with forward-looking attitude to adapt to suit local and personal environments keeping in view the convenience and manageability is also another challenge for the teachers coordinating research in architecture education.

The impact of offering research based subjects to the B.Arch. students during their five year course is very powerful because the students are required to do something new and innovative in terms of model, data, design, idea, formulation and so on. The concern, perception and finally novel creation is the fundamental route to innovation and thus are the essential requirements for becoming a researcher in any discipline including architecture. Therefore, an architect must ponder over the problems, perceive the resolution and come up with a novel innovation addressing a particular architectural problem. Although, it is very interesting to the students to strive for novelty and creativity in the field of architecture but it becomes sometimes challenging for the students due to lack of support and guidance besides their personal liking and disliking.

2. Research Based Learning (RBL)

In view of the human instinct of enquiry, research may be defined as the effort towards the search for knowledge, the scientific and systematic search of knowledge on a particular area, scientific investigation on a process or phenomenon or new facts in any subject, knowing the unknown and so on. The

eagerness for newer knowledge is the basic driving force for all types of researches.

Therefore, the knowledge and the methodology for obtaining the newer knowledge may be considered as research. It is an original and in most cases new contribution furthering present knowledge with the help of studies, observations, comparisons and experiments etc.

In brief, the research may be referred to as the search for newer knowledge through the systematic approach of detecting a problem, formulating a hypothesis, collecting the facts or data, analyzing the facts and reaching certain conclusions either in the form of solutions towards the problem or the generalization in the form of formula to solve that problem.

The objective of research is to find the solutions for the particular problem by using scientific procedures and methods. Although, each research problem has its own particular objective, however, some general objectives of research are mentioned hereunder viz. to gain knowledge of a phenomenon which may be considered as exploratory research, to present the characteristics of a particular individual, situation or a group of individuals which may be considered as descriptive research, to find out how frequent something happens which may be considered as the diagnostic research and to evaluate certain hypothesis proposed regarding relationship among certain variables which may be considered as hypothesis-testing research.

2.1. Significance of Research Based Learning (RBL)

Research based learning may be considered as group of activities which develop the skills in a learner towards a systematic exploration of a topic, its impact on individuals or society or organization, problems and challenges faced during this quest, finding ways towards resolution of the problem, the benefits of the piece of work done (in the form of documents, models, formula, hypothesis etc.), presentation of his findings and suggestions for the furtherance of the work to be carried out by him or others. This activity may be carried out by learner under the guidance of some learned personnel or by himself. The activities done towards research based learning whether autonomous or under guidance have to be critically examined by peers for approval, the process generally called refereeing. Research based learning may be seen as a journey of a learner from their status of information carrying stage through putting the information in proper perspective by research based teaching/learning process in order to make them autonomous and self-reliant to undertake research on a burning topic under the supervision of trained guides.

Research-based learning is not confined to the research based subjects only but should be evident from all the subjects in the curricula even from those which may be considered as 'basic or academic' as the original research is translated into the basic knowledge and vice versa. The one of the requirements for this to achieve is to engage highly proactive research staff for research activities.

Therefore, it is always ensured while designing the curricula that the skills for research-based learning are inculcated in the learners from the very beginning of a particular course especially in science, engineering and technology. It is intended that the learners acquire enough understanding of the

background of a problem, application of methodologies available to crack the problem, extent to which the problem is solved, future work to be carried out and so on before he works on a burning problem faced by individuals, society or organization towards his final year's dissertation/thesis.

2.2. Challenges and Resolutions in Research Based Learning (RBL)

Like in other disciplines, teachers of architecture also have a challenge to produce architects of high integrity and professionalism. The use of newer theories and technological advances by their pupils and transferring the experiences with forward looking attitude to adapt to suit local and personal environments keeping in view the convenience and manageability is also another challenge for the teachers coordinating research in architecture education.

Although, the undergraduate program in architecture may have wide variety of constraints in putting together the research and lecture class/studio based learning to prepare the students for practise in architecture, there is always room for development of research skills along with academic skills and competencies in the learners of architecture. Therefore, the curricula must have definite component of research based subjects and the learners should be provided with the best facilities in terms of laboratory, equipments and research guides to develop research skills in them.

In research based learning (RBL), the teacher's role is that of a guide and a facilitator against his traditional duties of transmitting information and converting information into knowledge for the learners. For this, the teacher as a research guide must be aware of his learner's interests and actively involved in the discussion of the topic his learner is highly fascinated towards. It also requires a special kind of leadership skills in the guide that the learners are extended full support, suggestions and made aware of the potential obstructions to move in the direction of their interest.

It may be noted that the projects may succeed or fail. Thus the teachers as guide should not expect too much on the part of the learners to crack a particular research problem. The learners be guided for the necessary groundwork and be encouraged to take the lead when they become capable of. Another problem is the poor importance given to the research based learning during classroom/studio learning-teaching process. Therefore, the problem does not lie at the primary level of education but at the undergraduate level, the base for the preparation of future teacher. In order to guide research based learning, the 'would be teachers' be prepared by imparting sufficient theoretical and practical knowledge besides inquisitiveness in them.

This initial study was conducted to identify and scrutinize was to find out the answers to the major research questions: "What are the challenges faced by students in research based subjects in the curriculum of B.Arch. and what are the resolutions thereof?"

2.3. Merits and Demerits of Research Based Learning (RBL)

The merits of research based learning (RBL) may include: (i) students are become aware of the important research problems/projects being undertaken by the department, (ii)

students become aware of the resources those are available for research based learning in the department and can actively utilize them for their research based subjects, (iii) active participation of learners in research oriented subjects makes the learning-teaching process more interesting, enjoyable, stimulating and exciting, (iv) involvement of research based subjects in B.Arch. curricula creates the enough aptitude, skills and thirst for newer knowledge and a commitment to lifelong learning in the students. They develop the ability to create new knowledge that increases their employability and (v) besides the ability to handle complex problems independently, the students also learn the wide variety of presentation skills, data collection skills, data analysis skills, communication skills, problem solving skills, critical thinking skills, creativity skills, collaboration skills required for interdisciplinary research and so on.

The demerits of research based learning (RBL) are not too many or serious but they are there for a small class of students. A small class of students feels the research problems hard to work with, however, they can be tackled by proper and continuous counseling and guidance after the regular timings allotted to this.

