Professionalism among the Pupil Teachers: A six-sigma Approach in Teacher Education

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Abstract

Education is a process of acquiring and being able to apply knowledge. It also refers to the process of learning. It is very contextual and qualitative in nature. Today, in the technologically advanced scenario, quality education is the paramount need of every nation. It is the responsibility of teachers to provide opportunities, nurture capabilities and maximize learning for quality output. They should acquire professionalism. Possessing professionalism through experiences during service period is very risky, time consuming and might not be successful while, inculcating these skills during pre service training could be promising and quality oriented.

As training is entirely different from teaching, it is the molding up of personality according to the desired or required skills for that particular job world, it must inculcate professionalism among the trainers. It is thus inevitable to make teachers understand the requirements of the teaching profession. Therefore, an attempt was taken to design an innovative assessment process for the performance of pupil teachers. This design is based on six sigma approach used for quality management. The project was conducted in a Self Financed Teachers Education Institute, Yamunanagar. It was carried on 56 pupil teachers studying in the institute. Mixed type of approach was used for data collection. The result shows very promising achievements. The work recommends six sigma approaches in education sector for quality output.

Introduction

Teaching is a profession, as it is a kind of job that requires special education, training or skills. The profession of a teacher has never been so challenging and demanding as it has become now. Global emphasis on literacy shows the world's concern for the teacher's role in the development of society. The future of the youth of a country depends on the knowledge and skills of the teachers. It is the intellectual worth of the teacher that makes

students creative, imaginative, ideological and diversified. Through vision and wisdom, a teacher can bring changes in students' knowledge and life as a whole. It is quite necessary to develop a professional attitude among the teachers. Therefore, for a teacher, it becomes a paramount need to acquire special, education or training for professionalism. Teaching is a complex job as it doesn't means to fill or overload students with tons of information rather it requires some specific talent, sense and proficiencies. A teacher should have sufficient subject knowledge, a better understanding of psychology of students i.e. how students learn. The core of teachers' heart comprises teaching skills which include a number of activities. Having master in subject knowledge, sensitiveness towards students and required teaching competencies are not enough to be a quality teacher as the attitude of the teacher, his/her personal views and beliefs are very important in this profession. Because, it is a job in which the success resides upon others opinions, the student's learning. Further, all above must be reflected in the behavior of the teacher and it should be a continuous process. So, for a flexible, organized and regular behavior, teacher should be trained accordingly. The behavior of teacher reflects his/her personality. The impressive personality is a sign of novelty instead of similarity, knowledge instead of information, creativity instead of criticism, vision instead of a will, dedication instead of dictation and practical instead of theory. Therefore, a balanced personality should be reflected in teachers' professional, personal and teaching or decision making.

Attitude towards work reflects professionalism among teachers. The teaching profession demands good communication skills, sound knowledge in the subject and related duties that are to be performed and the technical skill of teaching explicitly and focused content orientation, refined values and behavior. In addition, to excel in the teaching profession, pupil teachers should have the ability to nurture the intellectual potential of each student, encourage collaborative learning and accept the challenging learning environments and capability of system evaluation for opening a new spectrum of information. For this, firm determination & commitment within the profession of teaching is needed through research and continuing professional development.

For the promotion of professionalism among the pupil teachers and to develop their multi dimensional personality, effective training is the prerequisite. The teaching profession demands an impressive personality who can understand demands and responsibilities of the profession, manage human resource for knowledge, thoughts, possibilities and dreams. The tools to manage human resource are language, humbleness, personality, attitudes and the most important liveliness. A teacher having balanced personality keeps balance in academic responsibilities and duties of promotion and justification/ rationalization of life skills. Teacher educators are the people "who provide instruction or who give guidance and support to student teachers, and who thus render a substantial contribution to the development of students into competent teachers" (Koster *et. al.,* 2005).

Today, as more and more parents demand quality education for their children, teacher professionalism provides a way for schools to be accountable for the quality of education in their classrooms and to address underperformance among teachers. Six Sigma is about quality and it offer sets of tools that are dedicated to meeting the customer requirements. Parents and society in addition to students are considered as customers in educational sector and their perception is important in improving the Quality of education. Most of the Universities are assessing the quality on the basis of students' opinions. Moreover, there should be no compromise in the learning process and the ultimate goal to achieve zero defects, i.e. one of the criteria of six-sigma.

