Constructivism in the Pedagogical Practices of the University Faculty

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Abstract

The present research is aimed at assessing the extent to which university teachers employ student-centered learning, independent learners, higher order thinking, usability in real world and a conducive learning environment. Demographic differences like gender, age, experience and position differences in teachers' usage of constructivist practices are explored. Six dimensions of the constructivist practices questionnaire are sorted through the use of exploratory factor analysis. It is identified that many teachers use the constructivist pedagogical practices at a moderate level. No significant difference is found in the use of constructivist practices of gender and experience strata, while significant difference is present in the constructivist practices of teachers in age and position strata.

Key Words

Constructivism,
Pedagogical Practices,
Constructivist

Introduction

Constructivism is a learning approach that is based on the premises that every individual constructs her/his own learning. It is a process of acquiring and processing information and giving a meaning to experience. It has both epistemological as well as psychological foundations. It has its roots in interpretivism and has been emerged as a result of general dissatisfaction with the traditional theories of learning which claim that knowledge represents truth of the real world (Glaserfield, 1995). The psychological basis of constructivism suggests that every individual has its own theory of learning and keeps on modifying it in the light of his experiences. Jean Piaget's viewpoints about learning have a profound impact on constructivism. In constructivism, knowledge is considered as ephemeral and impermanent that keeps on changing continuously according to new experiences. Individuals keep on testing and adjusting their knowledge on the basis of their experiences. Constructivism focuses on social element of knowledge and also viability of knowledge (Osborne, 1996).

Constructivism is opposite to traditional learning approach which believes that knowledge is permanent and tried and tested and has no need of modification. Shi (1998) says that survey indicates that most of the teachers use didactic (teacher-centered) pedagogical approaches. The one obvious reason is that teachers are either unaware about constructivist approaches in teaching or are not trained in these approaches therefore they are inclined more towards didactic/ one-size-fits all approaches to teaching. Didactic approaches are criticized by western educators for being passive and highly examination-oriented approaches.

Von Glasserfield (1995) claims that learning occurs when individual builds conceptual structure as a result of reflection and abstraction. The unique context of every learner is very significant

(Carr et al, 1994). The context in which the new knowledge is built has a profound impact on learning. His/her life experiences, back ground and social conditions bring diversity in his experiences which paves the way for further learning. Anderson (1992) asserts that the building of new knowledge depends upon the preconceptions which the individual brings to the educational experiences. Previous knowledge interacts with the new experience. As learners come from different contexts and have unique experiences they may, therefore, give a different meaning to the same experience in the same learning situation (Fensham et.al, 1994)

Constructivism is not an approach that provides a radical list of new strategies of teaching.

Glaserfield (1995) states that constructivism does not claim to provide earth-shaking interventions in the education. There are many practices that were existed and were in vogue previously before the theory of constructivism was founded. The only contribution made by constructivism is that it has provided a solid conceptual ground for such strategies which the teachers had to use without any theoretical foundation. Now they may use those strategies with fair amount of confidence as it has a solid conceptual support of constructivist theorists.

There are various salient features of constructivist pedagogies. In constructivist pedagogies learners construct their own meaning of realty. There is a provision of authentic learning environment that offers a concrete ground for learning. Constructivist pedagogies accommodate multiple perspectives in teaching-leaning process. It engages the learners in active learning where learners are provided with collaborative learning opportunities. Constructivism tries to satisfy the innate curiosity of the students about the world and the way things work. Students are offered with maximum opportunities to explore the world and reconstruct their experiences.

The Attributes of Constructivist Instructions

A constructivist classroom is surely a learner-centered classroom in a democratic environment where learners have maximum opportunities to build and create knowledge and meaning. They are engaged in hypothesizing, questioning, investigating, imagining and inventing. Learners continuously reflect, develop connection of new knowledge with prior knowledge and develop new understanding about the different phenomena and world.

There are certain abilities and skills which are developed among learners through constructivist pedagogies. Chief of them are self-managed learning ability, critical thinking, analytical reasoning and communication skills. According to Abdoli Sejzi (2012) learners also comprehend vital concepts, create relevance, challenge beliefs, learn actively, and become flexible in the process of teaching and learning.

Constructivist Environment

A constructivist environment is active and student-specific. It encourages social learning. As it is based on constructivist theory, learners are engaged in constructing meaning in the process of learning. The most important characteristic of a constructivist classroom is its student-centeredness (Mvududu, 2005).

