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Research Article

Does Satisfaction with Teaching Quality Factors Bring Conceptual Change?

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Abstract: The purpose of this study is to explore classroom teaching quality factors that determine the satisfaction level and ultimately bring conceptual change among students. This study tests the theories of customer satisfaction in educational psychology research on a sample of 972 respondents. Overwhelmingly the results point out that male students were highly dissatisfied and have little impact on conceptual change whereas female students were reported significant level of satisfaction and conceptual change. In conclusion, detailed empirical analyses promote the theory of learning-satisfaction with classroom teaching bring conceptual change.

Keywords: Conceptual change, students' satisfaction, teaching quality factors

INTRODUCTION

Now day's education has become essential because "... global wealth is concentrated less and less in factories and the land and more and more in knowledge and skills". In developed countries, most of the colleges are meeting these challenges by enhancing their skills and engaging to potential students. In addition to this, colleges have become a part of markets because they are the sources of entrepreneurial activities. All these factors have transformed colleges into organizations where students are trained to meet future challenges. But, to meet the future challenges there is need to bring conceptual change among them along with satisfaction.

Satisfaction ratings of students go mainly on teaching quality factors, which have a narrow focus, to include broader aspects of the student learning experience throughout their lives (Lewis and Kattmann, 2004). To take hold the complexity of that teaching quality, it is not enough to understand the degree to which students are satisfied but, to know the sub-factors of teaching quality that contribute to his/her satisfaction. So, it is important to study factors of teaching which not only motivate students but also make them satisfy to bring conceptual change.

Once I asked my senior colleagues in college, how can I improve my teaching quality? Many seniors have different factors at their disposal but more particularly standardized teaching evaluations methods. These evaluations are used by Principals Federal Directorate of Education (FDE) for promotion decisions and for course selection decisions. More often, evaluations are useful and are essential for teachers to improve their teaching quality (Mortimer and Scott, 2003). However, some (less numbers) feel alternative methods could provide other alternative information beyond basic descriptive standard methods. Therefore, the main objective of this study is to highlight some primary issues that teachers could inculcate to enhance their teaching quality and bring conceptual change in students. The current procedure begins with a simple survey to obtain specific information on satisfaction with teaching quality factors and conceptual change among students. The researcher wants to determine a relative impact of variety of teaching quality factors on both satisfactions and conceptual change. The strength of these relationships provides guidelines on what teaching factors need improvement and what teaching factors are less significant. Hence, this study relies on existing educational psychology approaches to describe and measure teaching quality factors. According to constructivist approaches, a key class learning outcomes are achievement of long lasting conceptual change in students (Tom, 2011). Because students come to class with everyday new conceptions and models that they are expected to acquire (Lewis and Kattmann, 2004). Teachers need to explore their students' existing learning process and use various techniques to build new understandings that students find understandable, plausible and useful (Posner *et al*., 1982; Treagust and Duit, 2008). Classroom communication has a key role in quality teaching, as it is by entering into dialogic interaction with students that class teachers can understand their already existing concepts and attempt to move them towards scientific understandings (Tom, 2011). As Treagust and Duit (2008) pointed out, class teachers do not necessarily perceive the need to work with students' conceptions, as they hold views of teaching and learning that are predominantly transmissible and not constructivist (p. 321). Therefore, Bassel (2011) clearly reported that the role of dialogues and face to face communication must be given due

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attention: not only in classroom discussion, but in teacher discussion about classroom communication. The current study aims for educational development and reconstruction of system are demonstrated in recent recollections of teaching quality factors and experiences in post-conflict societies. Hence, Smith *et al*. (2003) demonstrated the three levels for long term learning in classroom: intrapersonal measures, pedagogical and professional development. Teachers' own personal values, experiences and workplace culture during transitional process can significantly support the facilitation of democratic and participative learning in classrooms.

LITERATURE REVIEW

Conceptual change: A theoretical viewpoint: According to Treagust and Duit (2008), conceptual changes as per epistemological views claim that the students have to construct new knowledge for themselves (throughout their lives). Therefore, the students are seen as active participants in the learning process, as ultimately, it is they who must construct new understandings based on various measures adopted by teacher in classroom. As Lewis and Kattmann (2004) pointed out, in order to move towards conceptual understanding of scientific knowledge, students will have to see alternative aspect their old models. However, these alternative frameworks and models are not seen to be barrier to learning process, as Lewis and Kattmann further pointed out that they are "an essential starting point from which scientific understanding can be developed". Hence, it is the duty of class teacher to use various measures leading conceptual change with the satisfaction of students.