Six-sigma (6σ)

Six sigma is regarded as a new quality management strategy which is viewed as a systematic, scientific, statistical and smarter approach to management innovation. This is quite suitable for producing breakthrough improvements in the educational sector. It has been a matter of debate whether the six sigma concepts are successful only in the manufacturing and business sector or they can be utilized in teaching profession too. It eliminates errors, reduces variations, makes system changes and sustains improvements.

Six Sigma is a highly disciplined process that helps to focus on developing and delivering near-perfect products and services. The word 'sigma/ σ' is a statistical term that measures how far a given process deviates from perfection. The central idea behind Six Sigma is that if one can measure how many "defects" s/he have in a process, s/he can systematically figure out how to eliminate those and get as close to "zero defects" as possible. Phases of the Six Sigma Methodology are DMAIC.

Define- Who are the customers and what are their needs?

Measure- How is the processes defined and how are defects and/or variation measured?

Analyze - What are the most important causes of the defects or variation?

Improve - How can the causes of the defects be eliminated or variation reduced?

Control - What actions are needed to sustain improvement?

Key Concepts of Six Sigma: At its core, Six Sigma revolves around a few key concepts.

Critical to Quality: Attributes are the most important to the customer.

Defect: Failing to deliver what the customer wants.

Process Capability: What your process can deliver.

Variation: What does the customer see and feel.

Stable Operations: Ensuring consistent, predictable processes to improve what the customer sees and feels.

Design for Six Sigma: Designing to meet customer needs and process capability.

To achieve Six Sigma quality, a process must produce no more than 3.4 defects per million opportunities. An "opportunity" is defined as a chance for nonconformance, or not meeting the required specifications. This means one need to be nearly flawless when executing the key processes. Six Sigma is a vision one strive toward and a philosophy that is a part of the business culture. The key aspects of Six Sigma incorporate the use of

quality tools, the use of statistical analysis to make data-driven decisions, a strong focus on results, major improvements to customer's satisfaction and a focus on customer's requirements.

Properly applied, design for Six Sigma is a powerful management technique that generates the right product at the right time and at the right cost. And yet, the development effort faces many challenges in practice. Design for Six Sigma is a systematic integration of tools, methods, and processes for new product and service development (Pande and Holpp, 2003). It is a unified approach to process excellence. In education the Six Sigma approach can be used to improve the quality of education and the student's life.

The education industry exhibits some distinct features that are not found in the manufacturing industry. Six Sigma changes the way of the operation of the management. It is much more than improvement projects. Senior executives and leaders throughout a business learn the tools and concepts of Six Sigma, new approaches to thinking, planning, and executing to achieve results. In a lot of ways, Six Sigma is about putting into practice the notions of working smarter, not harder. The implementation or application of Six Sigma starts with the recognition of a problem, and the defining of a project to cure or alleviate the problem. Research proves that firms that successfully implement Six Sigma perform better in virtually every business category, including return on sales, return on investment, employment growth and stock value growth. The strategy that has to be applied in today's educational arena is a thoughtful concern on the part of the management to understand customer's needs and strive to reduce defects all throughout the educational processes. The specific focus of the Six Sigma management philosophy for continual improvement is a disciplined approach to all aspects of both the processes and production. Included in this focus are the products and process developments, process improvements and process management.

Pedagogy, in its contemporary usage, is a perspective that envisions effective teaching "as a process, not as a technique" (Hamilton & McWilliam, 2001). Teaching competencies are acquired in steps. One can't be a master in the teaching profession without spending time and attaining experiences. Therefore to study the influence of six sigma approach in promoting professionalism among the pupil teachers, this project was taken in hand. The researcher was the head of the teachers training institute where this project was carried out.

It is a teacher who prepares students to behave appropriately in the society. Social norms and cultural values are considered an integral part of the professional and social life transferred from a teacher to a student. As we become more & more reliable on the lifelong approach of learning, the greater are the consequences of assessment of learning which does not necessarily fit into the recognizable patterns. There is a need to continuously monitor and review the approaches and methods used to provide the students a whole-some teaching-learning experiences. Apart from examinations, tests, assessment or assignments, the study

focuses on the identification of the change in the personality of the pupil teachers from the time they entered into the teacher training institution till the time they leave.