They own their learning and improve it continuously in the result of their new experiences. As constructivist environment is essentially student-centered therefore it provides great deal of opportunities to learn at their own. Moreover, constructivist pedagogies lead the way for formative evaluation rather than only the summative evaluation in the form of paper and pencil tests at the end.

Descriptors of Constructivist Teacher

There are certain descriptors of constructivist teachers. They accept and appreciate self-sufficiency and risk-taking attitudes of students. They engage learners with interactive materials and use raw data and primary sources. They frame tasks for learners by such words which encourage learners to use their higher order skills such as to classify, analyze, predict and create. Such teachers control their lessons according to the responses of the learners by altering lessons and shifting strategies according to the needs of the learners. They ask about students' concept about a particular lesson before sharing their own understanding of the concept. They provide opportunities of dialogue to the learners with classmates as well as with teachers. They ask insightful questions to their learners to stimulate their instinct of enquiry and seek explanation of initial responses of the learners. They engage students in such experiences where they provoke dissonance and then invite learners for discussion. They give wait time after posing questions and create relationships among different phenomena. The constructivist teachers' learning cycle model has discovery as a first step of learning, concept introduction as a second step and concept application as a third step (Brooks and Brooks, 1993). There is one of the most critical areas in constructivist pedagogy. It is to determine the ways through which a teacher can relate her actions in a constructivist way to students' learning (Richardson, 2003).

Fox (2001) states that constructivism considers learning as an active process where knowledge is not innate or passively absorbed rather it is actively constructed. Knowledge is created not discovered. It is embedded in society. It is personal and idiosyncratic. Learning is to make sense of the world and to solve problems.

There are certain characteristics associated with constructivist pedagogy which are listed by Richardson (2003). In constructivist practices there is respect for students' background and attention is given to individual.It is student centered. It encourages group dialogue in order to develop and create a shared understanding of a specific topic. It

may have some time a planned introduction but often unplanned introduction of a body of knowledge, where direct instruction leads the students to conversation, exploration of text, referencing the text, or searching some website or any other means. Students are engaged purposefully in such type of activities were they can decide, challenge, or even improve their existing beliefs and understandings. Most important is that students can develop meta awareness of their own understandings and learning processes.

There is also a need to eliminate one misconception about constructivism. It is believed that students construct knowledge all the time through activity and reflection. There can be varied types of instruction that may lead to construction of knowledge. Students may learn through experience, intuition, listening, practice, conscious reflective thinking. When they are engaged in such activities they construct meaningful and also varied types of knowledge. Here the instructor role is very significant in creating a balance among these activities in order to meet the needs of different students at the same time (Mvududu, 2005).

Passman (2001) offers some suggestions for implementation of student-centered/ constructivist teaching strategies. The most important is to spend more and more time in learning including discussions, student-focused inquiries by employing integrated curriculum approach, reading authentic literature related to a particular problem, learning in-depth the content that is already mastered, active learning that may be noisy at times, focusing on heterogeneous grouping and inclusion groups and lastly portfolio assessment which is developmentally appropriate. John Marlon Heard has offered examples of constructivist pedagogies which were used in an educator preparatory program and the training he himself had received. He states that when a teacher uses constructivist pedagogies he uses dynamic and open-ended questions, encourages questions, use primary sources, allows time after posing a question, and encourages students to have a dialogue. More over the teacher educators can employ constructivist strategies in lesson development also. He also asserts that inclusion of constructivist strategies' is not merely enough. It is only the one step. One should be open to these ideas and may modify them on continuous basis during the lesson. He states that there is a great need to train teachers to look for the opportunities which they may use with students.

Jong Suk Kim (2005) states that there is a growing need to start educational reforms by focusing on how teachers teach and how student learn rather than what teachers teach and what students learn. The hallmark of constructivist teaching is that it focuses construction of understanding in teaching-learning process. There is a long debate about advantages and disadvantages of constructivist paradigm. There are various strata in the general public which still value traditional teaching in relation to students' academic achievement.

Some of the parents and teachers are of the view that as there is highly competitive college entrance examination system therefor the constructivist strategies cannot be implemented. Moreover, our teachers are not trained to teach through constructivist strategies. There is need to train them in these strategies if we want to implement them fully. Our education system prepares the students for competition and they are evaluated in terms of who performs better than others. If we want to implement constructivist pedagogies, we have to bring a complete paradigm shift from teacher-centered to student-centered, competition to cooperation, absorption of facts to creation of knowledge, objective understanding to subjective meaning creation, and product to process.