3. Methodology, Hypothesis and Assumptions

In the light of above discussion, the work was carried out in the following lines. The curricula of the five year B.Arch. offered by some important institutions of India were obtained and the data on the research based subjects offered in the five year B.Arch. program were tabulated. Tabulated data of each institution was analyzed for the weightage in terms of marks% and periods% allotted to the research based subjects against overall marks and periods allotted for the course. A questionnaire (**Appendix-1**) was also developed for the students of B.Arch. (1st year to 5th year) to investigate student's behavior towards their understanding of the significance and the problems faced by them in the research based subjects of the B.Arch. curriculum of Jamia Millia Islamia University. The curricula of institutions covered in this study includes: (i) Jamia Millia Islamia University (New Delhi), (ii) School of Planning and Architecture (Delhi), (iii) School of Planning and Architecture (Bhopal), (iv) Integral University (Lucknow) and (v) Aayojan School of Architecture (Jaipur).

In their response towards the significance and impact of research based subjects in the B.Arch. curricula, the students doing B.Arch. from Jamia Millia Islamia University may show the trend as shown in the schematic graphical presentation. The exactly reverse response may be hypothesized in case of challenges faced in the research based subjects of the B.Arch. curricula by the students doing B.Arch. from Jamia Millia Islamia University as shown in the schematic graphical presentation (**Figure 1a** and **Figure 1b**).

An extremely small portion of fresh students may not be aware of significance and problems at the initial stage of their course and may respond "Do not Know", however, we do not expect such answer from senior students. Also, an extremely small portion of students may respond "No Answer" if the question is either irrelevant to them or they are unable to understand the question (**Figure 1a** and **Figure 1b**).

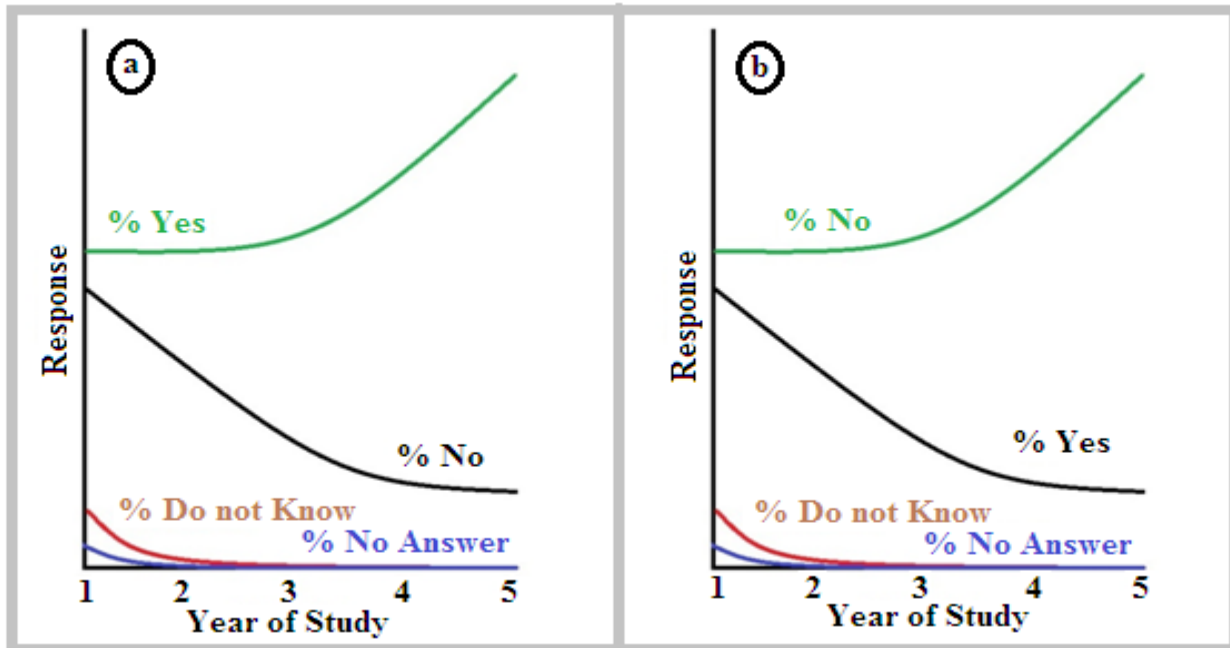


Figure 1. Graphical presentation of response to: (a) significance and impact of research based subjects in the B.Arch. curricula by the students doing B.Arch. (1st year to 5th year) from Jamia Millia Islamia University and (b) challenges in the research based subjects in the B.Arch. curricula by the students doing B.Arch. (1st year to 5th year) from Jamia Millia Islamia University.

