Achieving an Effective Teaching Model in Architectural Education; Case Study: Architectural Design Basics Two

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ABSTRACT

Learning process is of great importance in architecture courses, especially for the newcomers. The main issue of the present study is achieving an effective instructional pattern for teaching architecture and "Architectural Design Basics" have been considered herein as the case study. The proper patterns of instructing preparatory architectural designing lessons were identified through exploring the various teaching patterns in the area of educational sciences and architecture teaching. Then, changes were made in line with these lessons' goals to attain a teaching pattern and its specifications based on the intragroup professor-student collaboration (IPSC). The current research has been conducted to investigate this pattern in teaching preparatory architectural designing II and its completion and correction as well as its transformation to an effective instructional method. To do so, use was made of the qualitative research method of grounded theory so that the strong and weak points of this pattern can be better recognized. The study population included the students who had taken the preparatory architectural designing II lessons in two universities in Mazandaran. The reason for selecting this population is the familiarity with the environmental conditions due to the researcher's history of teaching in them. The information-gathering instruments in this study are observation, questionnaire, and interview. The study results signified the increase in the students' motivation, meeting the need for the students' approval and collaboration in this method and its effectiveness on the group activities. Amongst the other advantages obtained as a result of the professor's presence in the group, the importance of asking for the students' ideas, the correct task division in the group and more importance of the learning process with respect to the product can be pointed out.

Keywords: Teaching Model, Architectural Design Basics Two, Learning Process, Intragroup Professor-Student Collaboration.

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1. INTRODUCTION

A large number of students graduating from architecture during the recent decade and the high quantity of the architectural schools demand the enhancement of the education quality in them. Since the basic lessons of architecture mark the starting point of architectural instruction and also because the scientific personality of the students and their finding of competencies happens in the basic lessons, they gain particular role and importance. The newcomers of architecture lack the power and ability of analyzing the architectural works and occasionally exhibit emotional reactions to them and this causes them to become dissuaded and discouraged from keeping on the path. Compiling, codifying and recording the students' learning experiences in the basic lessons, especially the preparatory architectural designing lessons, seem to be necessary considering their importance for teaching the architectural designing lessons.

The today's common patterns of studio instruction of preparatory architectural designing lessons have certain shortcomings and it is the existence of these same faults and flaws that can be considered amongst the necessities of performing this research and dealing with the issue of effective instruction method for the preparatory architectural designing lesson. The present study aims at the investigation of a novel instruction method called "intragroup professor-student collaboration (IPSC)" for teaching preparatory architectural designing II lesson and its completion and revision as well as its transformation to an effective instruction method. The main question of the present article is that "how IPSC can be corrected so that a general theory can be attained in this regard?"

2. STUDY METHOD

The present study has been carried out based on the grounded theory method within the format of a case study. The reason for selecting the grounded theory research method is gaining a deep insight over the role of the "IPSC" method in project completion that can be effective in teaching preparatory architectural designing lessons. To accomplish this objective, there is a need for performing qualitative research that can examine the factors influencing the students' process of learning the preparatory architectural designing lessons. The study population included the students who had taken the preparatory architectural designing II lessons in two universities in Mazandaran. The reason for selecting this study population is the familiarity with the environmental conditions due to the researcher's history of teaching in the aforesaid universities.

3. STUDY LITERATURE REVIEW

Intragroup professor-student collaboration (IPSC) pattern will be elaborated with its preliminary specifications in a short review of the active and collaborative learning patterns, learning process in architecture and introductory lessons.

3.1. Active Learning

In the active learning, the students effectively engage in the teaching materials, answer the questions, propose questions, enter discussions and explain about the issues (Molenda, 2010). The education area researchers emphasize the importance of active learning and its techniques. The learners who attend the classrooms actively are usually found more satisfied with their tasks in contrast to those attending the classes wherein passive learning approaches are practiced; they can also better learn other important skills like critical thinking, negotiation and communication skills (Ngeow & Kong, 2001).

3.2. Collaborative Learning (Social Patterns)

In collaborative learning, the university students perform their assignments or projects in groups in such a way that they do effective group works and carry out their responsibilities. Numerous studies show that the individuals performing group works can learn more and very deeply, enjoy higher self-confidence and have more positive attitudes towards the subject in comparison to the ones working individually (Felder & Brent, 1994; Oakley, Felder, Brent, & Elhajj, 2004).

