Quality Education through Continuous Improvement: Evidences for Application of TQM in Higher Secondary Education in Kerala, India

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Abstract

Educational quality is ineluctable for the steady progress of a nation. Thus, quality of education in every stage is a serious concern all over the world. India has recognized the need centuries back and has contributed to the world, much of the finest human resources. Till date, the quality up gradation programmes in education, as part of the National Education Policies, has had remarkable impact on the school education in India. The application of total quality improvement in education in the schools in State of Kerala has evolved a radical change in the curriculum from 'teacher centered' to 'learner centered', transforming passive learning by students into activity oriented learning. The continuous and comprehensive internal evaluation envisaged to be conducted, as part of teaching, learning and student evaluation process, aim to ensure the quality of the output, the students. These features points out to the application of the principle of continuous improvement, an important doctrine of total quality management, in teaching–learning process in the classrooms. This paper examines the extent to which continuous improvement is present in the Higher Secondary School Education in Kerala, India. The study found that the initiative at the part of the government to improve the quality of education by introducing the concept of continuous improvement in the teaching, learning and evaluation process in the higher secondary school education in Kerala is successful.

Key words: *Total Quality Management (TQM), Continuous Improvement, Educational Quality, Activity oriented learning, Learner centered curriculum*

I. Introduction

India ranks 136th among 187 countries, in the matter Human Development Index[1] (HDI) in 2013 with a value of 0.554, while, the world wide average is 0.694. Its Education Index[2] was 0.232 in 1980 which has improved to 0.643 in 2007 (Chakravartty & Gupta, 2006; UNDP, 2013). Within India, when different states are compared, there is quite a disparity in the progress of education, with the southern and western states being far ahead in education than northern and eastern states (Desai,

[1] Human Development Index (HDI) is a composite index, measuring average achievement in three basic dimensions of human development – like a long and healthy life, knowledge and a decent standard of living (UNDP, 2011).

[2] Education Index, refers to the mean years of schooling, which is the average number of years of education, received by people aged 25 and older, converted from education attainment levels, using official durations of each level (UNDP, 2011).

2007). Kerala stands miles ahead of the other states of India, in terms of, a number of important social development indicators, education being one among them (Government of Kerala, 2011). It was declared as a totally literate state in 1991 (Government of India, 2008) and the present literacy level, as per the 2011 census, is 93.91 per cent. It claims to have the narrowest disparity among male and female literacy, narrowest disparity among different districts (2.6 per cent)[3], lowest school dropout rate (0.81 per cent in 2006-07) and wider distribution of schools. Thus, educational accessibility is equitable region wise and also gender wise (Government of India, 2008; Government of Kerala, 2010; George & Kumar, 1999). Kerala has attained this growth in education, not in a short period of time, but through the enlightened efforts of the rulers, from the very early times and the intellectual pursuit of the people, spread through several centuries (Menon, 2007). Very recently improvements have been made in the curriculum, through the introduction of continuous and comprehensive internal evaluation of students, together with the learner centered and activity oriented teaching methodology, in order to ensure better academic performance of students. It has been introduced in the schools from the 1st standard onwards and was continued in the higher secondary classes from the year 2005 (SCERT, 2006). The teachers have been trained to handle the new methodology of teaching and learning which specifically involves a process of constant and continuous improvement in the classroom transactions. This paper attempts to assess the extent of application of the principle of continuous improvement in the teaching-learning process of higher secondary school education in Kerala.

II. Concept of Continuous Improvement and Review of Studies

Continuous improvement is the systematic process of planning, implementing, evaluating and re-implementing, processes, continuously, for the purpose of improving the products and services, thus attaining higher levels of efficiency and customer satisfaction. It involves small scale incremental projects leading to substantial changes (Sallis, 2002). The concept of Continuous Quality Improvement or TQM is very much applicable in educational institutions as they have to improve on a continuous basis due to explosion in knowledge and changing styles in learning. Quality can be achieved only through a continuous effort; therefore, it has to be made part of institutional mission for the holistic development of students (Deming, 1982). TQM in education, surfaced in 1988 at Mt. Edgecombe High school in Sitka, Alaska, where, David Langford, the school's technology teacher/coordinator, applied successfully, the total quality concepts in his classes (Pour & Yeshodhara, 2011).