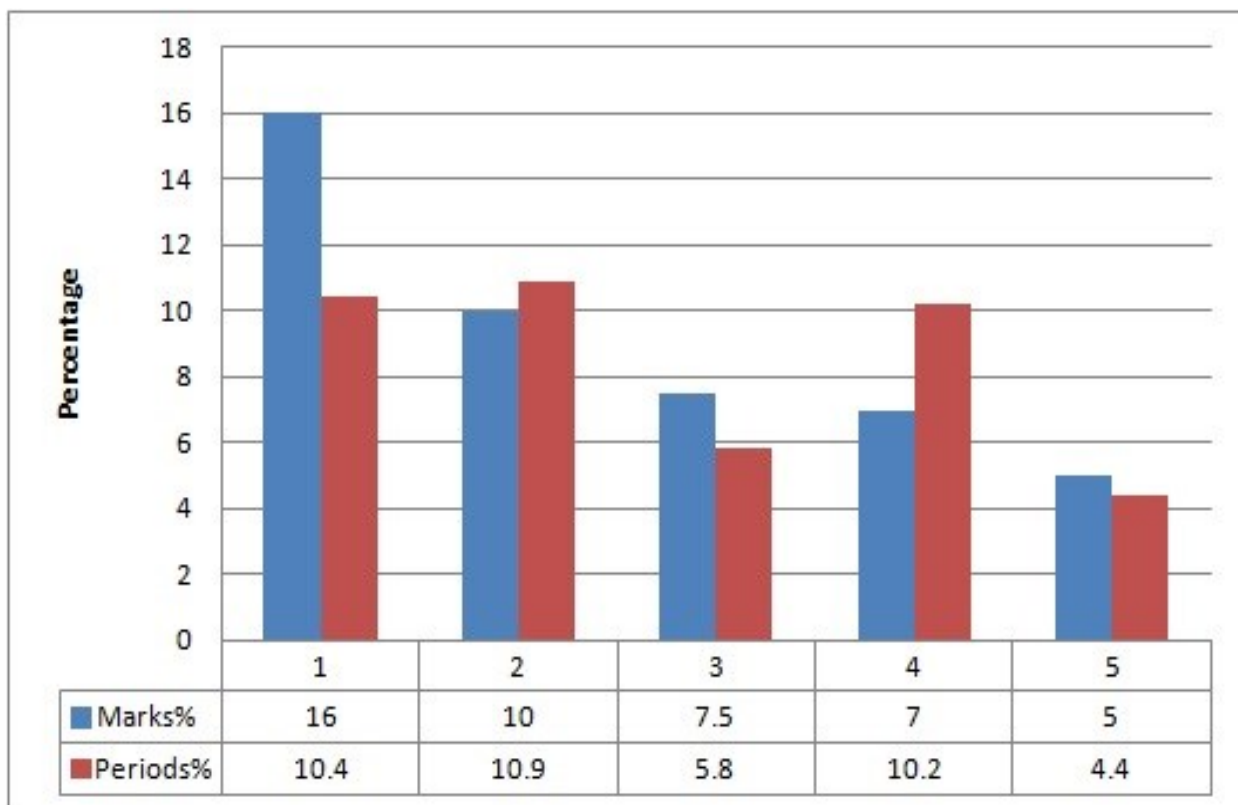


Figure 2. Weightage in terms of overall marks and periods allotted to the research based subjects in B.Arch. curricula of: 1. Jamia Millia Islamia University, New Delhi, 2. School of Planning and Architecture, Delhi, 3. School of Planning and Architecture, Bhopal, 4. Integral University, Lucknow and 5. Aayojan School of Architecture, Jaipur.

Although, all the subjects taught at graduate level have some tint of research, it was assumed that the courses which are 100% research oriented will be considered as research subjects in this study. It was also assumed that the B.Arch. (1st year to 5th year) students of Jamia Millia Islamia University are at par with any other institution included in this study and therefore the data generated by the questionnaire is applicable to all the institutions covered in this study. Also, a randomly approached portion of the B.Arch. students of each year for completing the questionnaire represents the whole class therefore the response from all the students of a class was not taken.

4. Curricula Analysis

In the data collection, the data on the research based subjects offered in the five year's B.Arch. curricula by the five institutions of India is tabulated and analyzed individually for the weightage in terms of marks percentage of the research based subjects against overall marks allotted for the course and for the weightage in terms of hours percentage of the research based subjects against overall hours allotted for the course as given in the **Table 1** to **Table 5**.

The data on the research based subjects offered in the five year's B.Arch. curricula by the five institutions of India is tabulated and analyzed collectively for the weightage in terms of marks percentage of the research based subjects against overall marks allotted for the course and for the weightage in terms of hours percentage of the research based subjects against overall hours allotted for the course as given in the **Table 6** and **Figure 2**.

It may be observed from the **Table 1** to **Table 6** and **Figure 2** that the weightage% of periods allotted to the research based subjects decreases in order of: School of Planning and Architecture, Delhi (10.9%) > Jamia Millia Islamia University, New Delhi (10.4%) > Integral University, Lucknow (10.2%) > School of Planning and Architecture, Bhopal (5.8%) > Aayojan School of Architecture, Jaipur (4.4%).

It may also be observed from the **Table 1** to **Table 6** and **Figure 2** that the weightage% of marks allotted to the research based subjects decreases in order of: Jamia Millia Islamia University, New Delhi (16%) > School of Planning and Architecture, Delhi (10%) > School of Planning and Architecture, Bhopal (7.5%) > Integral University, Lucknow (7%) > Aayojan School of Architecture, Jaipur (5%).

From the above, the curricula of School of Planning and Architecture, Delhi (10.9%), Jamia Millia Islamia University, New Delhi (10.4%) and Integral University, Lucknow (10.2%) have quite similar and high weightage% of periods allotted to the research based subjects as compared to the curricula of School of Planning and Architecture, Bhopal (5.8%) and Aayojan School of Architecture, Jaipur (4.4%).

Also, the curricula of Jamia Millia Islamia University, New Delhi (16%) and School of Planning and Architecture, Delhi (10%) have high weightage% of marks allotted to the research based subjects as compared to the curricula of Integral University, Lucknow (7%) and Aayojan School of Architecture, Jaipur (5%). The curriculum of School of Planning and Architecture, Bhopal (7.5%) is in between two groups in terms of weightage% of marks allotted to the research based subjects.

The following facts may also be observed regarding the inter-relationship between the weightage% of periods and weightage% of marks allotted to the research based subjects in the curricula of the five institutions under study. In School of Planning and Architecture, Delhi, the weightage% of periods (10.9%) is nearly similar to the weightage% of marks (10%). The weightage% of periods (10.4%) is quite less than weightage% of marks (16%) in the curriculum of Jamia Millia Islamia University, New Delhi opposite to Integral University where the weightage% of periods (10.2%) is much greater than the weightage% of marks (7%). The weightage% of periods (5.6%) is slightly less than weightage% of marks (7.5%) in the curriculum of School of Planning and Architecture, Bhopal. While the weightage% of periods (4.4%) is slightly less than weightage% of marks (5%) in the curriculum of Aayojan School of Architecture, Jaipur.

Therefore, the maximum weightage% in terms of periods and marks allotted to the research based subjects in B.Arch. curricula is given by Jamia Millia Islamia University and School of Planning and Architecture, Delhi.

5. Questionnaire Analysis

It may be observed that the positive response 'Yes' of the students doing B.Arch. from Jamia Millia Islamia University to the questions asked in the section, significance and impact, of questionnaire gradually increases from 1st year to 5th year as evident from **Figure 3**.

The trend that the understanding of the students doing B.Arch. regarding the significance and impact of research based subjects offered in the curriculum of Jamia Millia Islamia University follows the increasing order of 1st year (59.4%) < 2nd year (75%) < 3rd year (87.5%) < 4th year (93.1%) \approx 5th year (92.95%) as was hypothesized. Therefore, the significance and impact of the research based subjects in the curriculum of B.Arch. of Jamia Millia Islamia University increases gradually from 1st year to 5th year for the students doing B.Arch. from Jamia Millia Islamia University.

It may also be observed that the negative response 'No' of the students doing B.Arch. from Jamia Millia Islamia University to the questions asked in the section, challenges, of questionnaire gradually increases from 1st year to 5th year as evident from **Figure 4** and **Table 7** to **Table 11**.

The trend that the ability of the students doing B.Arch. to overcome the challenges in the research based subjects offered in the curriculum of Jamia Millia Islamia University follows the increasing order of 1st year (34.7%) < 2nd year (47.5%) < 3rd year (66.4%) < 4th year (75.8%) < 5th year (81.9%) as was hypothesized. Therefore, the challenges in the research based subjects in the curriculum of B.Arch. of Jamia Millia Islamia University decreases gradually from 1st year to 5th year for the students doing B.Arch. from Jamia Millia Islamia University.