Methodology: For this purpose, an appropriate assessment process based on the approach of six sigma was designed i.e. allocation of certificate colour to assess student teachers competencies at regular intervals. Such type of assessment process acts as a performance indicator and helps pupil teachers to know how well are they doing. Further, they are motivated and self inspired to perform better. The researcher intends to improve the teaching & learning/ training process through constant feedback. The main objectives of the project were to

> ➢ Inspire for close to 100% professional proficiency.
> ➢ Motivate the students to perform better.
> ➢ Provide a quality name to trainees.
> ➢ Encourage sustained hard work.
> ➢ Ensure the real attainment to the set standards.

About the Process

The six sigma approach is mainly associated with teaming. Therefore, the researcher identified few faculty members, teacher educators of the institute, who were sensitive hard workers and committed to the profession. Seven teacher educators were selected for the work and trained in the process. Few meetings were conducted with them to ignite their thinking towards quality in teacher education. During meetings, the main aims of the discussion with the teacher educators were to value the teaching profession and its significance in the 21st century, understand the teachers' expected contribution in educational institutions as well as in the society. Further, they were encouraged to identify the problems they face in achieving the professional standards and sensitize themselves about their role as an agent of social change. After the acceptance of the team to work for professionalism and their appreciation for the change agent, it was decided to identify the required skills for the teachers in the job world. A workshop was conducted in the institute for principals and teachers working in schools. The aim of the workshop was to identify the needed skills among the pupil teachers for the job or teaching profession. The participants were motivated to conclude with a list of required skills for the pupil teachers in today's challenging teaching world. They were further requested to underpin those areas where they also feel difficulty in delivering 100% performance. Total 15 skills were identified namely, communication skill, social skill, leadership, intelligence, creativity, organization skill, self concept, interview skill, teaching skill, participation in activities, alert, active and accuracy, values, observation and presentation skill.

After the identification of the skills, the team members were directed to observe professional ethics, and to understand and practice the role of teachers as an intellectual of society, and thus this enabled the teachers to develop balanced personalities. The teacher educators were allotted pupil teachers to mentor critically and constantly. Mentors were suggested to adopt 3T technology i.e. "training to train the teachers to train themselves" (Dhawan, 2009) and

the AAA concept which is related to the black belt concept of 6sigma. The Triple A means that All the teachers are Available at all times to All the students, or that the mentor were ready to guide 24 hours.

On the basis of the needed skills, the trainees are assessed in the beginning of the programme during orientation and are allotted a certificate colour according to their score. Each certificate colour reflects the percentage of identified skills. The PTs were allotted certificate colour according to the level of performance as Red, Pink, Yellow, Orange, Blue and Green.

Table 1: Allocation of Certificate Colour

Colour	Red	Pink	Yellow	Orange	Blue	Green
Grade	VI	V	IV	III	II	I
Overall Percentage of skills	0 to 20	21 to 35	36 to 50	51 to 65	66 to 80	81 to 100

Total 56 pupil teachers were selected for the study and an equal numbers of them i.e. six pupil teachers were distributed among the 7 team members/mentors. To avoid any favourism, the pupil teachers were designated with some typical numbers. Only concerned mentor knew the names of her/his group of pupil teachers. No mentor was familiar with other mentor's pupil teachers. However, all 7 teacher educators had to judge and provide marks to all 35 students. They provided marks among 1-100 % for each skill and the average was calculated. Colour was allotted on the basis of overall percentage of marks.

In a different historic and cultural context, but, with similar forces affecting American campuses, their diversity issues by challenging the colleges to be creative and to make diversity the American Diversity Initiative launched by the Ford Foundation in 1990 and addressed central mission in the educational system. The Campus Diversity Initiative grants have enabled colleges to run faculty-training programmes and workshops on diversity, to take a fresh look at pedagogy and emphasize the inclusion of diversity as an important theme in cross-disciplinary approach. Therefore, a Campus Diversity programme for five days was organized at the beginning of the session during which various activities were conducted and sufficient opportunities were provided the pupil teachers to show their talent, abilities and skills. Conducting orientation programme, pupil teachers' teaching aptitude is assessed. Various individual and group activities were conducted to judge the required skills and to make the pupil teachers aware, familiar and social with each. The students are informed about the allocation of certificate colour that how categorization and assessment of them will be done. In the beginning of the session, talent hunt was organized to estimate the ability of student other than academics and hobbies were also recorded.