3.3. Cooperative Learning Pattern (Synergistic)

It is one type of collaborative learning wherein preparations are taken into account for maximizing the advantages of group work (Felder & Brent, 2004). The synergy created in the cooperation-based learning environments gives rise to more motivation in contrast to competitive and individualistic environments. The group members' feeling of attachment creates a positive force. Every learning would be more ready for helping others. The interaction with others adds to the learning amount. Synergy increases the positive feelings towards one another, reduces the seclusion and prevents self-alienation and contributes to the establishment of relations with others and creates positive perceptions of others in the heart. Collaboration leads to self-confidence not only through elevating learning but also through creating such a sense of the need for caring for others and being cared by them. The interaction in two- or three-member groups is simpler than the larger ones (Joyse, Hopkins, & Calhoun, 2005).

3.4. Peer Learning

It is a form of cooperative learning wherein the students take the role of the instructor and a special responsibility is defined for the student in managing the classroom. The student's responsibility can be selecting the part to be studied, evaluating the assignments and planning or implementing parts of the instruction. The process of becoming ready for instructing another person needs a high level of cognitive skill and brings about an enhancement in the learning experience (Durling & Schick, 1976).

The summing of the issues posited in this pattern is reflective of the idea that the university students' participation plays an essential role in the quality of their learning. There are different techniques for increasing university students' collaboration that are called multiple learning techniques.

3.5. The Relationship between Professor's Teaching Method and Feedback in Architecture

The primary factors influencing the teaching process are method, recognition of the students, knowledge related to content, goals that describe final results and ideals for teaching and the relationships existent between the professor and the university students. These five factors exist in every teaching methodology in general. It does not matter in which course, where and how you are teaching, every teaching methodology can be specified by these five indicators (Fenstermacher & Soltis, 2011).

Designing studios fall in the center of instructing architecture, were teaching through the learning process, i.e. "learning through acting", forms the beginner students' experiences. Architectural instruction is necessarily an imperfect process because architectural instruction includes teaching different things to different persons (Salama, 2006).

Every architecture professor teaches according to his or her ideologies and beliefs and different from the others. Thus, there is a huge divergence between the taught contents and the teaching methods in the various faculties or even in a single faculty (Salama, 2006).

3.6. Learning Process in Architecture

University students follow the styles of various architects without considering the grounds of their works, conditions of the buildings' users and their appropriateness concerning climatic and environmental conditions. Under such circumstances, the beginner students see architectural designing more as an opportunity for expressing their internal creativities rather than a challenge for solving a complex set of social and technical issues (Gross & Do, 2013). Categorized frameworks have been written for architectural instruction goals based on

the instructional goals classified by Benjamin Bloom:
A) Knowledge: identification and recall of information.
B) Comprehension of the materials: sufficient conception for subjective organizing and arranging of the constructional materials in the setting.
C) Transferring learning: use of previously learned materials in responding to the new issues.
D) Analysis: proposing issues for compelling the students to deep and critical thinking.
E) Combination: proposing issues for provoking creative thinking in the students.
F) Evaluation: proposing issues for inciting students to judge the competency of an idea, a solution or aesthetical work (Harrow, 2013).

It can be understood in a glance at Bloom's classification and designing work's nature that the learning process in the designing lessons incorporates such stages as analytical discernment, critical thinking and creative decision-making (Salama, 2005).

The architectural designing process needs to translate the theoretical knowledge in accordance with the future needs and cultures of the users. The students who have been instructed based on sole memorization from the primary school to the university would be faced with problems in this stage, especially at the beginning of the designing process and theoretical knowledge translation (Mutlu Danaci, 2015).

3.7. Introductory Architectural Designing Lessons

The architectural engineering syllabus of BA course approved by ministry of sciences, research, and technology in 1998 has specified certain goals for the introductory architectural designing lessons, including the followings: enhancement of the preliminary designing knowledge and skills; elevation of spatial imaginations and expression skills, strengthening of the power of creativity and self-confidence, familiarity with contextual and conceptual architectural factors, fostering of the university students' ability for creating architectural spaces, understanding architectural designing through observation, statement of problem and establishment of communication (Ministry of Science Planning High Council, 1998).

