Research Article

# The Education of Quality for Quality Education

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## Abstract

Quality has been variously defined, but fairly understood because of its complexity. In case of education, this haziness is further enhanced, especially because of the illusion at the boundary of quality of education w.r.t education of quality – the two aspects of education quality. This paper attempts to clarify the haziness by citing the importance of each and underpinning how each contributes holistically to the excellence working at the system level.

To analyze the two aspects this work draws on the three definitions of quality, as defined by ISO 9000 series standard, or by Gurus like Philip Crosby or Joseph Juran. The quality prescriptions are weighted w.r.t the system of education that looks at approach of transformation, or outcomes or the customer's demand. The three attributes are mandates of excellence of the Thareja's AUM model, or of accrediting bodies or of the employer. The latter attribute is sought after both by prospective customers of education institutions (students) and by employers – the consumers of the product.

Finally, in this paper I prescribe improving the system requirements, addressing the constraints and holistically transforming the student through various education processes. The implementation is prescribed to chase objectives duly aligning with processes for performance improvement, using the transition tree approach. This is done through determination of gaps between current reality and possible solutions (actions).

**Keywords:** Employability, Fitness to auality, Holistic education, Compettitude (competence+attitude), System approach (system of systems), Thareja's AUM model

## The Essence of Quality Education

The parable that 'a strong building will be founded only upon a stronger foundation' holds ground, and will get a much better explanation when the rudiments are quality. For the development of a competent person, an excellent institute or organization will come at their back along with their quality process who could impart due education and training. Quality needs to be at the behest of the former (a competent person as resource) who signifies delivering a product through a process (of education). Since the operating feature among the two is 'quality', it is pertinent to start the discussion by defining 'quality'.

Quality is difficult to define, and while between them there is a large variation which spans, say, across the following definitions:

- "Fitness for use" – Juran[1]
- "Conformance to requirements" – Crosby[2]
- "The totality of characteristics of an entity that bear on its ability to satisfy stated and implied need" – ISO 8402[3]

The resulting elusiveness that renders it as being multi-dimensional is still narrow and focused.

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Principally, this set of definitions promises to connect usually synergistic requirements through right a development of the relevant product which should be fit for use. In the case of development of a competent engineer (quality attribute – fitness), the requirements are employability – in designated areas of operations – which need be ascertained and met through the development process that happens at the school and impart the characteristics fit enough to satisfy stated or implied needs.

Since the employability of engineers is not so good, it is construed that the outcomes of relevant process [shown in Eq. (i) below] are not fit, actors on the left of this requirement are not commensurate in fitness, or conforming to requirements.

$$\textbf{Initial preparedness} + \xrightarrow{Education\ planning} \int_{Imparted}^{retained} \text{Competencies} + \textbf{Attitudinal \& Quality training=Employability.....(i)}$$

Evidently, the success is demonstrative of the two-way fitness to use – of the left size of inputs and processes leading to reality, and on right the performance (i.e., employability), as a process measure for the fulfillment of expectation.

## That employability is an outcome of right performance, we can say

$$\textbf{Employability}\left\{\frac{Performance}{Expectation}\right\} = f\{\textbf{Total competencies possessed, attitude, skill for quality}\}$$

To account for the deficiencies in the product – the failures from fulfillment of stated or implied requirements leading to unemployability, the necessity of a "planned additions" to the 'student – raw material' is envisaged as in Eq. (i) above. This addition calls for those factors that cater to employees' knowledge, quality skills and attitude. It implies, a student must know these three interrelated elements, viz., what to do, how to do it, and understand the consequences of his or hers decision's wide perspective.[4] Yorke considers the concept of employability to be a synergic combination of personal qualities, skills of various kinds and subject understanding.[5] The meta-employability would entail as to how one uses those assets, and how these are presented to employers! While, Bates[6] considers autonomy and responsibility are integrated and interrelated with knowledge, together these constitute the constructs for practicing professionalism, evidently because a right attitude and its interface in quality terms is a preamble to employability.

Since employability is complex, 'a difficult concept to measure and define,'[7] weighting Eq. (i) is difficult. I define employability as the set of competencies perceived to be developed from employee to the stipulated requirements that should have been possessed. As 'skills' are often referred to as competencies, capabilities or attributes, levels or learning outcomes, these compound the sense of confusion while defining employability. Calling for clarity, de la Harpe et al.[8] prioritize that the first thing "required is that universities are able to determine what society expects from its graduates." Matching that, the operations (or processes) which will ensure development of product or service specifications are charted in Fig. 1.