According to Tom (2011), students to accept understandings of new subject lecture, the new conceptions need to develop under certain prevailing conditions. Students are more likely to accept new conceptions if they are dissatisfied with the old ones and or find the new ones intelligible as they make sense to offer solutions to other alternative problems. Treagust and Duit (2008) pointed out that conceptual change involves satisfaction with alternative or change models. Conceptual change may involve taking on a new models orientation, in effect changing beliefs of students about the fundamental nature of reality through quality teaching. In terms of the alternative dimensions, Pintrich *et al*. (1993) pointed out the need to go deeper with rational approaches to conceptual change, taking into account motivational factors such as students and teachers' beliefs about themselves and their interactions in classroom. Treagust and Duit (2008) argued that conceptual change research needs to combine teaching quality factors in a 'multidimensional' perspective. Such a multidimensional perspective, as it takes into account direct and indirect mutual interactions as the classroom communicative climate. It broadens the view of what can be investigated in conceptual change research, opening up new research questions and areas of investigation (Tom, 2011). Mercer and Littleton (2007) makes another point that, despite their extensive use of written and oral communication, conceptual change researchers such as Treagust and Duit "maintain a conception of conceptual change which does not recognize the dynamic motor of dialogue". Mercer (2000) highlighted the more important role of 'direct communication with teacher' in understandings of natural phenomena from more everyday life to more scientific one. He further emphases that it is not enough to present an example of Socratic dialogue interview of students' discourse as evidence of shifts in their conceptual understandings, but that it is necessary to show the role of both teacher and student in the joint construction of new knowledge, or 'thinking together'. Mortimer and Scott (2003) provided a framework (teaching quality factors) which allows teachers to better understand and plan for meeting their goals (satisfaction and conceptual change). Their framework contains five related domains that need to be taken into consideration while planning for and analyzing classroom teaching quality. These domains are teaching objectives, course content and communication approach, patterns of assignments and study materials and teacher interventions. These are classified into three groups, according to focus, approach and action. At the level of focus group, the opening up an issue in a way that engages students, probing their views on the topic, introducing the scientific version of the phenomenon and getting students to work with and apply the new scientific concepts. In terms of his approach, Mortimer and Scott (2003) describe the different ways in which the content and teaching purposes are realized in classroom communication. They describe two axes along which communication between teachers and students can vary: interactive/non-interactive and dialogic/authoritative. The interactive/non-interactive dimension refers to participation of student in communication. In interactive communication, more than one person contributes something, but in non-interactive communication one person (teacher or student) dominates the class. In dialogic communication, different points of view are encouraged and accepted, while in authoritative communication, only the 'teacher' point of view is heard. As Mortimer and Scott pointed out, none of these domains of classroom communication is significantly better or worse than the others. All have their time and purposes and can be used productively together to build teaching sequences to achieve the desired objective. In order to provide detailed of social action, discursive measures are drawn on the analytic resources of conversation analysis based on preference or non-preference in class social environment (Sidnell, 2010). This is seen in the fact that preference or non-preference options are signaled by interactional phenomena, such as

hesitations, pauses or the use of discourse markers to delay dis-preferred particular pair or group. The concept is used as flexible tool to provide a more refine-grained account of classroom communication from the students' perspective. As it has been indicated earlier, our study deals with the Quality of Teaching at intermediate level to determine specific satisfaction level of the students. So the survey of literature has remained focused more on the teaching quality of studies that have relevance to our kind of investigation.

Theoretical perspectives on teaching quality factors: In this research, researchers have identified target students and their needs. Stafford (1996) argued that the importance of teaching quality improvement at all levels, students may be considered as customers of Educational Institutions (EI). Therefore, it is important for EI to focus on the first of these target customers and the quality of what students expect from their EI.

Zahid *et al*. (2000) undertook an extensive qualitative study of performance of EI in Bangladesh and identified some variables particularly the course system, quality of teaching (lecture delivery) and measures (assignment, tests and materials) in class as the factors of satisfaction. Majid *et al*. (2000) at one study in EI found the similar factors and identified teaching quality, teaching learning methodology and teaching aids as the basic satisfaction factors of students. Ahmed *et al*. (2000) found that skill-based curriculum and teaching quality are major satisfactions factors for the students. Thornton (2006) studied the performance of EI in Bangladesh and identified that teaching quality is the most important factor in judging overall satisfaction. Zahid *et al*. (2011) reported for academic institutions to improve their performance, satisfaction of students can be measured by their expectations. Students will be satisfied by some of the key factors, such as quality management, quality of teaching and the number of full-time faculty. Kotler and Clarke (1987) documented that a person is said to be in a state of satisfaction when he experiences performance or outcome in accordance with his expectation. Satisfaction acts as a function of relative level of expectations and expected outcome. Even before entering the higher education, the expectation of a student may go far, indicating that it is extremely critical for the researchers to establish first; what are the student's expectations before entering the university. In another contrary study, Carey *et al*. (2002) concluded that satisfaction deals with the student's experience and perceptions during interaction with teacher in classroom. Researcher, Hartman and Schmidt (1995) found significant effects on satisfaction on the perceptions of institutional performance in providing an intellectual environment, which included the teaching ability of faculty, intellectual capacity of the student body, interaction between faculty and students and interaction between teachers and students. Additionally, they found a significant effect for perceptions of career skills developed as an outcome of the educational process. The assessment of career skills as an outcome included perceptions of having an advantage over students from other colleges in obtaining the first job, feeling well-prepared for the current position and developing analytical skills. Recently, Price *et al*. (2003) focused on examining the influence of facilities on undergraduate student choice of university. They conducted a survey targeting number of educational institutions for the period of two years in order to investigate the student's reasons for choosing a particular university. They concluded similar average results for both years-the top eight reasons included: quality of library facility, good teaching reputation, having right courses, availability of quiet areas, quality of public transport in the city/town, availability of computers, friendly attitude towards students and availability of areas for self study. Furthermore, they also added that the students' perceptions of a university's facilities are one of the major impacts on their decision. Coles (2002) recorded that student satisfaction decreases with larger class sizes in earlier cohorts and when students are enrolled in compulsory core modules rather than optional modules. In another study, Sohail and Shaikh (2004) conducted a survey with 310 all male Saudi Arabian students from the King Fahd University of Petroleum and Minerals. They determined that "contact personnel" was the most significant influential force in student's assessment of service quality. In addition, appearance of buildings and grounds, the overall cleanliness layout, classrooms, physical environment and lighting are also the considerable factors contributing towards students' concepts of service quality. Banwet and Datta (2003) did a survey of 168 students who attended four lectures delivered by the same lecturer, importance and post visit intentions and covering perceived service quality. They documented that students were more concerned and attentive to the outcome of lecture (i.e., teacher's feedback on assessed work, depth and coverage of the lecture, knowledge and skills gained, availability of class notes and reading material) than any other factor. Furthermore, they also recorded that the satisfied students are most likely to be in another lecture delivered by him/her or enroll for another course taught by him/her. These findings are in line with the results of Schneider and Bowen (1995). They concluded that the overall quality of the service perception was considerably influenced by the quality of the core service. For universities the lecture is still the core service delivery method. Banwet and Datta (2003) reported that it was the perception of quality and the satisfaction of student from attending the previous lecture which forced him to re-attend or recommend the lecture. These findings were supported by the study of