3.8. Intragroup Professor-Student Collaboration (IPSC) Pattern

Reference was made in the literature review to the importance of group work and advantages of using collaborative methods so the students who work in groups can better and more deeply learn and enjoy higher self-confidence and have more positive attitudes towards the subject as compared to the students who work individually (Felder & Brent, 1994; Oakley, Felder, Brent, & Elhajj, 2004). Moreover, since the process of getting ready to teach

another person needs a high level of cognitive skill and there is a need for subtle comprehension of the materials for instructing peers (Durling & Schick, 1976), individuals are responsible for their own and their peers' learning.

But, the new approach in the present article's hypothesis is "placing the university student in the group's leadership role and giving the professor a role of internal guidance". In this model, professor and student are both in a single process and the student is even the leader and the professor follows him or her but the professor is also responsible for internal guidance.

IPSC is an instructional pattern wherein the professor like the student and along with him or her seeks to research and learn. Meanwhile enabling the students to use the basic concepts in a common experience with the professor, this method encourages them to innovation and creation of diverse ideas; it also teaches them the work method in practical and field manner because the person responsible for learning in here is not anymore the professor but the students. The tasks are done in group form in this method and the group members range in number between three and five persons.

This instructional pattern that has extensive concepts latent therein for students' learning has been obtained through the investigation of the weak and strong points of collaborative methods of teaching introductory architectural designing lessons and seeks to contribute a more thorough model to the collaborative methods.

3.9. Distinctive Points of IPSC Pattern

IPSC pattern offers a model that is missing from the cooperative methods meaning that professor acts as the instructor or facilitator of the affairs in collaborative methods and student proves an active participation but the professor, as well, is deemed as a participant in the direct professor-student collaboration method and he might even keep on with the student's method.
• In the IPSC method, the student can head the group in which case certain responsibilities are also given to the professor inside the group.
• In the IPSC pattern, the student's goal is no more the mere completing of the assignments and satisfying the professor's wants, rather the students see the professor standing at the side of them and both the students and the professor pursue common goals.
• In this model, the tasks are done in a team and an identical value is given to the notions of all the group members, professors, and students, in accomplishing the assigned tasks.

4. STUDY STAGES

The present study has been carried out based on the grounded theory method within the format of a case study. The reason for selecting grounded theory research is the achievement of a subtle understanding

of the role of "IPSC-based instruction for project completion". To accomplish this goal, there is a need for performing qualitative research so that the factors influencing the students' learning process can be investigated. The data collecting method of this research is the semi-open interview. The students are interviewed in several stages in the beginning, middle and end of the term. The study sample volume included 15 university students all of whom were interviewed.

The number of group members was chosen differently so that experiences can be acquired for varying numbers of group members and their various characteristics. Of course, efforts were made in the majority of the exercises to set the volume of the delivered work equal to the number of the group members. Furthermore, the university students were responsible for determining the number of group members so that they can work with whatever the number of group members they think it is easier for them. Therefore, three to five members were considered for each group. Based on the previous term's average score, the students were assigned to the groups in an order of their average scores from high to low. So, all of the groups are at the same level and efforts have also been made to have identical groups in terms of the students' qualities, talents, and learning ability to minimize the effects of these variables on the study results. Observations were regularly written down by the professor weekly and interviews were also made with the students during the semester.

In the groups that worked based on IPSC method, professor acted as a group member and directly took part in the group activities and played a role more than guidance and supervision in such a way that the professor participated in the common sessions with the group members and consulted with them for bringing about more coherence in the groups and tries removing the group's contingent shortfalls and problems and made efforts to make the members more coordinated. At the times that the group offered its plan in the classroom to be criticized and subsequently defended by it, the professor defended the group's ideas and plans as a group member for a share equal to that of other group members and accepted the others' criticism where it was necessary. The semi-open interview was made with some of the students in the semester so that the strong and weak points can be revealed. The interviews helped the information gathering be precise, subtle, interpretational, discoverability and an open ending.

4.1. Coding Stages

In this study, the coding was carried out in three stages, namely open, axial and selective.
Open coding included data separation and appending of the preliminary concepts to the raw data and it

featured a differential nature. Axial coding embraced the conceptual and theoretical connection between the topics and shortcutting and organizing of the subjects with respect to one another and it featured a combinatorial nature. The selective coding process encompassed the arrangement of codes based on their subjects and discovering of the axial codes and their properties and dimensions.

4.1.1. Stage One: Open Coding

Open coding stage in the present study included:

1) **Analysis and coding:** in this stage, the sampling has been performed in an extensive manner rendering it possible for the researcher to discover the concepts in an open situation. The researcher has paid attention to the coding of every interesting event. Many codes were extracted from inside the interviews' texts, explanatory questionnaires, and professors' observations. The data were revised regularly and the new codes were found out and the final codes were determined. The examples of the initially extracted codes have been summarized in the table beneath.