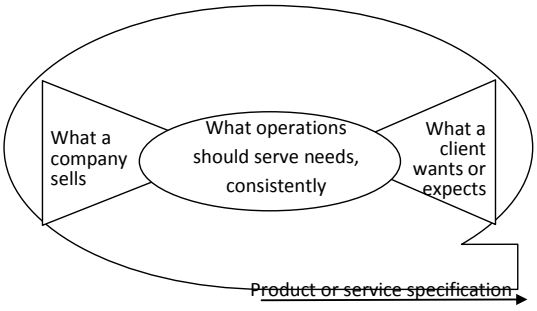


**Figure 1.The Engine of Processes/Operations which Will Ensure the Development of Product or Service Specifications that Client Expects**

Stemnet[9] lists the top 10 employability skills, and how these should be evidenced. The other question is that are these the requirements or fitness that drive towards the satisfaction of aforementioned quality definitions?

## Multifarious Fitment through Education

### When we explore fitness, we find four aspects namely

- Fitness for Standard, viz., quality management standard, Z1.11 education management, ANSI/ASQ/

ISO9001:2009, with due inspection orientation with the standard operating practices targeted for various functions. This usually has no consciousness to customer/market

- Fitness for Use – Must satisfy customer need for use – the direct requirement by industry (like design ability)
- Fitness for Employability (Market) – Must fulfill communication ability, team working, etc. (achieve low cost as well as the above two requirements)
- Fitness for Latent Requirements – Orientation to conform to the voice of the customer – by deploying continuous innovation for the value addition

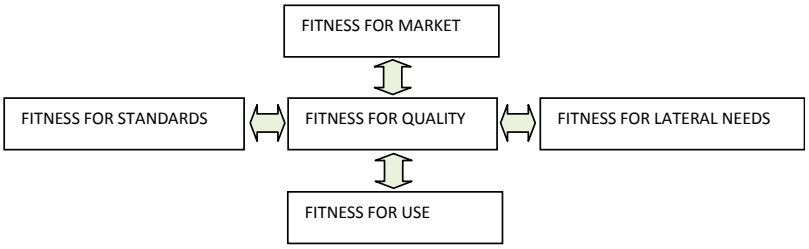


**Figure 2.The Character of Forces for Product Quality (Qualifying for Fitness for Use)**

**These four 'Fitnesses' align with 'employability skills'[10] matching the latter's key areas as under**

- Traditional intellectual skills – e.g., critical evaluation, logical argument; vs. Fitness for Use
- Key skills – Communication, IT, etc., (Fitness for Markets)
- Personal attributes – Motivation, self-reliance (Fitness for Lateral Needs) and
- Knowledge of organizations and how they work (Fitness for Standards)

To develop these skills effectively, as a precursor to right transfer of skills in the class room, I had blogged my feelings as: "There is possibly a need to inculcate responsibility for watching their [student's] learning. In that case, the scope/purpose of assessment can be limited to ensuring the variation and efficacy of rightful-retention in learning [1 and 2 above]. In the Indian educational system, assessing the motivation and focus is a big challenge [3 and 4 above]."[11]

In fact, skill development is a learning process in its own right, and their mutual transfer may be easier for skills in relation to objects[12] or learning situation.[13] At times, there may exist a difficult differentiation, viz., in computer skills (Fitness for Markets) vis-a-vis the 'soft' skills (Fitness for Lateral Needs). However these are easier to provide to students rather than, say, the organizational knowledge (Fitness for Standards) required, because interacting with and managing people effectively may be necessary for being equipped for a job.[14] As a result, Miller endorses higher concentration on the learning outcomes of students as fitness of quality, for which a change in practice with less focus on didactic tutor-led approaches to learning outcomes is recommended.[15]

The importance of relevant actors is schematically knit in Fig. 3. It implies that in order that the quality attributes for due employability are restored, the (process) characteristics that entail their ability to satisfy stated and implied need must be improved to desired levels. The stated and implied need is evidently one which the customers and stakeholders want. The onus is on fit education development that is finally ensured through a quality control process. This is also in accordance with notion of quality as the satisfaction of stakeholders.[16] He stresses that only the 'demand-satisfaction process' has quality [dimension].