Hill *et al*. (2003) who targeted that what quality education meant to student by using focus groups. The most important theme was the feedback to students during the session and on assignments, the quality of the lecturer including classroom delivery and the relationship with students in the classroom. The explicit service includes the consistency of teaching quality irrespective of personnel, ease of making appointments with staff teaching ability, the level of difficulty of the subject content and the workload and the knowledge levels of staff. While, the implicit service include respect for feelings and opinions, concern shown if the student has a problem, including friendliness and approachability, availability of staff, the treatment of students by staff and capability and competence of staff. Furthermore, it also includes, the sense of competence, confidence and professionalism conveyed by the ambience in lectures and tutorials, feeling that the student's best interest is being served and a feeling that rewards are consistent with the effort put into coursework/examinations, the ability of the university's environment to make the student feel comfortable. The entire over mentioned factors relies on students' perceptions of the various parts of the service and the data is usually collected via some form of feedback questionnaire (Rowley, 2003). A research study conducted by Broder and Dorfman (1994) focused on what is important to students in determining the teaching quality. They documented that the teacher and course outlines (syllabus) such as the amount of new, useful and relevant knowledge gained and proper evaluation system stimulate thinking and maintain interest and knowledge of the subject were the most important factors to students. Moreover, they also reported that "student's gives preference to course's contribution to their human capital and future earnings capacity" (p. 246). Like Broder and Dorfman (1994) and Lawrence and Ken (2008) introduced autocratic approaches and argued that teachers must be fully informed as to what their duties and responsibilities are. This can be done through well-defined and comprehensive job descriptions/job specifications and it's linked with financial and non-financial rewards. They must be made fully aware of these that they are to be evaluated on the basis of how well they perform these duties and responsibilities.

In nutshell, they proposed that departments should give special attention to the interpersonal skills of potential faculty so that they convey to students the significance of existing courses. Romer (1995) advocated three dimensions grabbed through review of research and Focus Group Discussion (FGD), as to what contributes to quality in undergraduate instructions. On the basis of educational, business and political leaders the answer revolved around two themes i.e., organizational/institutional attributes and desirable student performance (outcome). He further added that student outcome constituting of a well-developed sense of professionalism, enthusiasm for continuous learning, a strong sense of responsibility for personal and community action, higher-order, interpersonal skills, ability to bridge cultural and linguistic barriers, applied problem-solving abilities and including communication and collaboration provides solid base for institutional/organizational quality. On the other hand, institutional attributes guarantee that the conditions for quality in management practices, student-centeredness, efficiency and integrity of operation and commitment to specific "good practices" in instruction.

In light of comprehensive literature review the researcher is in position to simplify the task of comparing specific number of variables of teaching quality factors that contribute conceptual change, they were grouped into eight factors or dimensions:

- Classroom communication
- Knowledge of subject
- Class discipline
- Study material
- Assignment
- Class test
- Teacher's punctuality
- Student teacher relationship

Conceptual framework: This study aims at identifying the factors that affect satisfaction with teaching quality of student at the capital tertiary level in Pakistan. In order to conduct the study successfully, five independent variables related to classroom teaching quality have been selected. The independent factors used in the study are:

- Satisfaction with classroom communication
- Satisfaction with study materials, assignments and tests
- Satisfaction with punctuality of teacher
- Satisfaction with class discipline
- Satisfaction with class learning and participating environment
- Conceptual change in learning

Teaching at capital tertiary level has to be really unique, innovative and real-time because of large number of facilities and good salary structure of teaching staff. That's why quality of teaching and availability of teachers are very important factors in providing quality services. If teaching quality is not up to the mark, the students will be highly dissatisfied with the institution irrespective of other facilities and hence it will create bad reputation for the IMCI. On the other hand, student service quality largely depends on the students' academic development by teachers. Even if the student teacher ratio is good and physical facilities are available but performance of the teachers are not satisfactory, quality teaching service cannot be ensured at school and college level.