Table-1: Assessment of Skills through different Activities

Sl. No.	Skill	Activities	Tool
1.	Communication Skill	CDI, introduction, reports.	Observation, writing matter
2.	Social Skill	CDI, games, co-curricular activities	Observation & sociometry
3.	Leadership	CDI, Scout, guide camp, seminar, games.	Observation
4.	Intelligence	Entrance test, classroom observation formative assessment	Observation, Test & result
5.	Creativity	card making, best out of waste and competitions	Observation & presentation.
6.	Organization Skill	Seminar, games, camp, cultural programmes	Observation and participation
7.	Self concept	Introduction during CDI and administering psychological test	Observation & test
8.	Interview Skill	administering Interview test, mock interview	Interview test, performance scale
9.	Teaching Skill	Practice teaching in schools.	Observation, feedback proforma
10.	Participation in activities	CDI, Various curricular and co-curricular activities.	Observation & records
11.	Alert and Active	CDI, Routine work	Observation
12.	Accuracy /timely	CDI, Submission & Presentation of materials.	Observation& records
13.	Values	Orientation, administering value preference test, regular activities.	Observation, and value preference test
14.	Observation Skill	During orientation, practice teaching, visits etc.	Written material during orientation, school report and other reports.
15.	Presentation Skill	During CDI, teaching, seminar etc.	Observation

As democratic outlook was adopted and equal opportunities are provided to every individual according to his/her talents and potentialities. Various curricular and co-curricular activities provide the budding teachers ample opportunities for positive social interaction & active engagement in learning. To make students self-motivated and enthusiastically learners, adequate verbal and non-verbal reinforcement is provided to them.

Multifaceted personality is developed by organizing various co curricular and community services. Each and every student is observed keenly. Their skill wise records, weaknesses & strengths were maintained by their mentors on the basis of which their weakness are tried to remove whether by retest, remedial assistance or by verbal or nonverbal negative or positive reinforcement. Pupil teachers were prepared to face the challenges through the activities of different clubs and associations. The environment of the campus was maintained motivational, developmental and performance oriented.

Team members constantly motivated pupil teachers to ensure their maximum participation in each & every activity with equal zeal & jest. After the continuous observation of three months (Oct, Nov. & Dec.), PTs were again allotted certificate colour according to their performance, they were also assessed for teaching skills which

were observed during practice teaching by their mentors. Similarly, they are provided with certificate colour after March. In the month of May or June, they were evaluated for interview skill and finally, they were bestowed upon with certificates of Red, Pink, Yellow, Orange, Blue and Green for level I, II, III, IV, V and VI respectively. The allotted colour was known only to the concerned pupil teacher and the Mentor. The mentors were instructed to keep the detailed and objective records of all the activities of pupil teachers. They have to repot the researcher weekly in writing. Before selecting the students for a particular level of cards, the consent of all the teacher educators were taken into consideration. After detailed discussion about all the aspects, ruling out every little chance of biasness & favoritism, students were allotted the colour. The card of next level signifies the improvements and growth in the personality of students.

To observe the PTs continuously and objectively in addition to their mentor, teacher educators were given responsibilities. Such type of assessment gives energy & purpose to students to come forward and bring about improvements in their own performance. Even mentors pay more attention to plan strategies for improvements. As every student is different therefore, one strategy will not result. More, it also depends upon the circumstances. During the training, pupil teachers were trained to develop as useful members of the community, it was tried to relate them with the sensitive issues of the community awareness programmes related to hygiene and cleanliness, waste management, female foeticide etc. Visit to orphanage, old age home and special schools, value hub, panorama, research institute instill in them the responsibility to organize the society. To imbibe the feelings to live for others, various activities were conducted. PTs were infused with civic sense and values too. It was emphasized to modulate their personality to become a responsible citizen having patriotic feelings.

Six sigma approach

DFSS or Design for Six Sigma is a systematic methodology utilizing tools, training and measurements to design products and processes that meet customer expectations and can be produced at Six Sigma quality levels.

DMAIC or Define, Measure, Analyze, Improve and Control are a process for continued improvement. It is systematic, scientific and fact based. This closed-loop process eliminates unproductive steps, often focuses on new measurements, and applies technology for improvement.