In support of the TQM initiatives in education, Crawford and Shutler (1999) applied Crosby (1984) model to suggest a practical strategy, for using TQM principles in education. Their strategy focused on the quality of the teaching system, rather than on students' examination results. They argued that examinations are only diagnostic tools, for assuring the quality of the teaching system, but to satisfy the educational needs of students, continuous improvement efforts need to be directed to curriculum and delivery services. The possibility of adopting TQM in self financed technical institutions was explored by Thakkar, Deshmukh, & Shastree through a model, HOQ – House of Quality, an extension to the basic model of Quality Function Deployment (QFD) and the study recognized the need for continuous improvement, cultural change and effective use of financial resources to improve the value addition at each level (Thakkar, Deshmukh, & Shastree, 2006). Hansen and Jackson also applied TQM in classroom and called it as 'Total Quality Improvement'. Continuous improvement was one of the major principles that they applied, others being customer focus (students) and team process (student involvement). Their study revealed the effectiveness of TQM and they commented that the teacher became a manager of resources, rather than, an oracle on the podium. With students' involvement through TQM, the valuable time of the students could be managed effectively (Hansen & Jackson, 1996). University of Maryland had

[3] Computed from the data on literacy of different districts in Kerala, as per 2011 census. (Government of India, 2011).

developed Strategic Performance Measurement Methodologies (SPMM), through identification of key result areas, for determining whether TQM is working in universities or colleges (Tuttle, 1994).

III.The Problem

The Government of Kerala, India has introduced activity oriented and learner centered pedagogy in the higher secondary school education (11^{th} and 12^{th} standards) (SCERT, 2006). The new curriculum envisages the teachers to do lesson planning, vital for delivering quality education within the available time span. However, it is alleged that only a few teachers engage themselves in the process of planning for classroom transactions and in its implementation. The continuous and comprehensive evaluation of the learning process introduced has also been suspected to be conceived wrongly by the teaching community. Besides there have been apprehensions among the teachers with regard to the effectiveness of such quality initiatives and the negative impact it might have on their workload. It is doubtful that the agenda of quality improvement efforts in the higher secondary education in Kerala has struck with some amount of disapproval and reluctance to change from the part of the teachers and related authorities. However it is indispensable for this education system to achieve success in its quality pursuit with the whole hearted support of the teachers, so that, the students and other stakeholders continue to enjoy the benefits of one of the worlds largest, reasonably priced, more or less free education, equitably provided to all sections of the society, whether rich or poor, to all types of castes and creeds. These intriguing thoughts pose some important research questions regarding the implementation of total quality management through 'Activity Oriented Learner Centered Curriculum' and other quality initiatives in Kerala. Does the process of continuous improvement in planning for class room activities, as envisaged in the new activity oriented curriculum, as part of application of total quality management, work well? Is the process of 'continuous and comprehensive internal evaluation' implemented, as envisaged so as to ensure continuous improvement in the learning process?

IV. Objective and Hypotheses

The objective of the study is to assess the extent of continuous improvement in teaching, teachers, evaluation and infrastructure, as part of application of TQM in higher secondary school education in Kerala. Based on the objective, the following hypotheses were formulated for the study.

1. The overall continuous improvement as part of application of TQM in higher secondary education in Kerala is moderate.
2. The continuous improvement in teaching, teachers, evaluation and infrastructure, as part of application of TQM in higher secondary education in Kerala, is the same, irrespective of, the type of ownership of the schools, location of the schools, age of the teacher and subject taught.

V. Methodology and Materials

This paper attempts to assess the extent of continuous improvement, as part of application of TQM in higher secondary schools (HSS) in Kerala, India. For this purpose continuous improvement in four pertinent elements of school education namely "teaching", "teachers", "evaluation" and "infrastructure" are considered. Quality of these four elements have an impact on the students' and other stakeholders' satisfaction (Owlia & Aspinwall,1996; Waugh, 2001; Uline, Wolsey, Tschannen, & Lin, 2010). Continuous improvement process, as part of TQM, is supposed to follow Shewart's (1931) scientific method of Plan–Do–Check–Act cycle (PDSA cycle) (Deming, 1982; Edwards, 1991; Charantimath, 2011). The PDSA cycle consists of the systematic process of planning, implementing, evaluating, and reimplementing of activities, as a never ending process, continuously carried out, over a period of time, in order to improve product, process and services, for attaining higher levels of customer

satisfaction (Sallis, 2002). In this study the same sequence of action is applied to the teaching process, which is the core activity in an educational institution.