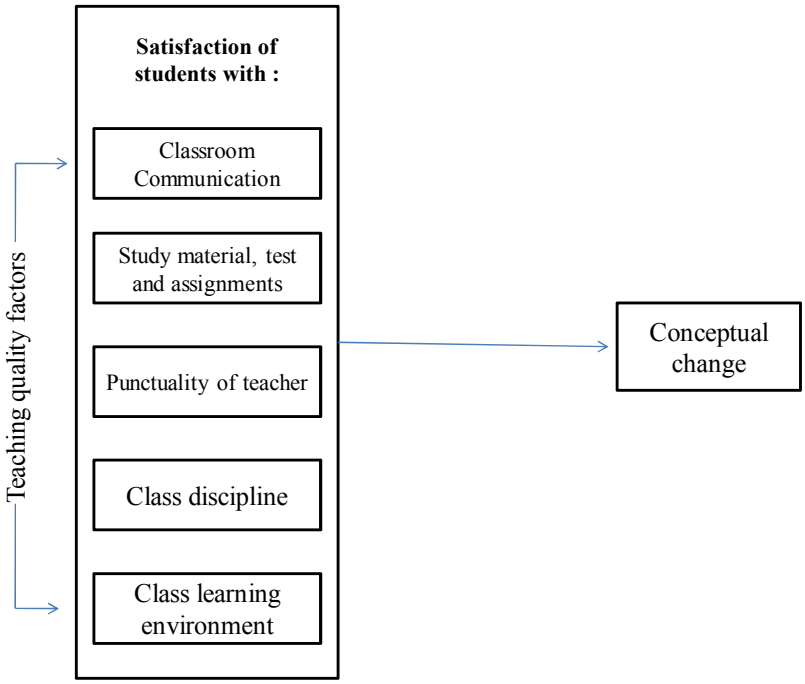

Fig. 1: Conceptual model (author research)

The following Fig. 1 represents the model for satisfaction with teaching quality factors of students' service at capital tertiary level.

METHODOLOGY

A quantitative research design is used in the current study using questionnaire based survey. According to Scheuren (2004) survey is a method to use information from the sample (p. 9). Survey research is conducted to collect from a set of individuals on some set of organizationally relevant constructs (Bartlett, 2005). Furthermore the phenomenon used in the present study cannot directly be observed and required a survey. Thus, Gall *et al*. (2007) are of the view that survey is the best approach to collect information from large number of population at one time. Terre Blanche *et al*. (2006) are of the view that results derived from quantitative study show more generalizability.

A self-administered questionnaire was used to assess satisfaction with teaching quality factors. It was designed based on the criteria affecting satisfaction as identified by Othman.

The questionnaire consisted of 3 parts:

Part 1: Socio-demographic characteristics (4 items)
Part 2: Information on overall teaching quality-open ended question (1 item)
Part 3: Information on satisfaction in the following domains:

Students-satisfaction with class classroom communication (3 items)
Satisfaction with study materials, assignment and tests (6 items)
Satisfaction with punctuality of teacher (3 items)
Satisfaction with class discipline (2 items)
Satisfaction with class learning and participating environment (6 items)
Conceptual change among students (6 items)

The questionnaire was drafted in the Urdu language. A 4-point Likert response scale was used ranging from 1 (very dissatisfied) to 4 (very satisfied). Mixtures of negative and positive statements were set to ensure that there is no standard format for answering. Therefore, students are told to read each question carefully before responding. All part of questionnaire was validated and pretested prior to data collection. The questionnaires were administered in a classroom and more often in library with proper guidance. For the analysis of individual satisfaction items, the scores were reversed for items that were negatively worded-that is, from 1 (very dissatisfied) to 4 (very satisfied)-and the score maintained for items that were positively worded. An example of a statement that was positively worded is, "My teacher give reasonable and constructive assignment." If the student circled number "4 = very satisfied," this means that the student was highly satisfied (score = 4). The mean score for each item ranged from 1 to 4. Satisfaction increases as the value increases.

A score of 2.20 indicates a 50% cut-off score point on student satisfaction. However, the author had set a

higher standard of acceptability, with a 60% (score 2.8) cut-off point for teaching quality factors. Therefore, if the respondent's average score for an item falls below 2.64, the item would be considered as unacceptable. The data were coded and keyed into the Statistical Package for the Social Sciences (SPSS) version 17.0.

Mean score differences were further analyzed using independent *t* test by comparing scores across 2 categories of an independent variable as in gender. For all results that were statistically significant, the post hoc multiple comparison test-Tukey's Honestly Significant Difference test-was applied to identify differences within the two groups. The level of statistical significance accepted was set at a level of 0.05.

Sampling: When a study has to be conducted on a population then there may be thousands of individual elements in that population. In that case, a sample from the population is taken which should be the true representative of the whole population. For the current study multi stage sampling was employed to choose the sample. At first stage 5 male and 4 female college of Islamabad were selected. The main reason to choose the colleges of Islamabad was its multi ethnic population. On the second stage 1200 students were selected on the basis of simple random sampling technique. Out of total, 1000 responded back. On the final evaluation 28 questionnaires were found to be incomplete and were excluded from the study rest 972 questionnaires were considered for the study (effective response rate = 81%).