The project is undertaken by the researcher using DMAIC, which stands for Define, Measure, Analyze, Improve and Control (Brue, 2005). DMAIC is a valuable tool that helps people finds permanent solutions to long-standing problems. The logic that links the DMAIC phases is a key to success. Training is assessed throughout the organization and is considered indispensable. Six Sigma educations needed to be provided to ensure that adequate levels of literacy, numeracy and proficiency are processed by pupil teachers. The Six Sigma process analysis methodology is used to enhance the existing process.

A Six Sigma framework for continuous improvement is developed with a system of indicators for monitoring progress and success. The DMAIC sequence is applied by performing the system of activities at each of the 5 stages.

Define- The primary tasks at this stage are to define who the consumer for this process is, what the consumer's demands are, what aims the project is pursuing and what results it should bring. A project was planned and activities were scheduled. Training is a process, entering behavior of pupil teachers are input, the training input is the process and pupil teachers with acquired skills are the output. The main customers are the employers of schools. In teacher education, quality criteria among output or teachers are more crucial as these further affect other resource i.e. students and at last influence their lives and society too. Therefore, to understand the employer requirements, workshop was organized and their voices were listed.

Measure: Focus on gaining a competitive advantage through analytics. How to measure the identified skills and the process as well as phases of data collection were decided.

Analysis: Focus on diagnosis first, then action. Qualitative and quantitative approaches were used to analyze what are the most important causes of the underperformance of pupil teachers or the defects.

Improve: Focus on process improvement for maximizing output and organizational growth. Mentors after analyzing the area of ability needed improvement among their students, provided guidance to achieve the level. They kept on watching each and every activity of pupil teachers allotted to them. Utilizing 3T technology and AAA concept, mentors guide them for improvement in each ability or skills. This step emphasized on increasing the performance of pupil teachers and reducing any incompetency.

Control: Focus on monitoring process changes, understanding process capability, developing response plans, and effective project closure. The actions are recognized which were used during the project and resulted in improvement in performance or imbibing professionalism among the pupil teachers and which are needed to sustain the improvement.

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Result and Discussion

Table -3: Allocation of Certificate Colour on the basis of Performance

Colour	Red	Pink	Yellow	Orange	Blue	Green	Gain in %
Grade	VI	V	IV	III	II	I	
Overall Percentage of skills	0 to 20	21 to 35	36 to 50	51 to 65	66 to 80	81 to 100	
No. of Students in 1st phase	28	24	4	0	0	0	
No. of Students in 2nd phase	00	18	23	15	1	0	28%
No. of Students in 3rd phase	00	00	19	23	12	02	51 %
No. of Students in 4th phase	00	00	04	10	26	16	16%

The result shows that there were gains in percentage of skills in the four phases of assessments. After every three months (Oct., Jan., April and June) the PTs are informed through the certificate colour.

After the 1st assessment, teaching practice in schools was conducted. In addition, seminars, competitions viz. mehandi, painting, slogan writing, rangoli etc were organized. The average percentage of gain in skills was 28 %. Maximum gain in percentage was recorded in 3rd phase of assessment conducted in the month of March. It may be due to the organization of scout guide camp, sports, tour, cultural activities and celebrations. After 3rd phase of assessment, mock interview were conducted.

It was observed that the pupil teachers strived hard for the allotment of next grade or colour. Confidences among the PTs having blue and green card were noticed. It was also observed that mentors regularly remained in touch with the students and helped them to become from pupil teacher to perfect trainee. After identifying their problem or weakness, immediate feedback was given from micro to macro level. Mentors kept constant eye on them and promised professional proficiency.

The Six Sigma process is increasingly used in corporate practice. Education sector can also use Six Sigma principles to achieve higher quality. In education, Six Sigma pertains to improving the quality of matter taught, the character generated of the students and the quality of study and students life. Bringing Six Sigma efficiency and performance improvements to education sectors will raise new challenges for quality managers. Today's education demands opportunities for the intellectual, aesthetic, ethical and skill development among individual students.