Kim (2002) states that there is a culture of competition in most classrooms which structurally discourages cooperation and mutual sharing of ideas. Such system requires students to work in isolation rather than in cooperation, and low-level thinking is promoted than higher-order thinking. Moreover, he asserts that in our education systems students are discouraged to use their independent thinking and teachers seek to get the right answer from the students. Teachers do not enable the students to think through intricate issues but go for readily available answers mostly found in books. Learning process generally revolves around the phenomenon that the world is a fixed world and there is a need for students to understand this notion. Mastery is valued more as compared to construction of new knowledge

Glasersfeld (1989) has made a distinction between traditional teaching and constructivist teaching. He says that there is a major difference in the epistemological base of both types of teaching. Traditional epistemology considers knowledge as an objective phenomenon, whereas constructivist epistemology regards knowledge as purely subjective, which is based on individual's understanding of the world and the meaning he attaches to the phenomenon. In this way, it can be said that it is more important to explore how to create knowledge instead of what to know

John Dewey one of the most significant proponents of constructivist paradigm and pragmatic philosopher asserts that education is a process of restructuring the individual experience (Dewey, 1916). When an individual expands his present experience and reflectively thinks about that experience, he creates knowledge and that

knowledge is unique to that particular individual. in this way knowledge is not what that is offered by others (teachers) rather it is something that is personal and related to individual's own experience. Here individual's constant interaction with the environment stimulates his continuous development and helps in creating a meaningful knowledge.

Objectives of the Study

The research objectives of the study were
1. To explore the extent constructivist pedagogical practices are used by faculty members at university level.
2. To compare constructivist pedagogical practices used by male and female faculty members at university level.
3. To compare constructivist pedagogical practices used by teachers of different age groups.
4. To compare constructivist pedagogical practices used by teachers of different levels of experience.
5. To compare the constructivist practices used by teachers of different positions at university level.

Hypotheses of the Study

The hypotheses of the study were:
1. Frequency of using the constructivist pedagogical practices is high in the university faculty.
2. There is no significant difference in the constructivist pedagogical practices of male and female university teachers.
3. There is no significant difference in the constructivist pedagogical practices of different age groups of university teachers.
4. There is no significant difference in the constructivist pedagogical practices of university teachers on the basis of their job experience.
5. There is no significant difference in the constructivist pedagogical practices of university teachers on the basis of their positions.

Conceptual Framework

Literature provides the evidences that there are different constructivist pedagogical practices which facilitate the construction of knowledge among students and thus promote active participation of students in the classroom.

The present study covered the six dimensions of constructivist pedagogical practices which are hallmarks of constructivism. These are use of innovative methods, student-centered learning, independent learners, higher order thinking, usability in real world and conducive learning environment.
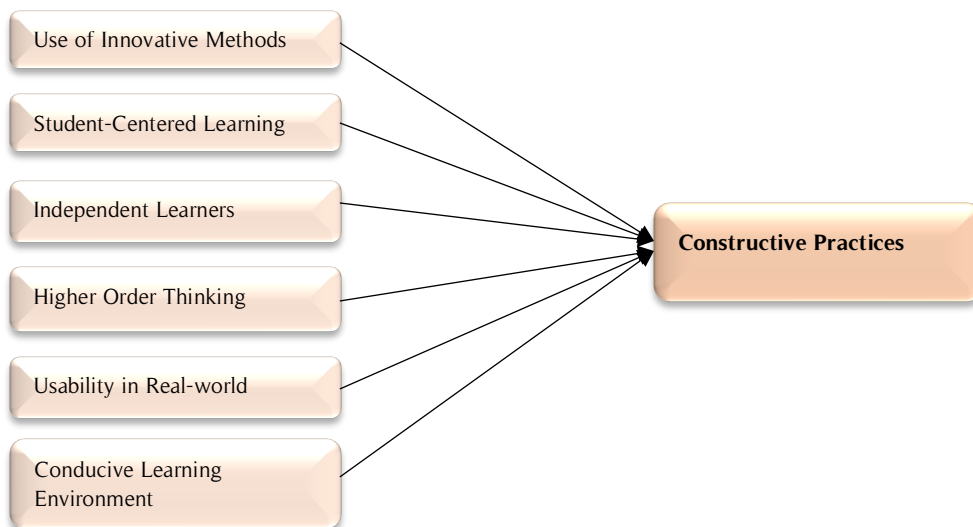

Figure 1. Dimensions of Constructive Practices used by Teachers

Methodology

The present research study was conducted in two phases. In the first phase the instrument was developed. For this purpose 320 university teachers were selected. Exploratory factor analysis was run to identify the component factors. Total 23 questions were extracted with six factors.