DATA ANALYSIS

Reliability and validity Tests: Reliability test (Appendix A) represents the scale values after applying the reliability test by using SPSS software for Cronbach Alpha. The following results revealed that the reliability of all the variables used in the study is in between 0.75 to 0.92 which shows that the statistical data used in the present study is significant because all the values of alpha are greater than standard value 0.70.

The conceptual model was further assessed through construct reliability and validity. Construct reliability is calculated as: (square of the sum of the factor loadings) ÷ {(square of the sum of factor loadings) + (sum of error variances)}. The interpretation of these actual factor loadings coefficients is similar to that of cronach's alpha. From Appendix A, construct reliability for all factors in the measurement model exceeded 0.70, which Nunnally and Bernstin (1994) suggested as an acceptable threshold. Bagozzi and Yi (1988) pointed out clearly that a factor loading exceeding 0.70 as a support of convergent validity. From Appendix A, the factor loadings for all measures exceed the minimum recommended level of 0.70, indicating acceptable item convergence on the intended constructs. Furthermore, from Appendix A, correlation between 6 domains constructs ranged from 0.22 to 0.78, with the correlations of no domain of measures exceeding the criterion (0.90 and above) (Hair *et al*., 1995). This is an empirical evidence for the discriminant validity of all five measures.

Empirical results: From the 1200 participants sampled, 972 met the criteria for this empirical study. There was a significant preponderance of male participants (97%) in the sample because researcher administers the questionnaire personally and that of female participants (65%) were not so significant.

Appendix A (1st Factor) indicates 3 items for each of male and female under the domain of satisfaction with classroom communication, which reflects the teaching staff's skill, communication and grip on subject. The average mean score ranged from 1.63 to 2.70 for male students and from 2.43 to 3.06. Overall, the author perceived that 66% of the items were deemed to be acceptable.

The most unacceptable item was, "I do not feel need for any extra coaching." The items that were most acceptable were, "classroom communication" and "teacher grip on subject". Here, the male and female were almost equally satisfied with. Appendix A (2nd Factor) shows the participants' satisfaction with study materials and assignments. For female respondents, with the exception of "My teacher gives notes and other study materials," for which the score was 2.36 and hence was deemed unacceptable, all the other items scored 2.73 and above. Particularly, for male participants, none of the item was considered acceptable. This is a turning point variable that land mark the difference between male and female participants. Of these, "delivery of study material", "class and home assignments", "checking and returning of assignment to students" and "class tests" were reported to be the most unacceptable items among male and female students. These reflect the highly significant amount of irresponsibility and carelessness on the part of teachers. Appendix A (3rd Factor) shows the participants' satisfaction with punctuality of teacher, which incorporates 3 items. Most of the items were significantly acceptable by the authors because of mean value above 2.93 (both male and female respondents), with the exception of "My teacher gives individual attention to students" scored lowest under this domain of teaching quality factor. Appendix A (4th Factor) shows the students' satisfaction with the class discipline setup by subject's teacher in the class. Overall results show that both items were acceptable because the average mean score ranged from 2.80 to 2.93. Of these, the class discipline of teaching quality factor was rated above rejection limit. Appendix A (5th Factor) shows

Table 1: Fit indices model

Model	*df*	X^2	X^2/df	RMSR	GFI	NFI	NNFI	CFI	RMSEA
Model 1: A relationship between five domains and conceptual change (male respondents)	5	5.45	1.09	0.05	0.91	0.90	0.91	0.88	0.79
Model 2: A relationship five domains and conceptual change (female respondents)	5	0.54	0.108	0.04	0.93	0.92	0.95	0.96	0.066

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the participants' satisfaction with class learning and participating environment. For male respondents, with the exception of "My teacher encourages hard working students," for which the score was 2.60 and hence was deemed to be acceptable, all the other items scored below acceptable limit. On the other hand, for female participants, items "My teacher establishes a good relationship with students", "My teacher motivates creativity and loyalty among students" and "My teacher welcomes the students in the class participation" were deemed to be unacceptable and the rest were marginally acceptable. Appendix A (6^{th} Factor) shows the participants' level of conceptual change in learning with 5 domains of teaching quality factors. For female respondents, with the exception of "developing new idea", for which the score was 2.30 and hence was deemed to be unacceptable, all the other items scored 2.74 and above. Particularly, for male participants, none of the item was considered acceptable. These reflect the highly significant amount of irresponsibility and carelessness on the part of teachers. Teaching factors are highly unacceptable among male students resultant low level of conceptual change, whereas there is significant amount of satisfaction and conceptual change among female students.

Appendix Ba shows the overall composite rating/ranking of the 5 domains related to students' satisfaction with teaching quality factors. An assumption made when doing the ranking was that all teaching quality factors carry equal weight, regardless of the number of items in each domain. These domains are ranked based on their total average mean score. The overall average mean scores of all respondents (male and female) items combined in the 5 domains are acceptable with the exception of "classroom communication in class", "class environment" and "study materials and assignment" for which the score was below acceptable limit (Appendix A 6^{th} factor). Nevertheless, the author considered only 2 domains (class discipline and punctuality of teacher) to be highly acceptable by both groups (male and female). Furthermore, for male group, "class discipline" was ranked highest, whereas "study materials and assignments" was ranked lowest. And for female group, "class discipline" was ranked highest, while "class learning environment" was ranked lowest.