Table 1. Examples of Seminal Coding

Row Number	Code Explication	Exploring the Reasons
1	Increasing the self-confidence in IPSC method	• Professor's presence in the group
2	Learning issues beyond the lesson from the group work experience based on IPSC method	• The flexibility of the method • Lessening of the deliveries' stress
3	Students' interest in architecture in the IPSC method	• Method's attractiveness to the students • Lessening of the deliveries' stress
4	Students' satisfaction of the professor's spending of time for correct instruction in IPSC method	• Correct planning
5	Many informative points in the classroom for the students in the IPSC method	• Method's attractiveness for the students • The flexibility of the method
6	Advancing of the individual works as a result of performing group work in IPSC method	• Proper planning • Professor's presence in the group
7	Becoming interested in group work in IPSC method	• Method's attractiveness for the students • The flexibility of the method
8	Preferring group work to individual work in IPSC method	• Professor's presence in the group
9	Acquiring different experiences of the professor's accompaniment of the group work	• Method's attractiveness for the students • The flexibility of the method

2) **Discovery of the categories:** in this stage, the concepts are classified based on their relationship with similar subjects. The titles dedicated to the classes are more abstract than the concepts forming the whole set of the category. The titles have been substantially selected by the researcher and efforts were made to make them most conforming and consistent with their representative data. In this stage, nine primary categories were determined, including motivation, professor's feedback, knowledge transferring method, critical perspective, group work experience, creation of competition, professor's evaluation of the students' works, the difference in the professor and student's method of impression and the need for students' cooperation.

Table 2. Examples of Secondary Coding and Forming of Some of the Main Category's Subjects

Primary Categories (Subjects)	Secondary Categories (Secondary Coding)	Initial Codes
Motivation	Motivation in IPSC Method	The student has become interested in architecture.
		When criticizing the work of a group member in the classroom by the other groups, the support from the other teammates and professor as a group member was very effective.
		Increase in the motivation for work due to the professor's presence
	Suggestions for heightening motivation in the group	Individual ideas of the group members draw more attention.
		More encouragement of the superior groups.
		Proposing of questions in the groups and giving a one-week respite for finding an answer

		Lessening of the delivery stress in the IPSC method.
Professor's Feedback	Effects caused by IPSC method	Students' feeling of more cordiality with the professor
		Higher importance is given to the students' ideas which is very important to them
	Effects caused by the professor's feedback	Teacher's cheerfulness and open arms are welcomed
		Professor's cheerfulness makes the classroom environment appear untiring
		Expressing the notions by the professor explicitly in the groups has been effective in the enhancement of learning.
Method of Knowledge Transferring	Effective knowledge-transferring experiences	Experiencing scientific field trips has been very effective in enhancing learning
		The usefulness of correction with other fellow members of the group before correction with the professor
		Group interactions in the IPSC method cause an increase in the knowledge and information
	Negative experiences of knowledge transferring	The method of transferring knowledge (learning through work experience) is a little ambiguous to the students.
		The preparatory exercises are short and diverse and large in number and there is not much time for deep engagement in them.
		Students imagine that their works should be faultless when they have made all their efforts.

4.1.2. Second Stage: Axial Coding

Axial coding is the second analytical stage in researches based on grounded theory or data-based theorization method. This stage aims at establishing a relationship between the categories produced in the open coding stage. This task is based on the paradigm model and helps the theorist easily perform the theorization process.

The following figure illustrates the relationships between such concepts as a learning process, professor's feedback, content and program, evaluation method, knowledge transferring method, and motivation.
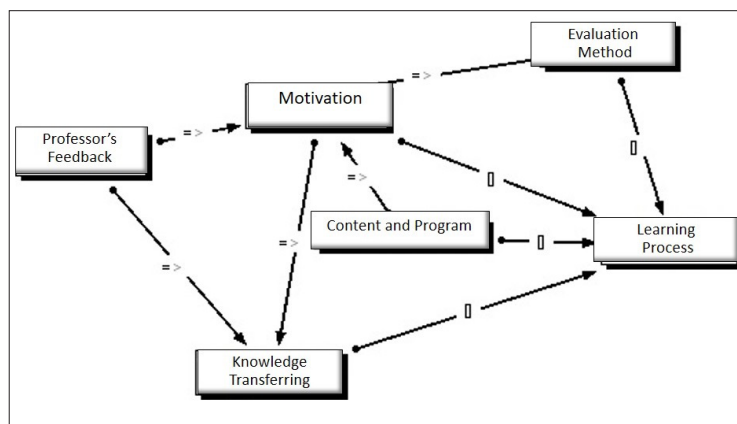