In second phase the questionnaire was distributed to the university teachers for assessing the constructive practices among university faculty. Two public sector universities were selected from the Islamabad. Total 351 teachers were selected through convenience sampling technique.

Data Analysis

Different statistical techniques like factor analysis, mean, standard deviation, t-test and one-way ANOVA were applied for the achievement of objectives and hypotheses testing of the study.

Table. 1 Exploratory Factor Analysis of Constructivist Pedagogical Practices Questionnaire (CPPQ)

Items	Statements	Factor Loading
Factor 1	**Use of innovative methods**	
22	I use problem solving method of teaching	.907
21	I use role play method of teaching	.837
23	I use research/project method of teaching	.807
20	I use simulation method of teaching	.767
Factor 2	**Student-Centered Learning**	
2	I consider personality types of students during my teaching	.917
1	I consider individual differences among students during my teaching.	.902
4	I consider social/cultural/ethnic backgrounds of students during my teaching.	.867
3	I consider learning style differences during my teaching.	.807
Factor 3	**Independent Learners**	
14	My Students set objectives	.810
13	My Students set their own pace of learning	.783
15	My Students work independently	.743
12	My Students have vision	.653
Factor 4	**Higher Order Thinking**	
16	My Students' reflective abilities are good.	.751
17	Students have hypothetical deductive reasoning	.729
10	Students accept novel situation and actively participate in it.	.657
7	Learning is an interchange between individual and environment.	.429
	I want students to take risks	
Factor 5	**Usability in Real-world**	
9	Students in my class are creative.	.682
5	Students learning of skill is more important than results of students.	.657
8	I relate teaching content with real world problems and their solutions	.655
11	Content is useful for students in practical life.	.567
Factor 6	**Conducive Learning Environment**	
6	For me learning process is more important that outcomes	.794
18	I provide opportunity to students to think creatively.	.570
19	I provide opportunity to students to think critically.	.563
	Extraction Method: Principal Component Analysis.	
	Rotation Method: Varimax with Kaiser Normalization.[a]	

An exploratory factor analysis was run and a rotated factor matrix was used to identify the simple structure of the constructs. The analysis sorted the 23 questions under six factors. Four items were sorted under each of factor one, factor two, factor three and factor four while three items were sorted under each of factor five and factor six. Item

loading less than |.40| has been excluded because loading |.40|and greater than that is considered as high. Six factors identified are use of innovative methods, student-centered learning, independent learners, higher order thinking, usability in real world and conducive learning environment.

Table. 2 Brief description of eigenvalue, % of variance and cumulative %

	Component					
	Factor 1	Factor 2	Factor 3	Factor4	Factor 5	Factor 6
	Use of innovative methods	Student-Centered Learning	Independent learners	Higher Order Thinking	Usability in Real-world	Conducive Learning Environment
Eigenvalue	4.575	3.274	2.584	2.350	1.422	1.356
% of Variance	19.062	13.642	10.766	9.793	5.926	5.651
Cumulative %	19.062	32.704	43.470	53.263	59.189	64.840
Cronbach Alpha Reliability	.864	.901	.759	.656	.647	.570

A principal component matrix with varimax rotation was run and a cluster of six variables were sorted about the constructivist practices. Total variance explained by first factor is 19.062 % while cumulative of all factors are 64.840 %. Initial Eigenvalues is higher than 1.0 in all the six components.

Table. 3 Descriptive Statistics of Constructivist Pedagogical Practices used by University Teachers

Dimensions of Constructive Practices	Mean	Std. Deviation
Use of innovative methods	2.95	.758
Student-Centered Learning	4.69	1.565
Independent learners	3.34	.679
Higher Order Thinking	3.90	.518
Usability in Real-world	4.18	.423
Conducive Learning Environment	3.82	.589
Constructivist Pedagogical Practices Questionnaire	3.81	.430

Results reveal that teachers use innovative methods of teaching like simulation, role-play, problem solving and project method less (mean value 2.95). However, teachers focus more on student-centered learning. They engage their students in such activities which make them independent learner, enhance their higher- order thinking skills

and provide conducive learning environment at moderately high level. The mean value of usability in the real-world shows that teachers relate the content with the real-world problems and provide such content to the learner which may be useful in the practical life. The constructivist pedagogical practices are found to be used at moderately high level but not at very high level by the university faculty members.

Table.4 Constructivist Pedagogical Practices Employed by Male and Female Teaching Faculty

Variable	Gender	N	mean	df	t	Sig.
Constructivist	Male	139	3.82	349	.368	.713
Pedagogical Practices	Female	212	3.80			

Results indicate that there is no significant difference in the practices of male and female teaching faculty of universities. As, mean value indicates that both males and females teaching faculty is using the constructive practices moderately high.