Appendix Bb shows the association between gender, in consideration of male and female, with the 5 domains of satisfaction. There were statistically significant differences by gender for all domains of satisfaction ($p>0.05$). The highest domain that showed statistically significant difference by gender was "study materials and assignment" interaction ($p<0.005$, t value -11.57). The result shows that there were significant variations among male and female groups for 2 domains of satisfaction: "study materials and assignment" and "class learning environment". Contrary to this, the difference was not statistically significant for 2 domains of satisfaction: "class discipline" and "punctuality of teacher". The overall result shows a highly significant difference between the perception and satisfaction male colleges and female colleges with teaching quality factors (t-value-8.07 at $p<0.006$).

Fit Indices structural model: The purpose of this study is to explore as to how five domains related to teaching quality as recognized by the class students, determine the satisfaction level and ultimately the conceptual change. To support the objective of study, structure equation model was used as suggested by Joreskog (1973). To explore the comparative fitness we tested two models separately in Table 1 (for males and females respondents). The value of X^2 in the first model (males respondents) was ($X^2 = 5.45$) was not good as compared to the model 2 ($X^2 = 0.54$). The second test was between X^2 and the number of degree of freedom. For the good model the value of ratios should be≤2.00. Here is the model 1 the value of ($X^2/df = 1.09$) and in the model 2 the value was even lesser than the first one ($X^2/df = 1.08$) i.e., both the models fulfill this requirement. The value of RMSR should be ≤0.05 and the values of GFI, NFI, NNFI, RMSEA and CFI should be near to 1. In both the models the values of RMSR are less than 0.05, while the values of GFI, NFI, NNFI and CFI were 0.91, 0.90, 0.91 and 0.88 respectively. In model 2 these values were less than the model 1 i.e., 0.93, 0.92, 0.95 and 0.96, respectively. The value of RMSEA in Table 1 is to test the null hypothesis and this value should be less than 0.50 here this value in the first model was greater than 0.50. The model fit indexes all exceed their respective common acceptance levels, indicating that the displayed fitted the data very well. Thus, these values indicate that hypothesized model was much better and fit index.

DISCUSSION AND CONCLUSION

The results of this detailed study which was conducted within the Islamabad Model Colleges Islamabad (IMCI) showed unambiguously that teaching quality is dependent on all the factors related to it for the satisfaction of the students and the conceptual change. This finding is consistent with that of Schneider and Bowen (1995), Banwet and Datta (2003), Hill *et al*. (2003) and Tom (2011). All of these mentioned researchers have similar findings indicating that in terms of education service, the core offering of teaching quality is central to the satisfaction and besides that achievement of knowledge, communication in the classroom, class notes and materials as well as assignments and tests are important. In addition to that the results are consistent with the findings of Price *et al*. (2003) which pointed out about the infrastructure and physical facilities does have an impact on the students' selection decision to some extent. But still the teaching quality is of central importance. Fortunately, IMCI have situated in capital territory and have large spaces and buildings have large computer labs with lots of computers with software provided as well as internet connection. Besides all the faculties have state of the art lecture halls and classrooms. All of these features in an academic institution do attract the students' decision to join the IMCI. But unfortunately the quality of teaching, particularly in male colleges, is at unacceptable level. The weakest area in teaching quality factors, in both male and female colleges, was seemed "study materials and assignments' and "class learning and participating environment". These domains, as reported by Banwet and Datta (2003), Coles (2002) and Tam (2002), are considered backbone of teaching quality and conceptual change. Indeed, once a student joins a certain college or a university, the only thing which can cause the satisfaction or dissatisfaction of the student and parents is the quality of teaching and all other things become secondary, as long as the quality of teaching is acceptable. Therefore, our finding correlate with researcher, Hartman and Schmidt (1995) and Tom (2011) discovered that satisfaction has a huge impact on the perception of people on the academic performance of an institution in terms of having an intellectual environment which encompasses the teaching skills of faculty, academic capabilities of the student body, how the students and faculty interacts, as well as the interaction between students and teachers. Tom (2011) presented here two levels of implications: the association between the conceptual change in student and the classroom communication, teachers' academic concepts and methodology (teaching quality factors). For the conceptual change of students the research supports that it is a multidimensional issue so an approach which covers different perspectives from classroom talk to conversation and two way communication which would help to change the old concepts. As far as the teacher's concepts and methodology is concerned, Mercer's viewpoint is supporting that that the practical target for teachers would be that the teacher should be made aware about the impact of his/her teaching on students at broader level and action level of specific interventions. Class teacher rationally choose the types of classroom communication, materials and participation which will meet the goals in the best possible ways (satisfaction and conceptual change). Our finding also relate with Hartman and Schmidt (1995) who found a significant effect for student satisfaction and conceptual change on professional skills developed as a result of the education process and teaching quality. They argued that measurement of career skills built which comes from the awareness of the feelings being superior to students from other colleges in getting the first job, feeling of having all the necessary qualifications for getting a current position as well as developed analytical conceptual skills through teaching quality factors. Here, male students who have big interest in their respective disciplines, their feedback confirmed that they were not provided by the teaching staff the teaching they were looking for, i.e., of high quality. The classroom communication, class assignments, class tests and class participation although all these teaching perspectives are provided by IMCI but how far they are successful is indicated by the students' high level of dissatisfaction and low level of conceptual change particularly male students. Students are mentally prepared to ignore other shortcomings and deficiencies of infrastructure and lack of other facilities if and only if the teaching quality is of high standard or at least acceptable and reasonable. But when we talk about the female students, they are reporting a significant level of satisfaction and conceptual change which reflects good teaching quality in classroom. There were 5 domains of teaching quality satisfaction covered in this study: class discipline, punctuality of teacher, classroom communication, class learning environment and study materials and assignment. Class discipline and punctuality of teacher were found to be 2 acceptable domains among male students, which contain only 5 items, whereas the other 3 domains that were unacceptable had 15 items. Most of the unaccepted items were not difficult to overcome. The teaching staff, especially college administration, needs to be more sensitive to the students' needs, willing to drastic change the conceptual way of delivering more care so as to better the teaching quality and have better understanding and collaboration with students and teachers. This dissatisfaction with 15 items reflects the highly significant amount of irresponsibility and carelessness on the part of teachers and administration particularly in male colleges. In light of comprehensive literature review and current empirical findings,