Fig. 1. Axial Coding of the Relationships between the Learning Process's Concepts

But, concepts like the creation of competition, professor's feedback, group work experience, critical attitude and method of transferring knowledge are associated with the learning environment.
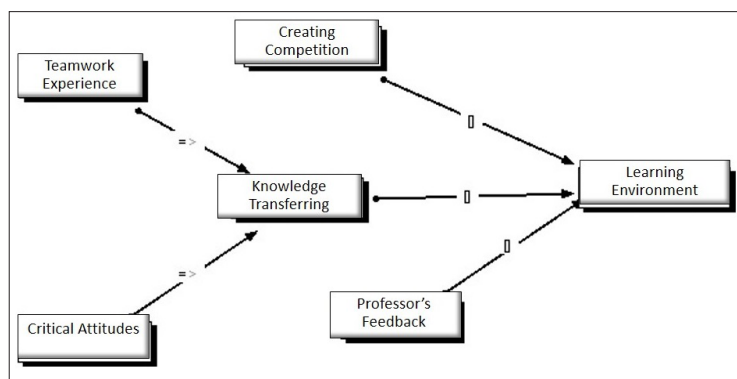

Fig. 2. Axial Coding of the Relationship between the Learning Environment's Concepts

And, the relationships between the differences in the professor's and students' impressions in groups and the need for the students' accompaniment are as displayed in the following figure:
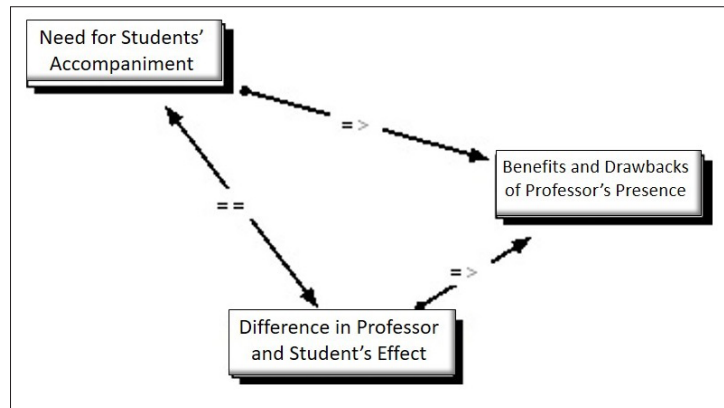

Fig. 3. Axial Coding of the Relationship between Concepts of the Professor's Presence Advantages and Disadvantages

4.1.3. Stage Three: Selective Coding

Figure (4) exhibits the final diagram in the selective coding stage and gets us to the accomplishments of the IPSC method. The necessity and advantages of the professor's presence in the groups along with scales like motivation and satisfaction are indices for achieving the IPSC's accomplishments. On the other hand, the reasons for the success of this method can be figured out in an investigation of the IPSC's strong and weak points the same way that the indicators influencing the learning process, as well, assist us in gaining a deeper insight over the success factors of IPSC. The set of the IPSC's accomplishment, the reasons of this method's success (the thing that can be recounted as the specifications of this method) and wants and theories of the students who have worked with this method give rise to some theories that enable the completion and correction of IPSC's method.
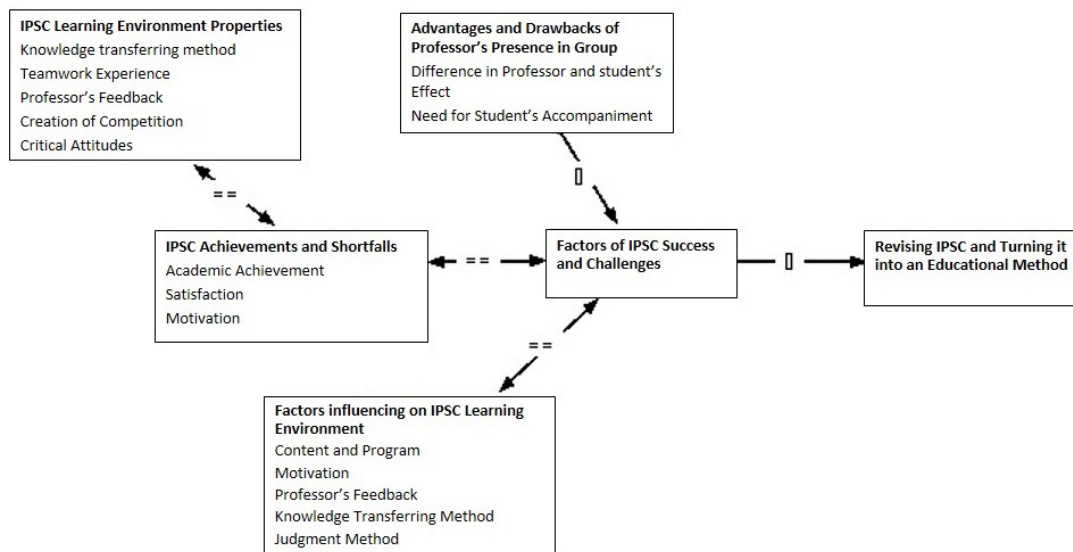