The study is descriptive in nature examining the application of TQM in higher secondary school education in Kerala. It is concentrated on one of the important tenets of total quality management namely; continuous improvement and the opinion on this were elicited from the respondents, selected as sample. The population of the study comprises of, the teachers, belonging to the government, aided and unaided higher secondary schools coming under the Directorate of Higher Secondary Education in Kerala, India. There were 760 government higher secondary schools, 686 aided and 461 unaided higher secondary schools in the state in the year 2010-11 totaling to 1907 higher secondary schools in all (Government of Kerala, 2011). From the total number of schools in the state, about 1.5 per cent (30) schools were selected for the sample through a multi-stage sampling process. Schools were included in the sample proportionately from, government, aided and unaided sector. Thus, 13 schools were included from government, 11 from aided and 6 from unaided higher secondary schools. For getting a complete representation of the state (14 districts in all), it is divided into three zones, northern, southern and central. From each of these zones a district was selected and from each district government, aided and unaided higher secondary schools were selected proportionally. Thus altogether 10 schools were selected from each district. From each of the school selected, 10 teachers were selected totaling to 300 teachers. The opinion of the teachers was collected using a pre-tested structured survey schedule. The survey schedule was developed by considering the variables in the works of previous researchers and from the pilot study conducted by the research scholar. Percentage analysis and descriptive statistics were computed for identifying the nature of the data. The hypotheses are tested using Z test, one sample t test, one way analysis of variance (ANOVA) along with least significant difference test for comparison between more than two groups and independent t test for comparing between two groups and also correlation. The level of significance was fixed at 5 per cent.

The extent of continuous improvement in the teaching process is assessed, by evaluating the extent of 'planning for classroom transactions', 'implementation of the plans', and 'periodical revision and remedial action'. This process results in constantly improving instruction, on a continuous basis, so that quality of education is enhanced. Planning for class room activities comprises of variables: 1. Curriculum objective orientation, 2. Time for completion of lessons, 3. Learning strategies, 4. Reference materials, 5. Evaluation strategies, and 6. Reporting. The second sub construct 'implementation of plans', under the main construct 'teaching', revolves around the idea, whether, the plans prepared are being implemented as designed and include variables such as, 1. Completion of the syllabus as per plan, 2. Use of learning strategies, 3.Use of evaluation strategies, and 4. Use of reference materials. The TQM concept requires evaluation of the plans implemented, for improving its effectiveness. This is done by, rethinking of matters concerned with time required for completion of lessons and recording the feedback of the students, so that, the problems in communication in the classroom, difficulty of the students in understanding the concept and such other problems could be identified. Moreover, measures can be taken on this ground to give remedial teaching and improving the learning process. Thus a third construct, "periodical revision and remedial action", assess the efforts taken by the teachers in evaluating and suitably modifying the plans so that the plans are being continuously upgraded. The construct covers variables such as, 1. Redrafting of plans, 2. Rescheduling of time, 3. Recording of feedback of students, 4. Remedial teaching, and 5. Provision for improving learning.

In order to support external examination with continuous internal mechanism of quality assurance, (Deming, 1982; Mukhopadhyay, 2001), continuous and comprehensive internal evaluation is introduced in the higher secondary school education in India, in accordance with the National Education Policy, 1986. Continuous improvement in the evaluation process has been analyzed, using three sub constructs, comprising of, 'Continuous and comprehensive internal Evaluation' (C.E), 'Practical Evaluation' (P.E) and 'Terminal Evaluation' (T.E).