researcher produced a new model of conceptual change at the workplace which may become the core area of new researchers.

A new model CC = £ (TQF×S):

(*CC = conceptual change*, *£ = function of*, *TQF = teaching quality factors*, *x = multiplied by*, *S = satisfaction*)

The mechanism of teaching quality factors and satisfaction (by students) are more precisely indicated in the form of a 1×1 (TQF×S) additive model. This helpful beginning to one new model is constructed on the work of (Posner *et al*., 1982; Treagust and Duit, 2008). Treagust and Duit (2008) pinpointed that conceptual change at workplace is put into practice by combining equally TQF and satisfaction as outcome of student. Hence, other supporting factors (equipments and materials) sources of support to teachers are put as control variables altogether. Carey *et al*. (2002) also argue that conceptual change enhance fast learning and creative behavior as it functions as a builder of positive sense of identity and has an effect throughout their lives. However, the researcher has not been identified the mathematical interaction between the three factors. As far as the concern about quality improvement as well as the conceptual change it is helpful to introduce focus level framework (Mortimer and Scott, 2003) and evaluation standards to various aspects of the teaching quality factors as reported by Tom (2011) and Sohail and Shaikh (2004). Comparable standards could be initiated in the classroom and administration offices which should include the assessment of teachers and evaluation of students both to achieve the desired targets. College administration should be seriously engaged in practicing such quality standards by making sure those students and teachers both have not been or will not be promoted at higher level unless they fulfill standard criteria. Administration is also responsible for the provision of required resources so that standards could be met. However, overall results on satisfaction and dissatisfaction tell us clearly about the weaknesses of the teaching quality or the problems encountered. Only further probing on specific aspects of staff teaching will reveal areas of expressed dissatisfaction (Appendix Ba). It is also noted that focusing on items of expressed dissatisfaction/unacceptability is more valuable than obtaining consistency of expressed satisfaction both male and female colleges. Colleges national wide compete for attracting students at both provincial and national level. For that purpose the institutional administration should do their best to improve the student satisfaction level and reduce the dissatisfaction more particularly with teaching quality factors. This can only be achieved if all the factors (Appendix Ba) which have an impact on quality teaching should be adhered to. The judgment on the quality of teaching would be from the students who are truly able to judge, therefore periodical satisfaction surveys are conducted with students on a quarterly basis and the teaching service improved accordingly. In this regard college administration must delegate specific authorities to teaching staff for academic issues to make them responsibility.

RECOMMENDATIONS

The existing strengths and weaknesses of teaching quality factors in IMCI should be monitored and reported periodically. Evaluation of students' satisfaction is to be part and parcel of the teaching quality in IMCI and measures should be taken to reduce or eliminate these sources of high level of dissatisfaction.

The cooperation between the teaching staff and the college administration has to be improved for the benefit of the college students. All items related to "classroom communication", "study materials and assignments", "class tests" and "class learning environment" can be resolved effectively when there is good understanding and collaboration between teaching staff and administration. For example, class timetable for each class for lecture plan, class tests, class assignments, tests and assignments return and student evaluation be informed earlier on the main notice board in the college and teaching staff need to co-operate with authorities. This study has also correlates the findings of Stoughton (2006), who argued that the need for further training of the administration for the preparation of teachers who are responsible and progressive in terms of decision making and who are willing to change depending on the concerns and requirements of students.