Fig. 4. Final Diagram of Selective Coding

5. STUDY FINDINGS

IPSC method has been effective in the professor's feedbacks and decision makings. This causes the professor's exertion of personal beliefs and ideas to be reduced to a minimum in the classroom. The IPSC method and effective presence of the professor in the groups have caused the students to have more amicable relationships with the professor and feel that their ideas are important to the professor and this is very important to them and it has caused them to have lower stress in performing and delivering the assigned tasks.

Table 3. The Effect of IPSC Method on Professor's Feedback

Primary Categories	Subject	Reason
• Reduction in the work delivery and performance stress in IPSC method • Students' expression of their ideas without stress • Controlling of the fear of correction	Stress reduction	IPSC method and professor's effective presence in groups
• Students' feeling of affability with the professor •Students' not becoming discouraged and their making of more efforts in IPSC method	Cordiality	IPSC method and professor's proper feedback
• More importance is given to the students' ideas for this is very important to them. • Professor's perception of the students •More influence of creating internal motivations in lieu of external rewards	Mutual understanding	IPSC method and professor's proper feedback
• The usefulness of the professor's presence in the groups and students' satisfaction thereof. • Students' encouragement to work for the group and being present in the group • Increase in the motivations for performing tasks due to the professor's presence • Since the professor is more experienced, the group more readily accepts the professor's notions as compared to students'. • Since the professor better knows what is going to happen and has information about all the dimensions and aspects, drags the discussion towards the more useful direction.	Group work	IPSC and the effective presence of the professor in the groups

But, some of the behaviors are influenced by the professor's behavioral and personal decisions that have influenced the IPSC method. The effect of the IPSC method on the professor's feedback and the role of the professor himself has been explained in details respectively in Table (3) in Table (4).

Table 4. The Effects Caused by the Professor's Feedback (The Role of the Professor Himself)

Primary Categories	Subject	Reason
• Professor's cheerfulness was welcomed. • Professor's cheerfulness caused the classroom environment to appear untiring.	Cheerfulness	Need for accompaniment
• Explicit expressing of the professor's ideas in groups have been effective in learning enhancement. • Professor's guidance has been accompanied by kindness. • Offering solutions by the professor. • Reference to the positive points even with the existence of all faults	Guidance style	Creation of self-confidence
• The positive effect of the cordial relationship between the professor and the student on the advancing of the works • The professor's affable treating of the group members causes disambiguation in getting the exercises done. • The classroom's cordial space causes an increase in learning.	Affability	The need for accompaniment
• Challenging the students by the professor causes more study and research. • Professor's criticism makes the students search for their tasks' flaws.	Fair criticism	Feeling of accompaniment

• Professor's feedback was in proportion to the student's ability.		
• The professor's feedback was so that it does not cause any change in the student but corrections in the project.	Consideration of the students' power and ability	Mutual trust
• The students were anxious at the beginning of the semester but the professor's feedback made them feel relieved.		
• The only thing that made them continue was the professor's talks that made them feel strong in heart.		

5.1. Group Work Experience

The study findings show that group work experience has been effective in the IPSC method for enhancing learning. In summary, the students' experiences of the group work in the IPSC method is expressive of the following materials:
• The usefulness of group work
• Proper management and coordination of the groups
• Students' satisfaction of the group work
• Heightening of the self-confidence and sense of duty in the students
• Effectiveness of the professor's presence in the groups
• And, the elevation of the students' motivation.