Education is considered necessary for social training of human beings and teacher assumes the responsibility of developing personality of the learners through changing and arranging the learning environment as well as presenting her/himself as a role model. Every individual is unique in his/her personality. Personality of a person consists of manners, attitudes, physique, mental faculties, learning styles & habits, and social status in the society. Construction of personality is related to mental thinking and physical behaviour. The mind designs a desirable concept of personality supplemented with body behaviour or action. A balanced personality forbids an individual from adopting any negative tendency or extreme behaviour. A teacher having a balanced personality maintains balance in his physical properties like food, dress and cleanliness, creates relevance in physical skills like walking, talking, body language, alert and active, controls emotional qualities as character, feelings, sensitivity and emotions, promotes mental faculties like knowledge, beliefs, imagination, creation, inquisition, innovation and develops bondage, relations, care and brings liveliness as an impressive personality helps a teacher to understand and observe social values and traditions, as well as to nurture and mentor relationships with family, friends and society. Similarly, professional traits of personality relate to the abilities of reading, writing, listening, talking, analyzing, competing, ordering, and formatting information into knowledge.

The concept of continuous improvement is not an unfamiliar one to educators. It is the rare school or district that does not employ some form of Total Quality Management (TQM) or Continuous Improvement Plan (CIP). These strategic models often guide the development of achievement goals for schools and districts that employ them but offer no real practical means to achieve these goals. But six sigma emphasizes on the process i.e. how to realize the goal of TQM.

Recommendations

Benefits of six sigma in teacher education.

It is evident that the education system especially teacher education when there are mushroom growth of teacher education institutions in the country struggling with the need to become cost effective and, at the same time, deliver top-performing student teachers. Some of the benefits of using 6σ in teacher education include:

1. It provides a system that enables college to meet the NAAC accreditation requirements.

2. The define, measure, analyze, improve and control (DMAIC) process provides a template for problem solving, root cause analysis (RCA) and continuous improvement. In education sector, most individuals are not familiar with the use of a systematic process for quality improvements.

3. It promotes total involvement of Teacher educators in the institution and training in management of information.

4. Measures used in teacher education are generally lagging indicators. The mentors used both quantitative and qualitative approaches for measurement. Because of the

requirements of 6σ, team members identify primary indicators that reflect the success of training.

5. It encourages teams to make processes visible, teams and pupil teachers can identify and remove or improve the incompetency.

6. In most educational environments, the concept of the customer is only applied to students. However, this approach considers the need of schools, society and job environment and their requirements as these are included in process design.

7. There are several costs that are hidden in teacher education. This concept is often referred to as the "hidden factory." These costs consume resources, people and time, and add very little to job world requirements. This approach reduces the hidden cost.

Obstacles

It is a new process of assessment for imbibing professionalism among the pupil teachers. Some of the obstacles using this method are that a complete record of all the activities, improvements and progression are difficult to maintain. Sometimes, it becomes very difficult for mentors to motivate students for each and every activity and only few students come forward again and again.

Students, especially their parents are only believed in annual examination so they didn't show interest. There are chances of biasness on the part of teachers. It should be more objective in nature.

Conclusion

A teacher has to develop professional skills and competencies to enable generations to live and work in the ever developing world of knowledge and competition. S/he should be aware of the due expectations of her/him from the different parts of society. The teaching profession is difficult and a bit delicate in comparison with other professions because a small error and slackness can cause a great damage. Effective pupil teacher appraisal helps to become sensitive to individual talent, performance and motivation by allowing them to progress in their career and take on new roles and responsibilities based on evaluations of their performance. The gain in percentages of skills among the pupil teachers reflect that this approach of six sigma is very successful in promoting professionalism among the pupil teachers.

The teachers training institutes in India mostly emphasize on quantitative approach. It must be qualitative in nature because the development of nation largely depends upon teachers. Teachers are the change agents of society.

Today, the society demands quality in education which can never be achieved without considering the quality of teachers and teacher education. From the project, it can be concluded that six sigma approaches can be used in teacher education to improve the quality content among the pupil teachers and to make them proficient professional. However, more researches in this area are needed. The present work mainly emphasized on performance of pupil teachers. However, there are other factors beyond the pupil teachers such as curriculum, methodologies and the type of training etc. Thus, the critical

quality element is wide in education and it requires a broader application covering all the elements of teaching and learning process. It is a beginning in teacher education, to improve quality in totality, and thus a comprehensive process comprising a dynamic and definite strategy is required.

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