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Appendix A: Participants' satisfaction with teaching quality factors

		Male					Female						
		1	2	3	4		1	2	3	4			
Number	Constructs	VD	D	S	VS	Mean S.D.	VD	D	S	VS	Mean S.D.	Factor loading	Construct reliability
	1st Factor												0.81
1	…..understanding communication	3.3	30.0	60.0	6.7	2.70 0.65	3.3	13.3	56.7	26.7	3.06 0.74	0.85	
2	…..teacher grip on subject	3.3	23.3	70.0	3.3	2.70 0..58	3.3	33.3	53.3	10	2.70 0.70	0.74	
3	…..student does not feel extra coaching	46.7	43.3	10	-	1.63 0.66	10	40	46.7	3.3	2.43 0.72	0.70	
	2nd Factor												0.88
1	….notes and other study materials	36.7	60	0.3	-	1.66 0.54	13.3	50	23.3	13.4	2.36 0.88	0.72	
2	….checking assignment properly	76.7	23.3	-	-	1.23 0.43	16.7	16.7	43.3	23.3	2.73 1.01	0.81	
3	…. reasonable and constructive assignment	70	20	10	-	1.40 0.67	10	20	53.3	16.7	2.76 0.85	0.80	
4	….feedback on their assignments and tests.	83.3	16.7	-	-	1.16 0.37	10	16.7	56.6	16.7	2.80 0.84	0.79	
5	…..students impressive marks	30	43.3	26.7	-	1.96 0.70	16.7	16.7	43.3	23.3	2.73 1.01	0.72	
6	….tests and assignments are for promotion	53.3	30	16.7	-	1.63 0.76	-	13.3	66.7	20	3.06 0.58	0.77	
	3rd Factor												0.75
1	….punctuality of teacher	13.3	70	16.7	-	3.03 0.55	6.7	6.7	63.3	23.3	3.03 0.76	0.87	
2	….teacher effectively use time	6.5	12.9	58.1	22.5	2.93 0.78	3.3	13.3	60	23.3	3.03 0.71	0.88	
3	…. teacher individual attention	20	56.7	20	3.3	2.06 0.73	3.3	53.3	40	3.3	2.43 0.62	0.74	
	4th Factor												0.78
1	….class discipline	3.33	23.3	50	23.3	2.93 0.78	10	10	56.7	23.3	2.93 0.86	0.81	
2	….influence of teacher	26.7	63.3	10	-	2.83 0.59	10	20	50	20	2.80 0.88	0.80	
	5th Factor												0.91
1	….relationship with students	36.7	40	23.3	-	1.86 0.77	10	33.3	50	6.7	2.53 0.77	0.70	
2	….motivates creativity and loyalty	13.3	33.3	53.3	-	2.40 0.73	13.3	40	33.3	13.4	2.46 0.89	0.71	
3	…. class participation	23.3	53.3	23.3	-	2.00 0.69	10	50	36.7	3.3	2.33 0.71	0.68	
4	….teacher attention on problem solving	20	40	40	-	2.20 0.76	3.3	23.3	56.7	16.7	2.86 0.73	0.78	
5	…..perception and satisfaction of student	26.7	40	33.3	-	2.02 0.78	10	10	50	30	3.00 0.90	0.76	
6	…..encouraging hard working student	3.3	33.3	63.3	-	2.60 0.56	10	6.7	66.7	16.7	2.90 0.80	0.75	
	6th Factor												0.87
1	….developing new ideas	35	35	20	10	2.05 0.99	25	30	35	10	2.30 0.97	0.70	
2	….alternative questions solving ability	25	40	25	10	2.20 0.95	5	15	65	15	2.80 0.86	0.69	
3	…. interest of self study	20	45	35	-	2.15 0.74	8	20	58	14	2.78 0.94	0.79	
4	….perceive change scientifically	25	40	30	5	2.15 0.87	10	22	48	20	2.74 1.05	0.88	
5	…..self confidence	15	50	20	15	2.35 0.93	10	25	45	20	2.75 0.91	0.86	
6	…..better perceive control	15	46	32	7	2.25 0.78	15	15	68	2	2.77 0.99	0.83	

Author research

Appendix Ba: Overall ranking of factors related to satisfaction

Male respondents			Female respondents		
Domains	Mean score±S.D.	Rank	Domain	Mean score±S.D.	Rank
Class discipline	2.88±0.36	1	Class discipline	2.86±0.69	1
Punctuality of teacher	2.67±0.44	2	Punctuality of teacher	2.83±0.36	2
Classroom communication	2.35±0.42	3	Classroom communication	2.73±0.48	3
Class learning environment	2.18±0.28	4	Study materials and assignments	2.73±0.53	4
Study materials and assignments	1.51±0.22	5	Class learning environment	2.68±0.38	5

Author research; S.D.: Standard deviation

Appendix Bb: Association between socio-demographic characteristics and the 5 domains of satisfaction

Socio-demographic Average Characteristic	n	Classroom communication		Study materials and assignments		Punctuality of teacher		Class discipline		Class environment		Average	
Gender		Mean±S.D.		Mean±S.D.		Mean±S.D.		Mean±S.D.		Mean±S.D		Mean±S.D.	
Male	582	2.35	0.42	1.51	0.22	2.67	0.44	2.88	0.36	2.18	0.28	2.32	0.13
Female	390	2.73	0.48	2.73	0.53	2.83	0.36	2.86	0.69	2.68	0.38	2.77	0.27
T test		-3.327		-11.57		-1.48		0.116		-5.743		-8.07	
P value		0.106		0.000		0.817		0.007		0.113		0.006	

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