The study has also assessed continuous improvement in teachers and in infrastructure. The success of teaching and evaluation are in the hands of the teachers, therefore it is inevitable to improve the quality of the teacher, by providing training and education on a continuous basis. Above all, the school environment becomes more conducive for learning in the presence of adequate infrastructural facilities, so replenishing and improving infrastructure become indespensable. The opinion of the teachers about the training provided and improvement in infrastructure is sought to assess the continuous improvement in these two areas.

VI. Results and Discussion

The descriptive statistics regarding the constructs assessing the continuous improvement in 'teaching', 'evaluation', 'teachers' and 'infrastructure in higher secondary schools are given in Table 1.

Table 1 Descriptive Statistics on Continuous Improvement

Constructs	Sub Constructs	No. of variables	Mean	Std. Error	% score
Continuous Improvement in Teaching	Planning for Class Room Transaction	6	23.89	0.32	79.62
	Implementation of Plans	4	15.67	0.23	78.37
	Periodical Revision and Remedial Action	5	19.46	0.25	77.83
1. Continuous Improvement in Teaching		**15**	**59.02**	**0.63**	**78.69**
Continuous Improvement in Evaluation	Continuous Internal Evaluation	11	34.80	0.57	63.27
	Practical Evaluation	1	3.65	0.06	72.93
	Terminal Evaluation	6	23.68	0.27	78.93
2. Continuous Improvement in Evaluation		**18**	**62.12**	**0.69**	**69.02**
3. Continuous Improvement in Teachers		**6**	**21.85**	**0.47**	**72.82**
4. Continuous Improvement in Infrastructure		**7**	**23.99**	**0.53**	**68.53**
Overall Continuous Improvement		**46**	**166.99**	**1.73**	**72.60**

Source: Primary data

A. Continuous Improvement in Teaching, Teacher and Evaluation

The study found that there exists continuous improvement in planning for classroom activities (percentage score of 79.62). It is also clear that implementation of plans (78.37) and the periodical revision and remedial action (77.83) is not up to the level of planning. The overall percentage score of the presence of continuous improvement in teaching at 78.69 (Table 1) indicate that there is continuous improvement in the teaching process in the higher secondary schools in Kerala.

Policies, curriculum and socio-economic factors can improve academia, only if, the teachers are armed with the knowledge, skills and supports. Quality of education is directly proportional to the quality of teachers (Nemser, 2001; Behrman, Khan, Ross, & Sabot, 1997; Veeragahavan & Bhatacharya, 1989). The changes in the new curriculum have called for the need for training to the teachers. For this purpose, the office of higher secondary directorate, Government of Kerala, along

with the State Council for Education Research and Training (SCERT) is providing training to the teachers through 'cluster' groups, formed at different places in the state. Continuous improvement in training is assessed using seven variables, 1. Regularity of training, 2. Timing of training, 3. Adequacy of duration, 4. Relevance of contents, 5. Appropriateness of training personnel, 6. Interested participation. Only 17.3 per cent of teachers think that the training is 'always' regular. Majority of the teachers believe that the timing of the training is 'often' set at the convenience of the teachers (so that the training is over before the classes commences for the next academic period). Only 21.7 per cent of the respondents think that the training is always relevant in terms of the contents and a meager 17 per cent 'always' believe in the appropriateness of the training personnel. One of the most important features that influence the effectiveness of training is the participation of the teachers in the training sessions. It is observed that only 22.3 per cent of the teachers 'always' actively participated in the training programmes. The percentage score of teacher training is at 72.82.