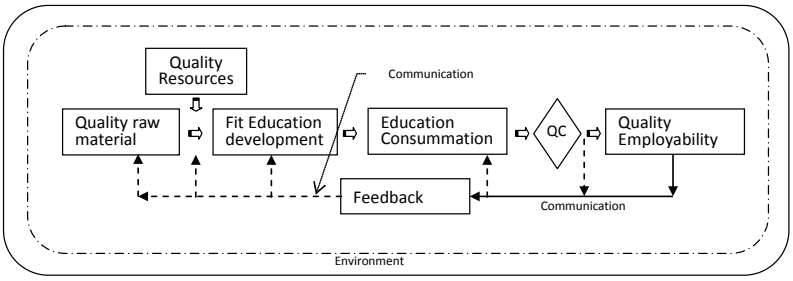


**Figure 3.The System Level Constructs for Education Process that Assures Employability**

Its output is assured through a process, which affects requisite consummation of educational stimulus provided through a fit educational developmental process duly planned using quality resources over the students (as good-quality raw material).

In essence, Warn and Tranter[17] posit that higher education is a transformative experience and that by developing these generic competencies students become adaptive and adaptable. The increasing complexity, however, is in the environmental contexts – that is changing at an accelerating rate.[18] It requires that all operators of education (students/

teachers) become more strategic in the introduction of change to the system as a whole.[19] Developing specific ideas for change that lead to improvement…[requires the] ability to develop, test and implement changes.[20] Quality of output is directly dependent upon that of the participating constituents, duly held together by relationships,[21] of which some are sustainably and effectively controlled while others are fluid. The collection of objects that interrelate gives rise to emergent properties in the system,[22] the quality of which should decide the end quality. The latter category of participating elements is as complex as a possible interaction,[23] and thereby necessitates a system approach. ISO 9001 goes on to define a system as a set of interrelated or interacting parts[24] so as to achieve objectives[25] (say of employability or fitness).

Probably because quality in higher education is a complex concept and has eluded clear definition,[26,27] the need for understanding quality deserves more attention, especially when in academics the 'quality of the outcomes' achieves an important dimension by accreditation bodies, who consider it as a vital attribute in graduates.[28] In context of requirements from the stakeholders, accreditation agencies or from the viewpoint of the relevant career centers, Ball[29] posits the idea of Fitness for Purpose as the definition of quality. For due operationalization, one requires a clear understanding @ society and the surrounding community, government, university management, students and external clients, staff of university programs to which students are referred, employers of prospective graduates and the career center staff themselves.[30] Thus multiple evaluations, multiple reporting systems, and dialogues with stakeholders are needed to build a shared understanding of the concept of quality that defines fitness for purpose.

Towards evaluation of teaching and learning, Melrose[30] associates the paradigm of auality as transformation,[31] as this is the primary purpose of education. Harvey and Knight[32] establish that transformation is a 'meta-quality' concept and that various definitions of quality are 'possible operationalizations of the transformation process rather than ends in themselves.' Quality as transformation of the individual along a career pathway should draw from necessary faculty competencies who value the concepts of employability, and also lifelong learning (another form of transformation.[33]

Academically, the transformation of input into output by the system is usually called throughput. In terms of quality management at macro level, strategic goals and objectives are achieved through processes – inputs and transformation – and outputs.[34] These processes are influenced by internal and external customer demands, situational demands, such as, capacity and regulations, human behaviors of employees, duly influenced by work climate, organizational culture, and the predominant style of managing. Given organizational culture is a crucial factor in understanding the ability of any organization to perform and compete.[35,36] The conventional organizations and those in education should work the same way. A student of management and organization theory could only be stunned by how little the efforts to improve quality [in education organizations] have learnt from current thinking in management and from the experience of other industries.[37] However, the condition in learning institutions can be disparate because of culture.

In 'education,' such inference that the output from academic process is a direct outcome of input quality, as expected from Eq. (i) is belied because the student is an active processor. Assuming that the student has its own fiefdom which limits others, top management and/or peers, to permeate the "secrets" by which they control their learning, the transformatory process is deemed to be complicated. In a class room since the student is interconnected with other such individuals (sibling systems), the mutual interactions of the component systems sort of "glue" them together into a whole. Further, each of this subsystem in the vicinity of a group of interacting people may form a family, a firm, or a city of which the collection could again be seen as a system.