5.2. The Effect of IPSC Method on Revising the Syllabus of Introductory Architectural Designing Lesson

Since the present study's subject is the methods of instructing and teaching architecture, the discussions on content and syllabus change are out of the current research paper's scope. However, according to the importance of the curriculum and instructional materials and precision in the content-based instruction method, the effect of this method on the contents of introductory architectural designing lesson's syllabus and its consistency with the goals mentioned in the syllabus were investigated.

Regarding the goals set for an introductory architectural designing lesson in the BA syllabus of architectural engineering, IPSC pattern is in line with many of these goals and aligned with their enhancement and corroboration. The followings are but some of these cases.
• Enhancement of preliminary designing knowledge and skills
• Enhancement of the spatial manifestation and expression skills
• Corroboration of the creativity power and self-confidence
• More familiarity with the contextual and conceptual factors of architecture
• More blossoming of the students' ability for creating architectural spaces
• Understanding the architectural designing through the statement of problems and establishing a relationship

But, the specific suggestion by this method for correcting the syllabus of introductory architectural designing is that the exercises designed for these lessons should instigate group and teamwork amongst the students so that they along with their professors can become more familiar with the nature of collective work and communication establishment skills in architectural professions.

6. CONCLUSION

Summing of the study findings determines properties for the IPSC pattern that contribute to the revealing of more precise specifications thereof. These properties add six principles to the distinctive points of the IPSC pattern.

These six principles are: cordial relationship between the professor and the student; professor's influence on group activity; professor's internal guidance for group's management; fostering of creative ideas in the group; professor's influence on the learning process and creation of motivation by the professor.

6.1. Affable Relationship between the Professor and the Student

The IPSC method and professor's effective presence in the groups cause the students to feel more cordiality with the professor and feel that their ideas are important to the professor for this is very important to them and this issue has caused their stress to be decreased for performing and delivering the assigned tasks. Amongst the other cases that influence the relationship between the professor and student in the IPSC pattern is the tolerance to the opposing ideas that cause the majority of the students to welcome the others' criticisms. Furthermore, the study findings signify that the professors should treat students cordially and amicably in the IPSC pattern and be humorous in their interactions with the groups; depending on the various conditions, they should be flexible and encourage the group towards interaction and cheerfulness and dynamicity. In addition, the professors should exhibit student-oriented behaviors and pay attention to their ideas so that they can be attracted to the group works' participation and efforts should be also made parallel to encouraging the group towards collective solving of the issues.

6.2. Professor's Effect on Group Work

Since the professor has more experience, his ideas are more readily accepted in contrast to the other students'. Therefore, the professor's presence in the group as a member and his playing of a role to the same size as the students' roles would be a lot more effective than the students'. In the ISPC method, when the tasks performed by a group member is criticized by the other groups in the classroom, the support by the teammates and the professor would exert a positive effect on the students' spirits and encourages them to make more efforts and offer stronger works. Amongst the other signs of the professor's influence on the group in the IPSC pattern, the followings can be pointed out: in IPSC, all of the group members participate in the activities; the students' ideas are corrected in the group and the group succeeds in correcting the weaknesses.

Also, the study findings signify that the professor should make efforts for advancing the tasks as a group member in IPSC method; in finding the answers to the problems, the professor should work along with the other group members and contribute to the problem-solving; he should explain and explicate the problems and issues to the group; he has to pay attention to the result and output of group's theories for solving the problems and he and the entire group members have to express their own experiences about the subject.

6.3. Internal Guidance for Group's Management

The professor's method of internal guidance is, for instance, in such a way that he should guide the discussions wherever he reckons it could be effective towards a path he thinks most contributive to the group's progress. It was very important for the professor to be informed of the group's works and this was very important for the students who tended to perform their tasks with greater power to conclude when they saw that the professor is well aware of the finest things about the tasks and planning. These cases caused the creation of the group's unity and integration and helped the group impress each other via consultation. On the other hand, the professor's internal guidance caused the planning to be properly carried out and work divisions were subsequently conducted appropriately and this caused an increase in the speed with which the tasks were done. Additionally, the use of university students' ideas in the group caused the students to be satisfied with the efforts they made in the group work.