Besides, the following challenges in working with research based subjects were also detected from questionnaire analysis viz. lack of motivation and commitment to do research, the selection of the right topic which fascinates the student, the choice of the right methodology which is workable, the selection of topic on which no data is available and the teacher taught discussion. The following may be suggested in order to



Figure 3. Response on the questions related to the significance of the research based subjects in B.Arch.by the students doing B.Arch. from Jamia Millia Islamia University: 1. 1st year, 2. 2nd year, 3. 3rd year, 4. 4th year and 5. 5th year.

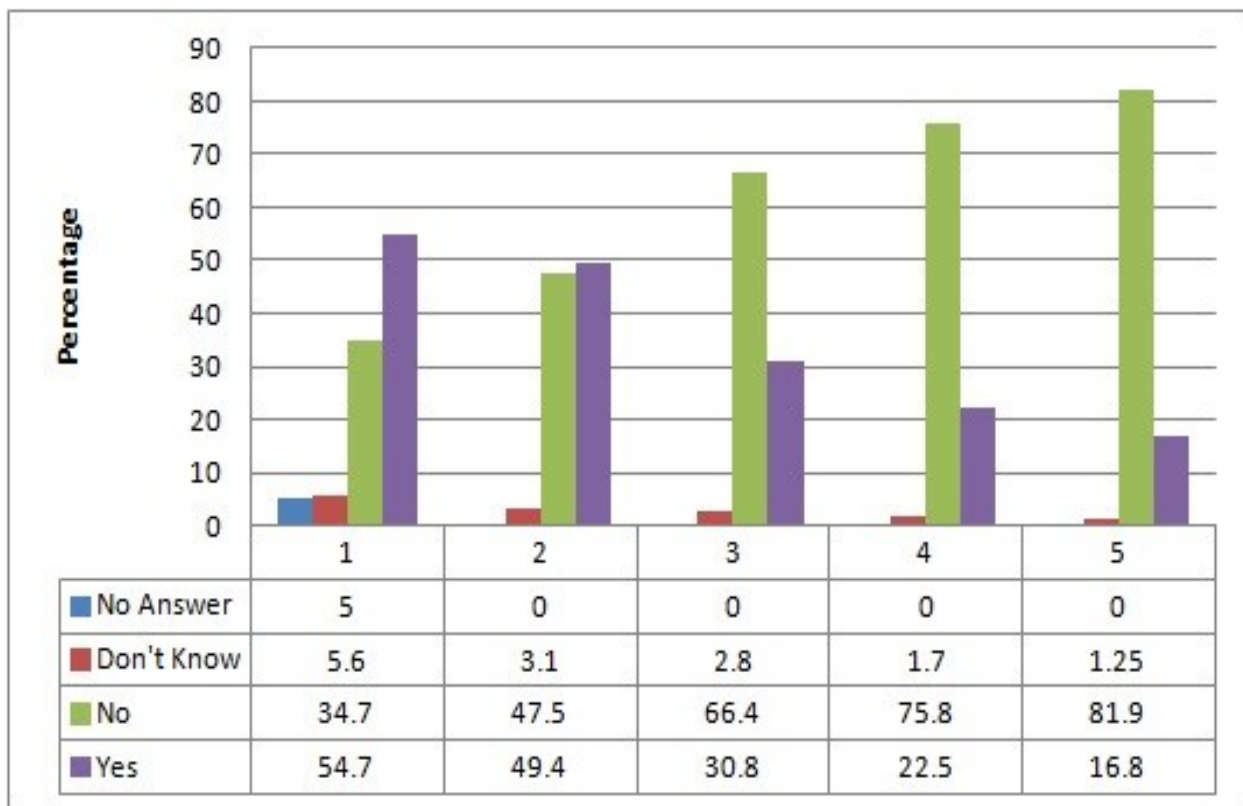


Figure 4. Response on the questions related to the challenges of the research based subjects in B.Arch.by the students doing B.Arch. from Jamia Millia Islamia University: 1. 1st year, 2. 2nd year, 3. 3rd year, 4. 4th year and 5. 5th year.

overcome such challenges in research based learning of architecture.

5.1. Lack of motivation and commitment to do research

The findings revealed that students often involved in the research topics that didn't match their interest. Therefore, they are to be motivated by additional beyond class hours counseling for the novelty and significance of their work.

5.2. The selection of the right topic which fascinates the student

The topic should be pertaining to the burning problem of an individual or society or organization. This will fascinate the students and he will be motivated to carry out research due to his familiarity of the topic. Topic should be doable and where possible the data should easily be available. Such topic chosen for research will certainly match the student's interest.

5.3. The choice of the right methodology which is workable

The students should be guided for selection of correct and convenient methodology to do his research. If the aim of the research is to explore, understand or generate, then the qualitative methodology be suggested and in case of compare, relate or correlate, the quantitative methodology be adopted. The real understanding of the right methodology comes during and after the study.

5.4. The selection of topic on which no data is available

Sometimes adequate data on research topic is not available, the student needs additional guidance and motivation to generate his own data. The data available on the internet should be cross-checked for its authenticity before taking it for research.

5.5. The teacher taught discussion

It seems that more teacher taught interaction in discussing the research based subjects is needed.

A general opinion was asked from the participants, whether the research methodology used to identify, investigate and resolve the challenges in RBL is appropriate? It may be observed that the response of students to the question number 29 of the questionnaire is favorable. Therefore, the methodology adopted in identifying the challenges faced by the students in working with research based subjects is appropriate and applicable (Figure 5).

6. Conclusions

The maximum weightage% in terms of periods and marks allotted to the research based subjects in B.Arch. curricula is given by Jamia Millia Islamia University and School of Planning and Architecture, Delhi.

The weightage% of periods allotted to the research based subjects decreases in order of: School of Planning and Architecture, Delhi (10.9%) > Jamia Millia Islamia University, New Delhi (10.4%) > Integral University, Lucknow (10.2%) > School of Planning and Architecture, Bhopal (5.8%) > Aayojan School of Architecture, Jaipur (4.4%).

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The maximum weightage% in terms of periods and marks allotted to the research based subjects in B.Arch. curricula is given by Jamia Millia Islamia University and School of Planning and Architecture, Delhi.

The positive response 'Yes' of the students doing B.Arch. from Jamia Millia Islamia University to the questions asked in the section, significance and impact, of questionnaire gradually increases from 1st year to 5th year.