The new curriculum envisages that the teachers should organize a variety of learning experiences, in order for, the students to acquire necessary skills. Learning is considered as a continuous process and evaluation as an integral part of this process (SCERT, 2006). In the new learning environment there are 3 components for evaluating a student. Terminal Evaluation (T.E), Continuous and Comprehensive Internal Evaluation (C.E), and Practical evaluation (P.E) and this study has assessed the presence of continuous improvement in these three areas. Traditionally, a single evaluation tool, which measures the intellectual capacity of the learner, through written examination, was followed. To eliminate the limitations of this method and to assess the multidimensional competencies of the learner, many suggestive tools are provided in the teachers' source book for continuous internal evaluation like; seminar, assignment, class test, practical, projects, collections, brainstorming and debate, group discussions and field trips. Many of the strategies used for the evaluation of the student are both learning as well as evaluation strategies. Considering the nature of the subject, appropriate strategies are used in different subjects, like 'role play' for languages. Some of these tools like seminar, projects and assignments are assessed by further dividing the major skill into sub skills and each of these sub skills are evaluated. Thus, marks are given for sub skills, such as, literature review, relevance of content, appropriateness of sources, structure of the content, content depth, arrangement of ideas, clarity, analysis, interpretation and evaluation of the content, communication, participation and discussion, and reporting. The construct continuous improvement in evaluation analyses, whether, the different evaluation and learning strategies are used, by the teachers, in the manner, discussed in the teachers' source book, so that, there is continuous and comprehensive evaluation of the students, which would in turn, improve the learning process and enhance the quality of education. When a teacher is put on the scale value 'Always', it means that, the teacher is always using the particular evaluation strategy in the manner envisaged in the teacher's source book[4].

It can be reasonably concluded that, if the extent of usage of the different learning and evaluation strategies are high, then, there is high level of activity oriented learning going on in the higher secondary school education in Kerala and there exists continuous improvement in the learning process. The study found that the most intensively used evaluation strategy is 'class test' (54.7 %) followed by 'assignment' (46.7 %). Majority of the teachers (52.7 %) never use the strategy, 'field trip'. Various constraints like finance, transport facilities and staff availability were pointed out by the teachers for using this kind of tool. Majority of the teachers do not use the strategies like 'role play' and 'brainstorming'. 'Role play' is never used by 40.7 per cent and 46.7 per cent of the teachers never use 'brainstorming'. Thus, the percentage score of the continuous 'evaluation' is only at 63.27. The

[4] Teacher Source book contains directions and guidance for the teachers to prepare lesson plans, evaluation of students and conduct of the activity oriented learner centered curriculum. It is prepared by the State Council of Educational Research and Training (SCERT).

continuous and comprehensive internal evaluation is on a lower level, than the other elements of Higher Secondary School (HSS) education studied like, continuous improvement in 'teaching' and 'teachers'. It can be understood that teacher centeredness still prevail to a great extent in the classrooms, and that, it has to go a long way, for being activity oriented and learner centered.

The practical evaluation is related to subjects, which need to test the students' skills in application of various concepts, in a science laboratory or in a computer lab. The percentage score of practical evaluation is 72.93. The terminal evaluation is in the written form, where, the emphasis of assessment of a student is, on the skill of application, analysis and synthesis of learned matter, rather than, on testing knowledge and understanding levels. For the purpose of this study, the opinion of the teachers were sought, on the basis of the experience of past 5 years, about the quality improvements in the question papers set for the HSS examinations and also the opinion on the improvement in the evaluation of the answer scripts. Majority of the teacher respondents are of the opinion that, the question paper set by the group of expert teachers contains application level, knowledge level and understanding level questions and also selects questions which are of different levels of difficulty (simple, average and complex), so that, question papers become more effective in bringing out the differences in abilities of students. Only a meager 13.3 per cent of the teachers opine that they always value strictly, majority of the teachers resort to liberal valuation. Majority of the respondents (44 %) are of the opinion that there is 'often' influence from outside, to be liberal in valuation of answer scripts, in the terminal evaluation process. The percentage score of terminal evaluation (78.93) indicates that there is continuous improvement in terminal evaluation.

Out of the three sets of evaluation assessed, 'continuous and comprehensive internal evaluation', has got much importance in determining, the extent of 'continuous improvement in evaluation', from the perspective of total quality management. This is because; it is this mechanism which ensures that the output, i.e., the students, at the terminal examination is of the desired quality. The percentage score of overall continuous improvement in evaluation comprising of C.E, T.E and P.E is relatively lower at 69.02.