Table. 5 Comparison of Constructivist Pedagogical Practices of Teaching Faculty on the Basis of Age (Years)

Variable	Age	N	Mean	F	Sig.
Constructive	21-30	59	3.7310	4.14	.007
Practices	31-40	246	3.8648		
	41-50	32	3.6386		
	51-65	14	3.6894		

Results of one-way ANOVA indicate that there is a significant difference in the mean score of using constructivist practices of faculty members of different ages. Results also show that faculty with the age group of 31-40 use constructivist practices most as compared to other age groups.

Table 6. Post Hoc Test

Age(I)	age(J)	Mean Difference (I-J)	Sig.
21-30	31-40	-.13377	.133
	41-50	.09244	.755
	51-65	.04158	.988
31-40	21-30	.13377	.133
	41-50	.22621*	.025
	51-65	.17535	.437
41-50	21-30	-.09244	.755
	31-40	-.22621*	.025
	51-65	-.05085	.982
51-65	21-30	-.04158	.988
	31-40	-.17535	.437
	41-50	.05085	.982

The mean difference is significant at the 0.05 level.
Results indicate faculty with the age group ranging from 21-30 and 51-65 has no significant difference in the constructive practices with respect to the other age groups. However, faculty members of 31-40 years are found significantly different with reference to extent of using constructivist practices as compared to the faculty members of 41-50 years of age.

Table 7. Comparison of Constructive Practices of University Teachers on the Basis of their Experience in Teaching

Variable	Experience	N	Mean	F	Sig.
Constructive	1-5	69	3.8343	2.051	.08
Practices	6-10	140	3.8050		
	11-15	114	3.7670		
	16-20	14	4.0807		
	21+	14	3.9379		

Results revealed that experience of teachers does not make any difference in the constructive practices of university teachers.

Table. 8 Comparison of teachers' constructive practices due to their positions

Variable	Position	N	Mean	F	Sig
Constructive	lecturer	226	3.7961	4.610	.01
Practice	Assistant Professor	117	3.8201		
	Associate Professor	8	4.2609		
	Professor	0	0		

Results show that significant difference was found in constructive practices of university teachers. The mean value shows that associate professors were using the constructive practices.

Post Hoc Tests

Position(I)	Position (J)	Mean difference(I-J)	Sig.
Lecturer	Assistant professor	-.02407	.873
	Associate professor	-.46479*	.007
Assistant professor	Lecturer	.02407	.873
	Associate professor	-.44073*	.014
Associate professor	Lecturer	.46479*	.007
	Assistant professor	.44073*	.014

The mean difference is significant at the 0.05 level.
Results show that lecturers were found significantly different in the use of constructivist practices as compared to the associate professors. Difference was also found in the assistant professor and associate professors. Associate professors used constructivist practices most as compared to faculty members of other positions.

Discussion and Conclusions

The present research was carried out to assess the extent to which university faculty members are engaged in constructivist pedagogical practices. For this purpose, the researchers developed the scale of Constructivist Pedagogical Practices Questionnaire (CPPQ). Six aspects of constructivism were sorted through exploratory factor analysis. These were use of innovative methods, student-centered learning, independent learners, higher- order thinking, usability of content in real world and conducive learning environment.

The questionnaire was distributed in the teaching faculty of the universities. Three hundred and fifty-one faculty members filled the questionnaire. The use of Constructivist pedagogical practices in all aspects was found at moderately high level except the usability of content in real-world situations which was at highest level among the university faculty members. Male and females both used constructivist practices at moderately high level without any significant difference. Difference of teaching experience did not cause any significant change in the use of constructivist practices but there was found significant differences in the use of constructivist pedagogical practices among teachers of different ages and of different positions.

Recommendations

1. Use of innovative methods may enhance the level of use of constructivist practices among teachers so students may get benefit.
2. Student-centered learning may be introduced by the teachers for the promotion of the constructivist approach.
3. Teachers may make their students independent learners so they can set their objectives and set their own pace of learning.
4. Higher order thinking skills may be enhanced by engaging the learners in hypothetical deductive reasoning, reflective skills and teaching them to deal with the novel situation.
5. The teachers must provide such real-world related content to their learners. It will help them to reflect upon real world problems and solve them. This may be done through reducing gaps between theory and practice
6. Teachers may create conducive learning environment for the students for promoting the learning culture.

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