The understanding of the students doing B.Arch. regarding the significance and impact of research based subjects offered in the curriculum of Jamia Millia Islamia University follows the increasing order of 1st year (59.4%) < 2nd year (75%) < 3rd year (87.5%) < 4th year (93.1%) ≈ 5th year (92.95%) as was hypothesized.

The challenges in the research based subjects in the curriculum of B.Arch. of Jamia Millia Islamia University decreases gradually from 1st year to 5th year for the students doing B.Arch. from Jamia Millia Islamia University.

The ability of the students doing B.Arch. regarding to overcome the challenges in the research based subjects offered in the curriculum of Jamia Millia Islamia University follows the increasing order of 1st year (34.7%) < 2nd year (47.5%) < 3rd year

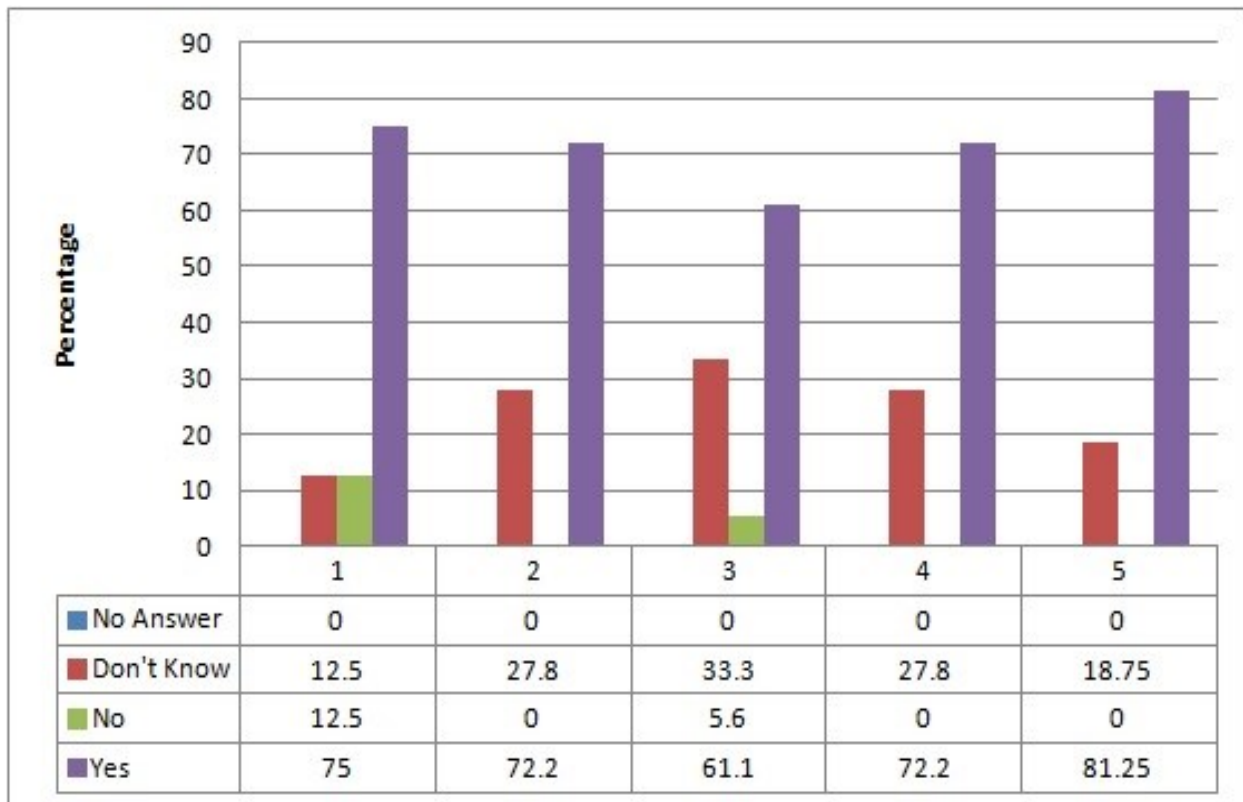


Figure 5. Response on the questions related to the general opinion about the questionnaire by the students doing B.Arch. from Jamia Millia Islamia University: 1. 1st year, 2. 2nd year, 3. 3rd year, 4. 4th year and 5. 5th year.

(66.4%) < 4th year (75.8%) < 5th year (81.9%) as was hypothesized.

The findings revealed that students often involved in the research topics that didn't match their interest. Therefore, they are to be motivated by additional beyond class hours counseling for the novelty and significance of their work.

The topic should be pertaining to the burning problem of an individual or society or organization. This will fascinate the students and he will be motivated to carry out research due to his familiarity of the topic. Topic should be doable and where possible the data should easily be available. Such topic chosen for research will certainly match the student's interest.

The students should be guided for selection of correct and convenient methodology to do his research. If the aim of the research is to explore, understand or generate, then the qualitative methodology be suggested and in case of compare, relate or correlate, the quantitative methodology be adopted. The real understanding of the right methodology comes during and after the study.

Sometimes adequate data on research topic is not available, the student needs additional guidance and motivation to generate his own data. The data available on the internet should be cross-checked for its authenticity before taking it for research.

It seems that more teacher taught interaction in discussing the research based subjects is needed.

The methodology adopted in identifying the challenges faced by the students in working with research based subjects is appropriate and applicable.

It may be suggested at this stage that the questionnaire may also be presented to the students of others institutions under study. The further study should be carried on some foreign institutions in order to compare the Indian institutions with them and to find out whether our institutions are at par with them?

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Table 1. The year/semester-wise course codes, course titles and weightage in terms of marks and periods of research based subjects in B.Arch. curriculum of Jamia Millia Islamia University, New Delhi.

Year	Semester	Course Code	Course Title	Marks		Periods		Weightage	
				Allotted	Total	Allotted	Total	Marks%	Periods%
1	1	-	-	-	2000	-	960	5.0	3.3
	2	AR110	Dissertation: Indian Arts and Crafts	100		32			
2	3	-	-	-	2000	-	960	5.0	3.3
	4	AR210	Dissertation: Indian Architecture	100		32			
3	5	-	-	-	2000	-	960	5.0	3.3
	6	AR310	Dissertation: Indian Architects	100		32			
4	7	-	-	-	2000	-	960	5.0	3.3
	8	AR410	Seminar: Indian Habitat	100		32			
5	9	AR501	Thesis	1200	2000	320	480	60.0	66.6
	10	-	-	-		-			
Total				1600	10000	448	4320	16.0	10.4

Note: Each semester was taken as of 16 weeks.

Table 2. The year/semester-wise course codes, course titles and weightage in terms of marks and periods of research based subjects in B.Arch. curriculum of School of Planning and Architecture, Delhi.