B. Continuous Improvement in Infrastructure

Infrastructure is one of the important elements that contribute to the quality of school education (Das, 1974; Heyneman & Loxley, 1983). Continuous improvement in infrastructure comprises of incremental changes brought about in the infrastructure of the school, which includes, improvement, maintenance and new constructions. A set of seven variables were identified including buildings, library, computer labs, science labs, electricity supply, water supply and technology. Majority of the teacher respondents believe that there is 'always' improvement in different components of infrastructure. Table 1 shows that the mean score of continuous improvement in infrastructure is 23.99 and the total percentage score is at 68.53, when compared to continuous improvement in 'teaching', 'teachers', and 'evaluation', the continuous improvement in 'infrastructure' is way behind.

C. Overall Continuous Improvement

The study has tentatively stated that, the overall continuous improvement, achieved as part of application of TQM in higher secondary school education in Kerala, is moderate. One sample Z test shows (Z 14.994) is found to be significant at 1 per cent level and the mean (3.55) is greater than the central value (3) of the scale, which indicates that, the level of continuous improvement in higher secondary school education in Kerala is above moderate. Thus, the hypothesis that, the overall continuous improvement achieved as part of application of TQM in higher secondary schools in Kerala, is moderate stands rejected.

Table 2: Hypothesis Testing - Overall Continuous Improvement

Variables	Mean	SD	Z-value	p-value
Overall Continuous Improvement	3.55	0.639	14.994**	0.000

*Source: Primary data. ** Significant at 0.01 level.*

D. Continuous Improvement based on Ownership of Schools

The learning environment of the higher secondary schools is quite different according to the differences in the ownership of the school and this will have an impact on the opinion of the teachers belonging to different schools. Schools in Kerala are of three kinds: those that are owned by government, private schools aided by government and unaided private schools. Analysis of variance was carried out for comparing the opinion about continuous improvement under different dimensions among the sub sample based on type of ownership of the school. Results show that only the variables 'Planning for class room transactions', 'Continuous internal evaluation (C.E)' and 'Continuous improvement in infrastructure' are significantly different among various types of schools based on differences in ownership. Pair wise comparison shows that 'planning for class room transactions' is noted more among unaided schools (mean 25.87) compared to government (mean 23.29) and aided schools (mean 23.51), (p value 0.007). The infrastructure is continuously improved in aided and unaided schools than in government schools, F value (14.437) is highly significant (p value < 0.001) at 0.01 levels. Another area, where there is significant difference, is the 'continuous improvement in internal evaluation' (C.E). Continuous improvement in internal evaluation is more in government schools than in unaided schools (p value 0.044). The F value is not significant in the case of continuous improvement in 'teaching'(p value 0.611), 'evaluation' (p value 0.169) and 'teachers'(p value 0.388), therefore the hypothesis that, continuous improvement in 'teaching', 'evaluation' and 'teachers', is the same, among government, aided and unaided higher secondary schools in Kerala, stands accepted. Continuous improvement in 'infrastructure' is found to be more in aided and unaided schools than in government schools (p value < 0.001). Therefore the hypothesis that, continuous improvement in 'infrastructure' as part of application of TQM in higher secondary school education in Kerala is the same, irrespective of the ownership of the school, stands rejected. There is no significant difference in the opinion about overall continuous improvement among government, aided and unaided school teachers (p value 0.400).

E. Continuous Improvement based on Location of School

Independent t test results indicate that continuous improvement in terminal evaluation (p value < 0.001), overall evaluation (p value 0.013) and in teachers (p value 0.009), is higher in the opinion of rural higher secondary school teachers. The opinion on overall continuous improvement is not significantly different between rural and urban school teachers (p value 2.70). There is no significant differences in opinion of teachers from urban and rural schools, on the continuous improvement in 'teaching' (p value 0.451) and 'infrastructure' (p value 0.308) and therefore, the hypothesis that, continuous improvement in 'teaching' and 'infrastructure' as part of application of TQM in higher secondary school education in Kerala, is the same, irrespective of the location of the schools, can be accepted. However, there is significant differences in the opinion of the teachers from rural and urban locations in the case of 'continuous improvement in teachers' (p value 0.009) and 'continuous improvement in overall evaluation' (p value 0.013). Therefore, the hypothesis that, continuous improvement in 'teachers' and 'evaluation' as part of application of TQM in higher secondary school education in Kerala, is the same, irrespective of the location of the schools, stands rejected.