## System Level Impacts on Quality of Education

The system approach requires that sequential tasks must be realized so as to maximize the product formidable using valued resource (including soft resources like information). In this strategically poised task, the cost and performance characteristics capable of performing each of relevant tasks must be defined. The fundamental goal is to determine the most cost-effective combination of resource types for a specified production batch.

Webster's Third New International Dictionary defines a system as a coherent unification.[38] The unification can be of activities, events, thoughts, information, code, materials, people, methods, measures and equipment. When implementation wise they graduate as a set of interrelated or interacting parts as in the equation defined in Fig. 2, the enabling of the objectives is easiest. Equation 2 is an elaborate form of the basic equation in the form of input-process-output, which (latter) is defined by Oxford Dictionary as a starting point, minimum required without elaboration, or inalienable. This equation reveals much more than it hides. The case of engineering student – the raw material is not as simple as that of a conventional raw material. For the product, the desired expectations also remain dynamic. These progressively become tougher as and when these are met, requiring higher and higher levels. Thus outcome requirements remain dynamic and continuously upgrading in terms of capatence (capacity+competence),[39] conforming to requirements of qualte-k-nology (quality, technology and knowledge).[40] The latter aspect is because of continual upgradation of thresholds of current technological revolution (CTR).

While Whitney & Nevins stipulate that approximately 75% of life cycle (design and manufacturing) costs are determined during the product development process,[41] since the latter is pulled by employer – more changes are necessitated in engineering education settings. Thereby, we conclude that the need for restoring quality attributes of left side of equation is slated to become more and more complex. This aspect also draws strength from the author's definition of quality which qualifies it as "a quantitative measure of perfection at the stance of customer's preference."[42] The goal is excellence @ customer's perception. The process parameters must assure due measurement and control. To continually enable a development of these requirements as per needs, the engineering education process must be reliably strengthened to systemic levels. The fundamental goal is to determine the most cost-effective combination of inputs and resource types for a specified production batch. Given the independence of the components in Fig. 3, their evolutionary nature and possibly time-linked/ emergent behaviors, each influences the interaction of its components. When the various tasks, by pooling their resources and capabilities together to newer complex of arrangement that create better functionality and/or performance, such system of systems yields a better product than the earlier sum of the constituent systems. However, since Troncale[43] views a total over eighty processes may get involved in any complex System of System Processes (SSP) throughout nature, the mandate is that the processes are maintained in a holean[44] (holistic, holy and lean) way.

The system of system has it that any organism that is interacting with another agent is inseparable in terms of quantum mechanics and affects the quality as per the quality of their interaction. Similar paradigm applies in a class room. The onus of individual processes and of that of improving the quality of interaction applies on each of the actors – the students. Part of this is individual's operation (student as his/her own operator of learning – a sensitive part in a production process), and rest is passive (as that of inactive raw material in a production process).

Mijares et al. further observe, "Because they interact, something more is added. With respect to the whole the parts are seen as subsystems. With respect to the parts, the whole is seen as a supersystem."[45] It is this property that enthuses the 'whole' (throughput of a class) is more than the sum of individual parts. By definition, in a supersystem the awareness that a system under consideration has a relationship with one or more of other systems whose major functions at the first level oversee a process of synthesis rather than analysis. It stands permitted duly identifying through a boundary-maintaining entity or process. Thus this system is seen to compose of parts analogues to a black box and a complement of white box – like of the oneness of Yin and Yang – the complementary (rather than opposing) forces that interact dynamically. They exist without any clarity on cause-and-effect relationship.

In a process where the student is an object under working for say less than 1/3$^{rd}$ of time, and in rest of time become a subject of environmental influence (with friends, parents and society), the two types of forces as above will govern the quality of whole. Piecemeal approach does not enable the education system to reach its full potential and piecemeal adjustments have proved inadequate to cope with changes that occur in the larger environment of social systems.[46] Both the constancy of purpose, and the quality of environment are therefore vital. However, there are several negative influences in the system as observes Dr. W. Edwards Deming:[47]

"The prevailing system of management has destroyed our people. People are born with intrinsic motivation, self-esteem, dignity, curiosity to learn, joy in learning. The forces of destruction begin with toddlers – a prize for the best Halloween costume, grades in school, gold stars – and on up through the university. On the job, people, teams, divisions are ranked – reward for the one at the top, punishment for the one at the bottom."