Year	Semester	Course Code	Course Title	Marks		Periods		Weightage	
				Allotted	Total	Allotted	Total	Marks%	Periods%
1	1	-	-	-	3200	-	1008	0.0	0.0
	2	-	-	-		-			
2	3	-	-	-	3200	-	960	0.0	0.0
	4	-	-	-		-			
3	5	-	-	-	3200	-	960	0.0	0.0
	6	-	-	-		-			
4	7	PRX	Project Report	200	2700	64	480	7.4	13.3
	8	-	-	-		-			
5	9	1. SRX	1. Seminar	200	2700	80	720	48.1	53.3
		2. AD 5b	2. UD Research Report	100		48			
	10	1. ADTa	1. Thesis	700		144			
		2. ADTb	2. Thesis Book	150		48			
		3. ADTc	3. Tech. Study	150		64			
Total				1500	15000	448	4128	10.0	10.9

Note: Each semester was taken as of 16 weeks.

Table 3. The year/semester-wise course codes, course titles and weightage in terms of marks and periods of research based subjects in B.Arch. curriculum of School of Planning and Architecture, Bhopal.

Year	Semester	Course Code	Course Title	Marks		Periods		Weightage	
				Allotted	Total	Allotted	Total	Marks%	Periods%
1	1	-	-	-	1500	-	1040	0.0	0.0
	2	-	-	-		-			
2	3	-	-	-	1600	-	992	0.0	0.0
	4	-	-	-		-			
3	5	-	-	-	1600	-	992	6.3	3.2
	6	BARC-0608	Seminar-I	100		32			
4	7	BARC-0708	Seminar-II	100	900	32	480	11.1	6.6
	8	-	-	-		-			
5	9	BARC-0908	Seminar-III	100	1100	48	656	27.3	26.8
	10	BARC-1001	Design Thesis	100		96			
		BARC-1004	Seminar-IV	100		32			
Total				500	6700	240	4160	7.5	5.8

Note: Each semester was taken as of 16 weeks.

Table 4. The year/semester-wise course codes, course titles and weightage in terms of marks and periods of research based subjects in B.Arch. curriculum of Integral University, Lucknow

Year	Semester	Course Code	Course Title	Marks		Periods		Weightage	
				Allotted	Total	Allotted	Total	Marks%	Periods%
1	1	-	-	-	2000	-	1056	0.0	0.0
	2	-	-	-		-			
2	3	-	-	-	2000	-	1056	0.0	0.0
	4	-	-	-		-			
3	5	-	-	-	2000	-	1056	0.0	0.0
	6	-	-	-		-			
4	7	ARC-705	Research Skills and Project Introduction	100	2000	48	1056	35	40.9
	8	ARC-801	Architectural Thesis	600		384			
5	9	-	-	-	2000	-	-	0.0	0.0
	10	-	-	-		-			
Total				700	10000	432	4224	7	10.2

Note: Each semester was taken as of 16 weeks.

Table 5. The year/semester-wise course codes, course titles and weightage in terms of marks and periods of research based subjects in B.Arch. curriculum of Aayojan School of Architecture, Jaipur.

Year	Semester	Course Code	Course Title	Marks		Periods		Weightage	
				Allotted	Total	Allotted	Total	Marks%	Periods%
1	1	-	-	-	2000	-	992	0.0	0.0
	2	-	-	-		-			
2	3	-	-	-	2000	-	992	0.0	0.0
	4	-	-	-		-			
3	5	-	-	-	2000	-	992	0.0	0.0

	6	-	-	-		-			
4	7	-	-	-	2000	-	512	0.0	0.0
	8	-	-	-		-			
5	9	-	-	-	2000	-	832	25	23.1
	10	10ARC	Thesis Project	500		192			
Total				500	10000	192	4320	5	4.4
Note: Each semester was taken as of 16 weeks.									

Table 6. Over all weightage in terms of marks and periods allotted to the research based subjects in B.Arch. curricula of different institutions under study.

S.No.	Institution	Marks		Periods		Weightage	
		Allotted	Total	Allotted	Total	Marks %	Periods %
1	Jamia Millia Islamia, New Delhi	1600	10000	448	4320	16	10.4
2	School of Planning and Architecture, Delhi	1500	15000	448	4128	10	10.9
3	School of Planning and Architecture, Bhopal	500	6700	240	4160	7.5	5.8
4	Integral University, Lucknow	700	10000	432	4224	7	10.2
5	Aayojan School of Architecture, Jaipur	500	10000	192	4320	5	4.4

Table 7. Response on the Questionnaire by the students doing B.Arch. (1st Year) from Jamia Millia Islamia University.

Question No.	Response					Response (%)				
	Yes	No	Do not Know	No answer	Total	Yes (%)	No (%)	Do not know (%)	No answer (%)	Total (100%)
Significance and Impact										
1	10	4	2	0	16	62.5	25	12.5	0	100
2	13	2	1	0	16	81.25	12.5	6.25	0	100
3	12	0	4	0	16	75	0	25	0	100
4	4	6	6	0	16	25	37.5	37.5	0	100
5	8	2	6	0	16	50	12.5	37.5	0	100
6	11	3	2	0	16	68.75	18.75	12.5	0	100
7	12	4	0	0	16	75	25	0	0	100
8	6	5	5	0	16	37.5	31.25	31.25	0	100
Total	76	26	26	0	128	59.4	20.3	20.3	0	100
Challenges										

9	10	2	4	0	16	62.5	12.5	25	0	100
10	12	4	0	0	16	75	25	0	0	100
11	12	4	0	0	16	75	25	0	0	100
12	10	6	0	0	16	62.5	37.5	0	0	100
13	11	5	0	0	16	68.75	31.25	0	0	100
14	10	6	0	0	16	62.5	37.5	0	0	100
15	11	5	0	0	16	68.75	31.25	0	0	100
16	10	6	0	0	16	62.5	37.5	0	0	100
17	11	5	0	0	16	68.75	31.25	0	0	100
18	7	6	3	0	16	43.75	37.5	18.75	0	100
19	8	6	2	0	16	50	37.5	12.5	0	100
20	7	7	2	0	16	43.75	43.75	12.5	0	100
21	9	7	0	0	16	56.25	43.75	0	0	100
22	0	0	0	16	16	0	0	0	100	100
23	7	7	2	0	16	43.75	43.75	12.5	0	100
24	11	4	3	0	16	68.75	25	18.75	0	100
25	4	12	0	0	16	25	75	0	0	100
26	3	9	2	0	16	18.75	56.25	12.5	0	100
27	12	4	0	0	16	75	25	0	0	100
28	10	6	0	0	16	62.5	37.5	0	0	100
Total	175	111	18	16	320	54.7	34.7	5.6	5	100
General Opinion										
29	12	2	2	0	16	75	12.5	12.5	0	100
Total	12	2	2	0	16	75	12.5	12.5	0	100

Table 8. Response on the Questionnaire by the students doing B.Arch. (2nd Year) from Jamia Millia Islamia University.