F. Continuous Improvement based on Age of the Teacher

For comparing the opinion on 'continuous improvement' among school teachers of different age, the respondents were classified as younger, middle and elder groups. Those who were between

24 and 34 years of age were grouped as 'younger'; those between 35 and 44 were grouped as 'middle' and those between 44 and 54 were grouped as the 'elder' age group. The study found that according to the 'younger' teachers there is more continuous improvement in the case of terminal evaluation (p value 0.012), infrastructure (p value 0.025) and overall continuous improvement (p value 0.013). In the case of teaching (p value 0.044) the 'younger' and the 'elder' group opine that there is more continuous improvement than the 'middle' group, showing that the younger and the elder group of teachers are more involved in the process of planning, implementation and periodical revision of class room transactions than the middle group of teachers. In the case of continuous and comprehensive internal evaluation (p value 0.659), overall evaluation (p value 0.114), and continuous improvement in teachers (p value 0.135) there is no significant difference in the opinion of the teachers of different age groups.

G. Continuous Improvement based on Subject Taught by the Teacher

The opinion of the teachers on the extent of continuous improvement in different variables would vary, according to, the subject handled by the teachers. Languages are subjected to frequent change. Subjects like Science, Commerce and Economics are vast, which limits the application of activity-oriented learning. There are more possibilities for continuous evaluation work in subjects like Science and Languages but due to the high teacher-student ratio and heavy syllabus, it is observed that majority of the teachers finds it difficult for implementing the different learning and evaluation strategies. The study found that in the case of 'continuous and comprehensive internal evaluation' (C.E) and 'practical evaluation' (P.E), the differences in the opinion, of the teachers teaching different subjects, are highly significant (p value less than 0.001). In the case of overall evaluation (p value 0.038) also there is a significant difference in the opinion of the teachers teaching different subjects. In all other areas, there was no significant difference in the opinion of teachers, handling Language, Science, Humanities and Commerce subjects.

In the case of 'continuous and comprehensive internal evaluation' (C.E), the Language, Humanities and Commerce teachers, showed significantly higher intensity in the use of C.E elements and hence, the significantly higher mean score than Science teachers. Continuous and comprehensive internal evaluation (C.E) is lesser among Science teachers, when compared to the other groups (p value < 0.001). This also means that the C.E elements are sparingly used by the Science teachers. The extent of continuous and comprehensive internal evaluation, through the use of different learning and evaluation strategies, is more in the case of Language teachers, but, they are not significantly different from Humanities and Commerce teachers, but, showed significant difference only when compared to Science teachers (p value < 0.001). Continuous improvement in evaluation of practical skills is more in the case of teachers, handling Science subjects. The intensity of practical evaluation is more in the case of Science subjects followed by Commerce (p value < 0.001). Continuous improvement in overall evaluation is higher among Language teachers, than among Science teachers (p value 0.038). However, it is interesting to note that, there is no significant difference among the teachers, teaching different subjects, in the matter of overall continuous improvement (p value 0.154). The hypothesis that, continuous improvement in teaching, teachers and infrastructure, as part of application of TQM in higher secondary school education in Kerala, is the same irrespective of the subject taught can be accepted. However, the hypothesis that, continuous improvement in evaluation as part of application of TQM in higher secondary school education in Kerala is the same irrespective of the subject taught, stands rejected.

VII. Conclusion

Continuous improvement is the process through which an organization attains higher levels of quality by enhancing the efficiency and effectiveness of its processes and activities. It is this never ending urge for betterment that makes the philosophy of total quality management unique. Policy decisions of the government in education always trigger anxiety in the teachers as regards to the work load and the effectiveness of the policy is debated in detail. The study found that the overall

continuous improvement in the higher secondary school education in Kerala is above moderate. Thus, the initiative on the part of the government to improve the quality of education by introducing the concept of continuous improvement in the teaching, learning and evaluation process in the higher secondary school education in Kerala, India is successful to a great extend.

References

Behrman, J. R., Khan, S., Ross, D., & Sabot, R. (1997). School Quality and Cognitive Achievement Production: A case study for Rural Pakistan. *Economics of Education Review , 16* (2), 127-142.