All instincts, including what Deming observed, exist as inborn mechanism in our minds and cognitively compel our minds to constantly improve our knowledge. These knowledge instincts finally drive our permanent behavior or culture,[48] and over a period articulate consciousness, cognition, and emotion as functions and series of processes. Since consciousness is associated with our "second nature," it impacts our capacity to exist within and further create systems together.[49]

As a consequence and to support the context of employability, the complementary purpose of educational system becomes as one to set up a value base, along with the like of a cultural umbrella that continually shields the students from all odds – averse to any development which is not productive. Paul J. Meyer attributes the personal and career success to the human connection to which the key is communication.[50] It (communication) also helps monitor large-scale system-level initiatives that successfully change the "culture of organization." With due cognizance to Sikh Guru Gobind Singh's teachings, the operational attributes of an individual learning student itself is construed to being equivalent to that of an organization.[51] While the endorsed value system can help reform and re-engineer the practitioners so as to transform into fine individuals,[52] it is in sync with the creation of a culture for continual learning, termed '*sikhi*'. His teachings can sensitize the global business leaders towards value-based management for sustainable growth and success. Thus managers can build ethical socially responsible organizations.[53]

Thus for a holistic or better holean (holistic+lean+holy) development,[54] parameters as espoused in equation above

need be regulated both in terms of needs and provisions.

Augurs Fred Wilson,[55] "Investing in management means building communication systems, business processes, feedback, and routines that let you scale the business and team as efficiently as possible." The outcome at a higher level is cognizant of a more abstract, encompassing view of the whole, without attention to the details, whereas, at the lower level the analytic approach helps understand a multitude of interacting parts whose sum may be considered to stipulate as 'output'. Given the throughput of all initiatives qualifies adequately on stipulated scales as designed into the 'quality control' schema, but it is the outcome that qualifies the process in terms of say 'employability'.

It distils that the quality of product (learning) depends upon the way the system operates. The holistic system environment as that of Indian System of Gurukul[56] provides best context and hence knowledge instincts. Defining holistic education, Miller[57] terms it as a philosophy…that… finds…purpose in life through connections to…spiritual values....Concurs Paul A. Lacey[58] that "education aims for far more than religious indoctrination." Miller believes holistic education is more concerned with drawing forth the latent capacities and sensitivities of the soul that prepares young people to live purposefully, creatively, and morally in a complex world.[59]

D'Andrea[60] asserts holistic education involves initiating identifying and managing three major areas: academic development, learning development and quality development. I classify quality development into the system of quality and quality of the institution. The system of quality implies catering to quality at each stage – i.e., holistically. The new perspective is shown in Fig. 4.

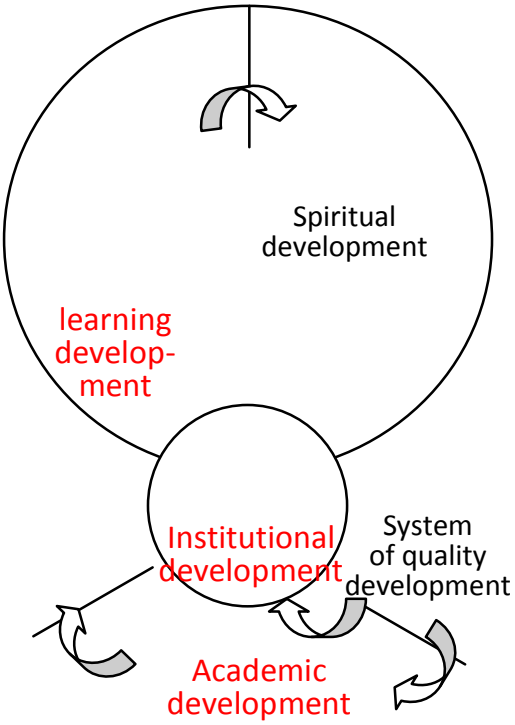


**Figure 4.Holistic Educational Development (Adapted from D'Andrea[60]**

Concur Lave and Wenger[61] claimed that a realistic learning situation and setting fosters the transfer of knowledge and skills, which are influenced by the learning context[62] and the way learning is activated.[63]

The linkages between these components are oriented with the system view of learning development. The achievement of objectives (or measurable outcomes like 'employability'), coupled with human performance – including expertise and experience and the strength of communication, is further subjected to the strength of transformation processes, which governs as an effective measurement system of the core competencies of the organization.

## Quality Management of Education as a Process

Quality should necessarily be a win-win proposition, calling for a productive interaction between customer-organisation-supplier partnership. It conforms to Stephen Covey's paradigm of pursuing organization goals as a collated process between the three, which is in sync with reality versus the perception, and thus enables determining the necessary action for success.