Question No.	Response					Response (%)				
	Yes	No	Do not Know	No answer	Total	Yes (%)	No (%)	Do not know (%)	No answer (%)	Total (100%)
Significance and Impact										
1	12	6	0	0	18	66.7	33.3	0	0	100
2	16	2	0	0	18	88.9	11.1	0	0	100
3	16	2	0	0	18	88.9	11.1	0	0	100
4	10	4	4	0	18	55.6	22.2	22.2	0	100
5	14	1	3	0	18	77.8	5.5	16.7	0	100
6	16	0	2	0	18	88.9	0	11.1	0	100
7	14	4	0	0	18	77.8	22.2	0	0	100
8	10	5	3	0	18	55.6	27.7	16.7	0	100
Total	108	24	12	0	144	75	16.7	8.3	0	100
Challenges										
9	12	6	0	0	18	66.7	33.3	0	0	100
10	14	4	0	0	18	77.8	22.2	0	0	100
11	11	7	0	0	18	61.1	38.9	0	0	100
12	9	9	0	0	18	50	50	0	0	100
13	11	7	0	0	18	61.1	38.9	0	0	100
14	13	5	0	0	18	72.2	27.8	0	0	100

15	9	9	0	0	18	50	50	0	0	100
16	11	7	0	0	18	61.1	38.9	0	0	100
17	6	12	0	0	18	33.3	66.7	0	0	100
18	4	14	0	0	18	22.2	77.8	0	0	100
19	8	10	0	0	18	44.4	55.6	0	0	100
20	8	10	0	0	18	44.4	55.6	0	0	100
21	6	12	0	0	18	33.3	66.7	0	0	100
22	5	13	0	0	18	27.8	72.2	0	0	100
23	4	11	3	0	18	22.2	61.1	16.7	0	100
24	12	4	2	0	18	66.7	22.2	11.1	0	100
25	6	10	2	0	18	33.3	55.6	11.1	0	100
26	4	10	4	0	18	22.2	55.6	22.2	0	100
27	12	6	0	0	18	66.7	33.3	0	0	100
28	13	5	0	0	18	72.2	27.8	0	0	100
Total	178	171	11	0	360	49.4	47.5	3.1	0	100
General Opinion										
29	13	0	5	0	18	72.2	0	27.8	0	100
Total	13	0	5	0	18	72.2	0	27.8	0	100

Table 9. Response on the Questionnaire by the students doing B.Arch. (3rd Year) from Jamia Millia Islamia University.

Question No.	Response					Response (%)				
	Yes	No	Do not Know	No answer	Total	Yes (%)	No (%)	Do not know (%)	No answer (%)	Total (100%)
Significance and Impact										
1	14	2	2	0	18	77.8	11.1	11.1	0	100
2	18	0	0	0	18	100	0	0	0	100
3	18	0	0	0	18	100	0	0	0	100
4	14	0	4	0	18	77.8	0	22.2	0	100
5	18	0	0	0	18	100	0	0	0	100
6	16	2	0	0	18	88.9	11.1	0	0	100
7	14	2	2	0	18	77.8	11.1	11.1	0	100
8	10	2	6	0	18	55.6	11.1	33.3	0	100
Total	126	6	12	0	144	87.5	4.2	8.3	0	100
Challenges										
9	10	8	0	0	18	55.6	44.4	0	0	100
10	9	9	0	0	18	50	50	0	0	100
11	6	12	0	0	18	33.3	66.7	0	0	100
12	7	11	0	0	18	38.9	61.1	0	0	100
13	5	13	0	0	18	27.8	72.2	0	0	100
14	10	8	0	0	18	55.5	44.4	0	0	100
15	4	14	0	0	18	22.2	77.8	0	0	100
16	9	9	0	0	18	50	50	0	0	100
17	5	13	0	0	18	27.8	72.2	0	0	100
18	5	13	0	0	18	27.8	72.2	0	0	100
19	6	12	0	0	18	33.3	66.7	0	0	100
20	2	12	4	0	18	11.1	66.7	22.2	0	100

21	2	16	0	0	18	11.1	88.9	0	0	100
22	4	14	0	0	18	22.2	77.8	0	0	100
23	2	16	0	0	18	11.1	88.9	0	0	100
24	3	13	2	0	18	16.7	72.2	11.1	0	100
25	2	14	2	0	18	11.1	77.8	11.1	0	100
26	1	15	2	0	18	5.6	83.3	11.1	0	100
27	8	10	0	0	18	44.4	55.6	0	0	100
28	11	7	0	0	18	61.1	38.9	0	0	100
Total	111	239	10	0	360	30.8	66.4	2.8	0	100
General Opinion										
29	11	1	6	0	18	61.1	5.6	33.3	0	100
Total	11	1	6	0	18	61.1	5.6	33.3	0	100

Table 10. Response on the Questionnaire by the students doing B.Arch. (4th Year) from Jamia Millia Islamia University.

Question No.	Response					Response (%)				
	Yes	No	Do not Know	No answer	Total	Yes (%)	No (%)	Do not know (%)	No answer (%)	Total (100%)
Significance and Impact										
1	15	3	0	0	18	83.3	16.7	0	0	100
2	18	0	0	0	18	100	0	0	0	100
3	18	0	0	0	18	100	0	0	0	100
4	14	4	0	0	18	77.8	22.2	0	0	100
5	18	0	0	0	18	100	0	0	0	100
6	18	0	0	0	18	100	0	0	0	100
7	18	0	0	0	18	100	0	0	0	100
8	15	3	0	0	18	83.3	16.7	0	0	100
Total	134	10	0	0	144	93.1	6.9	0	0	100
Challenges										
9	9	9	0	0	18	50	50	0	0	100
10	6	12	0	0	18	33.3	66.7	0	0	100
11	0	18	0	0	18	0	100	0	0	100
12	6	12	0	0	18	33.3	66.7	0	0	100
13	0	18	0	0	18	0	100	0	0	100
14	12	6	0	0	18	66.7	33.3	0	0	100
15	3	15	0	0	18	16.7	83.3	0	0	100
16	12	6	0	0	18	66.7	33.3	0	0	100
17	6	12	0	0	18	33.3	66.7	0	0	100
18	3	15	0	0	18	16.7	83.3	0	0	100
19	0	18	0	0	18	0	100	0	0	100
20	0	15	3	0	18	0	83.3	16.7	0	100
21	0	18	0	0	18	0	100	0	0	100
22	3	15	0	0	18	16.7	83.3	0	0	100
23	0	18	0	0	18	0	100	0	0	100
24	0	15	3	0	18	0	83.3	16.7	0	100
25	0	18	0	0	18	0	100	0	0	100
26	0	18	0	0	18	0	100	0	0	100