Chakravartty, S. N., & Gupta, R. (2006). Quality Index in Education. *Productivity , 47* (3), 273-282.

Charantimath., P. M. (2011). *Total Quality Management.* Noida: Dorling Kindersley India (Pvt) Ltd.

Crawford, L. E., & Shutler, P. (1999). Total Quality Management in Education: Problems and issues for classroom teacher. *The International Journal of Educational Management , 13* (2), 67-72.

Crosby, P. B. (1984). *Quality Without Tears.* New York: New American Library.

Das, R. (1974). *Impact of School Conditions on Primary Education.* Assam: State Institute of Education.

Deming, W. E. (1982). *Out of the Crisis.* Massachusetts: Massachusetts Institute of Technology.

Desai, S. (2007). Gender Disparity in Primary Education : The Experience in India. *UNChronicle,XLIV*(4).

Edwards, d. (1991, december). Total Quality Management in Education. *Management Services* , 16-19.

George, K. K., & Kumar., N. A. (1999). *What is Wrong with Kerala's Education System?* Ernakulam: Centre for Socio - Economic and Environmental Studies.

Govenment of Kerala. (2003-04). *Education for the New Age: Report of the Kerala State School Education Commission.* Thiruvananthapuram: Government of Kerala .

Government of India. (2008). *Kerala Development Report.* New Delhi: Planning Commission.

Government of Kerala. (2010). *Economic Review.* Thiruvananthapuram: Government of Kerala.

Government of Kerala. (2011). *Economic Review.* Thiruvananthapuram: Government of Kerala.

Hansen, W. L., & Jackson, M. (1996). Total Quality Improvement in the Classroom. *Quality in higher Education , 2* (3), 211-217.

Heyneman, S. P., & Loxley., W. A. (1983). The Effect of Primary School Quality on Academic Achievement across 29 high and low income countries. *American Journal of Sociology , 88* (6), 1182-1194.

Menon., A. S. (2007). *A Survey of Kerala History.* Kottayam: D.C.Books.

Mukhopadhyay., M. (2001). *Total Quality Management in Education.* New Delhi: National Institute of Educational Planning and Administration.

Owlia, m. S., & Aspinwall., E. M. (1996). Quality in Higher Education -a Survey. *Total Quality Management , 7*, 161-172.

Pour, H. M., & Yeshodhara, K. (2011, July 17). *Total Quality Management (TQM) in Education - Perception of Secondary School Teachers*. Retrieved June 4, 2012, from E Journal of All India association for Educational Research: ejournal.aiaer.net

Rajani, K. M. (2009, October). Human Resources Development in Higher Education in Kerala. Kochi, Kerala, India: Cochin University of Science and Technology.

Sallis, E. (2002). *Total Quality Management in Education* (3rd Edition ed.). London: Kogan Page Ltd.

SCERT. (2006). *Teacher's Source Book.* Thiruvananthapuram: Government of Kerala.

Thakkar, J., Deshmukh, S. G., & Shastree, A. (2006). Total Quality Management (TQM) in Self Financed Technical institutions: a Quality function deployment (QFD0 and force field analysis approach. *Quality Assurance in Education , 14* (1), 54-74.

Tuttle, T. C. (1994). Is Total Quality worth the effort? How do we know? *New Directions for Higher Education* .

Uline, C. l., Wolsey, T. D., Tschannen, M. M., & Lin, C.-D. (2010). Improving the Physical and Social Environment of School: A Question of Equity. *Journal of School Leadership* , 39.

UNDP. (2013). *Human Development Report - The Rise of the South: Human Progree in a Diverse World.* UNDP . www.palgrave.com.

UNDP. (2011). *Human Development Report- Sustainability and Equity: A Better Future for All.* UNDP.

Veeragahavan, & Bhatacharya. (1989). School Achievement,Student Motivation and Teacher Effectiveness in Different Types of Schools. *Indian Education Review , 24* (1).

Viswanathan, C. N. (2007). Total Quality Management in Higher Education in Kerala. Kerala: Mahatma Gandhi University.

Waugh., R. F. (2001). Academic Staff Perception of Administrative quality at universities. *Journal of Educational Administration , 2* (2), 172-188.