Success is a result of sustained effort, continuous leadership, and the long-term commitment of resources and systematic auditing of performance. Mahony et al.[64] identifies four factors central to effective implementation of the quality

management system in an HE institution: the management of culture change; the role and sponsorship of senior leadership; stakeholder engagement; and implementing quality processes. We look at a concise integration of the first three and then evaluate the road map of implementation.

Culture is important as it paves the way for excellence in quality of any university. Augurs Todorut[65] the culture represents university's genetic environment[66] that represents in the essence of its life – and remains an unwritten but mandatory regulation. By definition, culture becomes a conservative nature and opposes any innovation or major changes of management. It becomes important to consider as to how culture of an institute undergoes change in the event of increasing demand for demonstrable quality and outcomes. Evidently, the university hosts faculty who as process managers provides students with opportunities for their personal growth and presides over the transformation of inputs to outputs of greater value to the students,[67] institute, and to the ultimate customer.

Being applicable equally to education as to other organizations, all the above three factors call for total transformation. The total in education includes principals, teachers, parents, school administrators, etc. With high level of synergy in various actors, a high-quality organization culture is born displaying shared beliefs, attitudes, values, and norms of behavior.[68] The cultural traditions and values of the society inspire the educational leadership as the latter is a bounded process.[66] Leithwood et al.[69] posit leaders play critical roles in identifying and supporting learning, structuring the social settings and mediating the external demands.

Education leadership, defined as the process of enlisting and guiding the talents and energies of teachers, pupils, and parents toward achieving common educational aims has different roles in different situations. For example, in case of lower subject specialization – what should be taught; and in higher specialist education the policing and how education goals may be managed. It implies, in the terminal levels of education, it needs to converge towards consideration of employability as *'another'* objective. Another, because the various developmental outcomes include fulfillment of quality discourses terms such as wellbeing, passion, wisdom, enjoyment and self-actualization. This view is supported by Morley who observes: "Human capital theories hold that a government that failed to press higher education to do its utmost to enhance graduate employability would be seen to be negligent of national wellbeing."[70] On the other hand, when government may perceive that good-quality higher education should contribute powerfully to graduate employability, leads to fears that an emphasis on employability threatens achievement of the other societal/ developmental outcomes.

It is construed from above discussion that the role of leadership is more than advisory. The functions include setting up systems that engineer sustainable Improvements to world-class operations.[71] Moreover "governance needs to be underpinned by a culture that values lifelong learning in educational setting that recognizes the key part it plays in improving quality."[72] Practically, since only a crisis receives the direct attention of leadership, the systems and long-range problems that involve integration of many factors should require new patterns of organization[73] and hence deserve to be handled by teams devoted to total transformation.[74] So observes the Wallace study the presence of a strong connection[75] between student achievement and the "collective leadership." It espouses that the alignment to student achievement is the first rigor of educational leadership.

Swanson[76] Counts the major challenges that spell the need for quality as an attribute in an organizational system, as excerpted below. This implies

"to enlighten management regarding what customer focus and leadership mean [as the] development process in their organizations still requires acceptance and clarification from both parties. Following that, a customer-supplier partnership…that is based on trust and an understanding of what is needed from each is crucial. The partnership must be clearly defined, engaged in, and then continually evaluated to ascertain its contribution to human resource development for meeting the organization's goals….and… continuous improvement."

The suppliers include the institute, teachers, consultants, and various resource providers, who should be in sync supporting constructs between Eq. (i) and/or Fig. 3.

Several authors explicitly or implicitly agree with the importance of autonomy, self-organization, and the subjectivity of the former type of operators. They emphasize on such epistemological, psychological and social issues that complement the reductionist climate which follows on the great progress in science and engineering [as quoted in Heylighen.[77] This argument further supports that the individual's culture that must promote holean (holistic+lean+holy) development should dominate the total development process of a student in class.