27	9	9	0	0	18	50	50	0	0	100
28	12	6	0	0	18	66.7	33.3	0	0	100
Total	81	273	6	0	360	22.5	75.8	1.7	0	100
General Opinion										
29	13	0	5	0	18	72.2	0	27.8	0	100
Total	13	0	5	0	18	72.2	0	27.8	0	100

Table 11. Response on the Questionnaire by the students doing B.Arch. (5th Year) from Jamia Millia Islamia University.

Question No.	Response					Response (%)				
	Yes	No	Do not Know	No answer	Total	Yes (%)	No (%)	Do not know (%)	No answer (%)	Total (100%)
Significance and Impact										
1	16	0	0	0	16	100	0	0	0	100
2	16	0	0	0	16	100	0	0	0	100
3	16	0	0	0	16	100	0	0	0	100
4	10	6	0	0	16	62.5	37.5	0	0	100
5	16	0	0	0	16	100	0	0	0	100
6	16	0	0	0	16	100	0	0	0	100
7	16	0	0	0	16	100	0	0	0	100
8	13	2	1	0	16	81.25	12.5	6.25	0	100
Total	119	8	1	0	128	92.95	6.25	0.8	0	100
Challenges										
9	4	12	0	0	16	25	75	0	0	100
10	7	9	0	0	16	43.75	56.25	0	0	100
11	4	12	0	0	16	25	75	0	0	100
12	3	13	0	0	16	18.75	81.25	0	0	100
13	3	13	0	0	16	18.75	81.25	0	0	100
14	6	10	0	0	16	37.5	62.5	0	0	100
15	2	14	0	0	16	12.5	87.5	0	0	100
16	6	10	0	0	16	37.5	62.5	0	0	100
17	1	15	0	0	16	6.25	93.75	0	0	100
18	0	16	0	0	16	0	100	0	0	100
19	2	14	0	0	16	12.5	87.5	0	0	100
20	1	13	2	0	16	6.25	81.25	12.5	0	100
21	0	16	0	0	16	0	100	0	0	100
22	2	14	0	0	16	12.5	87.5	0	0	100
23	1	15	0	0	16	6.25	93.75	0	0	100
24	0	14	2	0	16	0	87.5	12.5	0	100
25	0	16	0	0	16	0	100	0	0	100
26	0	16	0	0	16	0	100	0	0	100
27	5	11	0	0	16	31.25	68.75	0	0	100
28	7	9	0	0	16	43.75	56.25	0	0	100
Total	54	262	4	0	320	16.8	81.9	1.25	0	100
General Opinion										
29	13	0	3	0	16	81.25	0	18.25	0	100
Total	13	0	3	0	16	81.25	0	18.75	0	100

Appendix-1

Your Course: B.Arch.

Your Year: 1st 2nd 3rd 4th 5th

(Please tick)

Significance and Impact

Q1. Did you choose your career in architecture with full conviction and willingness at the time of admission ?

- a) Yes b) No c) Don't know

Q2. Are you satisfied to choose your carrier in architecture as on now?

- a) Yes b) No c) Don't know

Q3. Do you feel elevated on your belonging to the field of architecture ?

- a) Yes b) No c) Don't know

Q4. Will you go into profession immediately after your B.Arch. ?

- a) Yes b) No c) Don't know

Q5. Do the research based subjects in B.Arch. match your interests ?

- a) Yes b) No c) Don't know

Q6. Do you feel that the research based subjects promote successful learning?

- a) Yes b) No c) Don't know

Q7. Is the work done in conducting the research is creative in your opinion ?

- a) Yes b) No c) Don't know

Q8. Do you feel that a master program in architecture will be beneficial immediately after your graduation ?

- a) Yes b) No c) Don't know

Challenges

Q9. Do you face any problem to decide the research method to be used in your research work ?

- a) Yes b) No c) Don't know

Q10. Do you face any problem in deciding or finalizing your research topic ?

- a) Yes b) No c) Don't know

Q11. Do you face any problem in developing your synopsis ?

- a) Yes b) No c) Don't know

Q12. Do you face any problem in data collection ?

- a) Yes b) No c) Don't know

Q13. Do you face any problem in data analysis ?

- a) Yes b) No c) Don't know

Q14. Do you face any problem in case studies ?

- a) Yes b) No c) Don't know

Q15. Do you face any problem in preparing your presentations ?

- a) Yes b) No c) Don't know

Q16. Do you face any problem in real case ?

- a) Yes b) No c) Don't know

Q17. Do you face any problem in virtual case studies ?

- a) Yes b) No c) Don't know

Q18. Do you face any problem in availing the facilities available in the department for doing your research work ?

- a) Yes b) No c) Don't know

Q19. Do you face any problem in discussing your research problem with your research guide ?

- a) Yes b) No c) Don't know

Q20. Do you face any problem in getting sufficient guidance from your teachers in conducting the research work?

- a) Yes b) No c) Don't know

Q21. Do you face any problem in getting assistance from your seniors in conducting the research work ?

- a) Yes b) No c) Don't know

Q22. Do you face any problem in getting assistance from your juniors in conducting the research work ?

- a) Yes b) No c) Don't know

Q23. Do you feel that the learning environment of the department is not favorable ?

- a) Yes b) No c) Don't know

Q24. Do you face any problem in learning enough skills in research based subjects to continue further research in architecture ?

- a) Yes b) No c) Don't know

Q25. Do you feel that your work done towards the research based subjects is not of good quality ?

- a) Yes b) No c) Don't know

Q26. Do you feel that you failed to acquire enough communication skills (oral, writing, digital, etc.) ?

- a) Yes b) No c) Don't know

Q27. Do you experience any problem during the preparation of your research report ?

- a) Yes b) No c) Don't know

Q28. Do you experience any problem to defend of your research report during the viva voce examination ?

- a) Yes b) No c) Don't know

General Opinion

Q29. Do you feel this questionnaire is a good piece of work in evaluating the topic "Research Based Subjects in B.Arch. Curriculum: Significance, Impact, Challenges and Resolution"

- a) Yes b) No c) Don't know