Moreover, in IPSC pattern, the professor should allow the group to be managed based on collective ideas; as for the group's conditions and criteria, the group should make a decision; the group should be flexible in scheduling the programs' implementation based on the group members' needs; it has to have new methods for completing the exercises; it has to endeavor to create a sense of team coworker and collective interaction for problem-solving; it has to pay attention to the group's needs and interests and change the arranged programs proportionately and tries to encourage the group towards collective solving of the problems.

6.4. Fostering Creative Ideas in Group

According to the study findings, all of the students answer a given problem in IPSC in group interactions that take place in the presence of the professor; but, creative answers are of great importance. In the meanwhile, the nature of the exercises, as well, is effective in creativity emergence. In some of the exercises like seminars, creativity did not matter so much but many creative works were observed in the exercises like combining the volumes. In exercises like blending volumes and surfaces, the students did their best to work differently and discarded the similar works themselves; in the final designing work, the students concluded that there is not only a single specific and predetermined solution for solving the designing problems and that they should test various ways for reaching an answer.

Moreover, the summing of the study findings indicated that the professor should encourage the group towards new answers in IPSC pattern and tolerate the incorrect answers; he also has to tolerate and motivate opposing ideas, as well; he has to pay attention to the ideas of the group members in unpredicted situations; he should encourage the group members to use more recent resources; he has to also provoke the group's inquiring members to keep on asking and exercising curiosity; he has to welcome unusual ideas and accept the novel and creative processes of the group members, as well. These properties lead to the creation of more creative ideas in the group.

6.5. Effectiveness of Professor on Learning Process

According to the study findings, the explicit expressing of the professor's ideas in the groups and his correct and timely guidance, as well as his supervision and planning, have been effective in IPSC in enhancing learning. Furthermore, the study findings demonstrated that "creation of motivation for students' study" is more effective than unilateral transferring of knowledge from the professor and that the usefulness of the diversity in the group members' ideas and expressing of the issues by the group members contribute to their deep understanding. In addition, the professor's assistance has been useful at the beginning of problem-solving stages in the groups for engaging the students with the designing issue. On the other hand, the collective criticism of the tasks has also had a direct effect on learning. The professor tries to take part in the group and allows the classroom to criticize the groups' works. The

professor's challenging of the student causes them to perform more research and study. Amongst the other useful methods of learning, students' writing of criticisms can be pointed out.

Additionally, the professor should make efforts for advancing the tasks as a group member; he should encourage the group towards newer answers and show tolerance to the incorrect answers; he has to give value to the learning process in group activities; he has to create a sense of teamwork and collective interaction for solving the problems; he has to encourage the group members to use more recent resources. These properties can lead to the professor's more influence on the learning process.

6.6. Creation of Motivation by the Professor

Professor's being informed of the group works is of great importance for university students and causes the creation of motivation in them. The students worked with more power to achieve a result upon seeing that the professor is well aware of the finest things about the works and planning. On the other hand, the classroom's friendly atmosphere and the cordial relationship between the professor and student, as well, has had a positive effect on the works' advancement and students' motivations. Amongst the other cases that have been effective in creation of motivation in IPSC pattern, the followings can be pointed out: usefulness of the diversity of group members' ideas; professor's assistance in the beginning stages of problem-solving in the group; professor's cheerfulness that causes the untiring of the classroom environment; alongside the groupwork, attentions are also paid to the individual ideas, as well. In IPSC pattern, professor should take into consideration the output of the group's theories for solving the problems; he has to create a sense of teamwork and collective interaction for solving the problems; he should tolerate and encourage opposite ideas in the group; he has to encourage the group members towards the use of more recent resources; he should ask the group members express their issues in their tongues; he should try to create novel methods by the group for getting the exercises done and, in general, he has to make efforts for elevating the students' internal motivation for participating in the group.

In a final summarization, some of the advantages of IPSC pattern can be outlined as shown below:
• The importance of inquiring the students' ideas for this is very important to them.
• Work dividing has been properly done in the group.
• Meanwhile being formal, the classroom has been exciting.
• Since the professor's ideas are more precise, this causes the tasks to conclude earlier.
• The learning process is more emphasized in the IPSC pattern than the final product.
• Since the professor is more experienced, his ideas have been more readily accepted in the group as compared to the students'.
• When the students see that the professor is well aware of the finest things about their tasks and programs, they tended to work more vigorously to conclude.

In sum, the advantages that have been obtained as a result of the professor's presence in the group are the followings:
• Meeting the students' needs of accompaniment
• Influencing the group activities

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