Systemically, these align w.r.t the Thareja's AUM model.[78] An effective alignment paves the way for growth of competencies (through utilization of resources, varied learning, etc.), which finally bloom @metamorphosis (a.k.a transformation). For engineering education, Hadgraft et al.[79] argue the professional preparations draw upon make following critical competencies for following three compelling reasons, viz., alignment for the philosophical part of engineering, deeper learning at usage level, and the learning at the transformational level @ system of systems, as reproduced in Exhibit 1.

| Exhibit 1.Hadgraft et al.'s Imperatives of Engineering Professionalism, Adapted to Thareja's AUM model [79] | | |
|---|---|---|
| **Construct** | **Role** | **Description** |
| Alignment | Philosophy of engineering practice | Exposure to different approaches to system conceptualization can highlight the new perspectives and insights offered by alternate approaches to modeling or metaphoric representation of systems. Hence development of systemic awareness offers engineers opportunities to improve understanding, design and steering of these systems. |
| Utilization | Improved future practice | The increasing complexity of systems created by engineers, and uncertainty and complexity associated with engineering work at the technology-society interface requires systemic understanding to map, predict, and, if possible, control or mitigate the nature and effects of engineering projects. |
| Metamorphosis | Continuing professional learning | Systems thinking is an important meta-attribute in that systems awareness coheres with a range of related attributes important for reorientation of practice and continuing professional development in engineering (eg. lifelong learning; reflective practice; innovation; creativity; openness; social justice). |

The role of a teacher cannot be demeaned, since she is not only a resource provider or a facilitator of teaching and learning, but also a just-in-time assessor, advisor and a mentor, who provides feedback as provided in Fig. 3. Both the quality management, and system approach draw strength by the "feedback targeted onto the operator as an enabler to constantly review and finally ensure the maintenance of process capability to continuously meet the customer requirements.[80] Since the customer is not one, and the needs of various individual customers in the class dare not be matched b2e (beginning to end), the teacher has to oversee the fulfillment of a majority of customers' ambitions. Like both ends meet."[81]

The teacher's role in class includes communication as not only in connecting with the employer or parents, since the latter has multiple applications – the lower level constructs operative in a class room as the process of teaching and learning is governed by communication – that develops a product whose effectiveness is dependent on this ability as a measure of employability; and the higher order construct since that is imperative in quality management.

Further, as an attribute of quality, it (good communication standards) is indeed vital to ascertain employer's perception as a requirement of quality management, in line with the definition of quality (Q=perception vis-à-vis the expectations). For this purpose, the effectiveness of the process and outcomes of, say, surveys from external parties to track measures that advise transformation process, surveys of competitors that provide corrective and preventive actions or help benchmark performance/ process measures are monitored.

In practice, Park et al.[82] observe feedback tends to be infrequent, uncoordinated, vague, or not actionable. They argue the lack of professional development too often results in the lack of skills necessary to engage teachers in trusting, instructive, and productive feedback conversations, and consequently a confusion about the purpose of feedback. Teachers may wonder whether feedback is meant to evaluate or improve their performance. Evidently, quality of information controls the future performance of processes.

A product perspective of information[83] entails business processes help support strategic corporate decisions The ability to capture right information, process it in the right way, and communicate it to right stakeholders in right time is vital. However many organizations are still struggling with information quality improvement and to mitigate the impacts of poor quality of information. Thus various tools that help plan, control and improve organizational, technical, and human dimensions of information system are utilized.

From the analysis of feedbacks both written and oral and information provided by students as well as the professional engineers involved, the conference concluded[84] that the suggested approach was applicable in the assessment of professional skills.

## The viability of the assessment approach rests upon three cornerstones of

- A good alignment between the teaching activity of role playing and the method of assessment, which allow the students to actually practice their professional performance
- Industry involvement, i.e., the formative assessment in which professional engineers, with solid experience from industry, provide instant feedback to the students about their professional performance


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- The realistic context, i.e., the role play was located in the meeting facilities at the office premises of the respective professional engineers, which contributed to the professional dimension, enhanced awareness and to the learning process of professional skills in the course

The approach showed some minor weaknesses in step 3, i.e., the concluding self-assessment, in which the students were asked to personally reflect upon their learning process in terms of a self-assessment. The written assessments handed in turned out to be quite disparate in terms of content, scope as well as the layout.

## Implementation of Quality Management for Quality Education

Koslowski[85] perceives the intense competition for quality education causes both pressure and demand for implementing quality management. It (improving quality education) is, therefore, a project which calls for changes to an existing culture and practices. Consequently, world over educational systems are going for vigorous development and restructuring, especially to conquer over the premise that educational outcomes accrue through students' achievement.[86]

One of the popular expectations and also a measure of fitness of institutions is the employability – the placement rate. Since that translates into brighter promises: by way of a pull exerted on fresh admissions for coming session, employability is being perceived as a metric of institutional success. As a consequence, in most institutions employability is being construed as an institutional achievement rather than the propensity of the individual student to get employment.[87] Albeit, employability is regarded as a performance indicator[88] of even an aspect of quality of higher education,[89] and consequently applied as end-of-pipe solution. More precisely, when the benefit and usefulness of the study program – stipulated as 'outcome' is searched in employment performance, this itself becomes a task with do-or-die approach, entailing plans with high and earmarked budgets.

When some quality management is applied to facilitating employability, the customer's voice in sought in say development of curriculum. This way, employers' views are embraced by disciples, but there is usually a lack of mechanism ascertained to sketch the all-assuring pathway. In a hurry to improve employability, the institutions deploy symptomatically perceived corrections, viz., institutions focus on say job attainment skills (interview technique) rather than developing employ-ability attributes; not bothering to embed generic employability attributes in the curriculum, thus threatening the empowerment of lifelong learners. Moreover, no "Questions are raised…whether the same employability attributes have similar economic and professional values for different social groups." Morley terms employability as a 'socially decontextualized signifier' and suffers of ills where the coveted skills of individuals are sugar-coated to sleep by sins of unified curriculum.[90] Thus, instead of putting effort into preparing a range of different types of students, especially for subjects that have 'problematic' employment rates, institutes end up in putting clones knowing the same curriculum that utilizes the assigned 'rote' tasks to demonstrate their content of learning at school. Harvey & Knight[32] maintain the concerns about employability reproduce concerns about the definition and measurement of quality and the relationship between quality assessment and quality improvement.

### To attempt quality improvement, employing an action-research approach is the best option.[30] This, ideally, includes the following steps

- Evaluation of stakeholder perceptions of excellence, or expectations of excellence
- Strategic planning and proactive planning to meet client needs and expectations
- Evaluation of the quality of service provided to stakeholders by the institution
- Action to improve targeted aspects of service-quality
- Monitoring and staff reflection about action taken

It may be noted from the above do-ables that both the quality of service and service-quality (say SERVqual or EduQUAL) exert the meeting of their 'fitness for purpose' in above actions. While quality is proffered as meeting (consistently) of set standards or exceeding them,[91] the setting of exceptionally high standards, consistently, entails transformation…ideas about employability, career and empowerment are a focus…a view of quality as transformation.[30]

Quality management system can only be successful if top management is persuaded to take a sustained, active role in establishing it. Once they are on board, then the next step is to analyze existing processes. Outline the methodology, identify potential improvements. To implement quality, it entails a "quantitative measure of perfection at the stance of customer's preference."[42] That is consistently exceeding customer's expectations (not only demands: c/f).[16] Evidently, as customer's preferences keep changing, and since as being organizational systems – so-called cybernetic systems – they are capable of self-adjustment such that they can re-designate their goals,[92] adjusting, in respect to changes in environment, or system components, etc. Hence full understanding of system components is indispensable, such that the repetitive refinement and enhancement of an existing process is provided. The paradigm is total – say holean. Not separable, not at all distinct from the objectives of say employability. It is hence important to undertake activities that facilitate the students reconstruct their own

motivation to gain knowledge, sharpen skills and ensure self-learning. Teachers should be capatent to respond to the consciousness of the role towards realization of this aim[93] and be able to address improvements in the degree of the fulfilment of the settled assessment criteria (e.g., to didactic tools, lecturers, the results of teaching, needs, satisfaction, etc.).

It provides that the most improvement is accessible from the weakest link, which is known as the system constraint. The proponent of 'theory of constraint' – Goldratt maintains that organizations live or die as systems, and not as processes. Their success or failure depends upon the efficacy of how well the component processes interact with one another. It deserves both qualitative and quantitative analysis. Concur Harvey & MacDonald,[94] who term the process of going from a theoretical concept to a measurable index as operationalization [of quality management].

To follow the weakest link approach, we use the Transition Tree approach as recommended by Dettmer[92] (Fig. 5). We investigate our system 'for' what is lacking, and the root cause w.r.t current reality, and what corrective (or preventive) actions could improve the situation. The deficiencies may be ascertained w.r.t standard's requirements, customer's pains or satisfiers, voice of the customer, etc. This draws strength from "Researchers' experiences which identified a multiplicity of obstacles to system wide improvement that form part of the initial landscape for reform and which have to be addressed in the process of reform."[95]

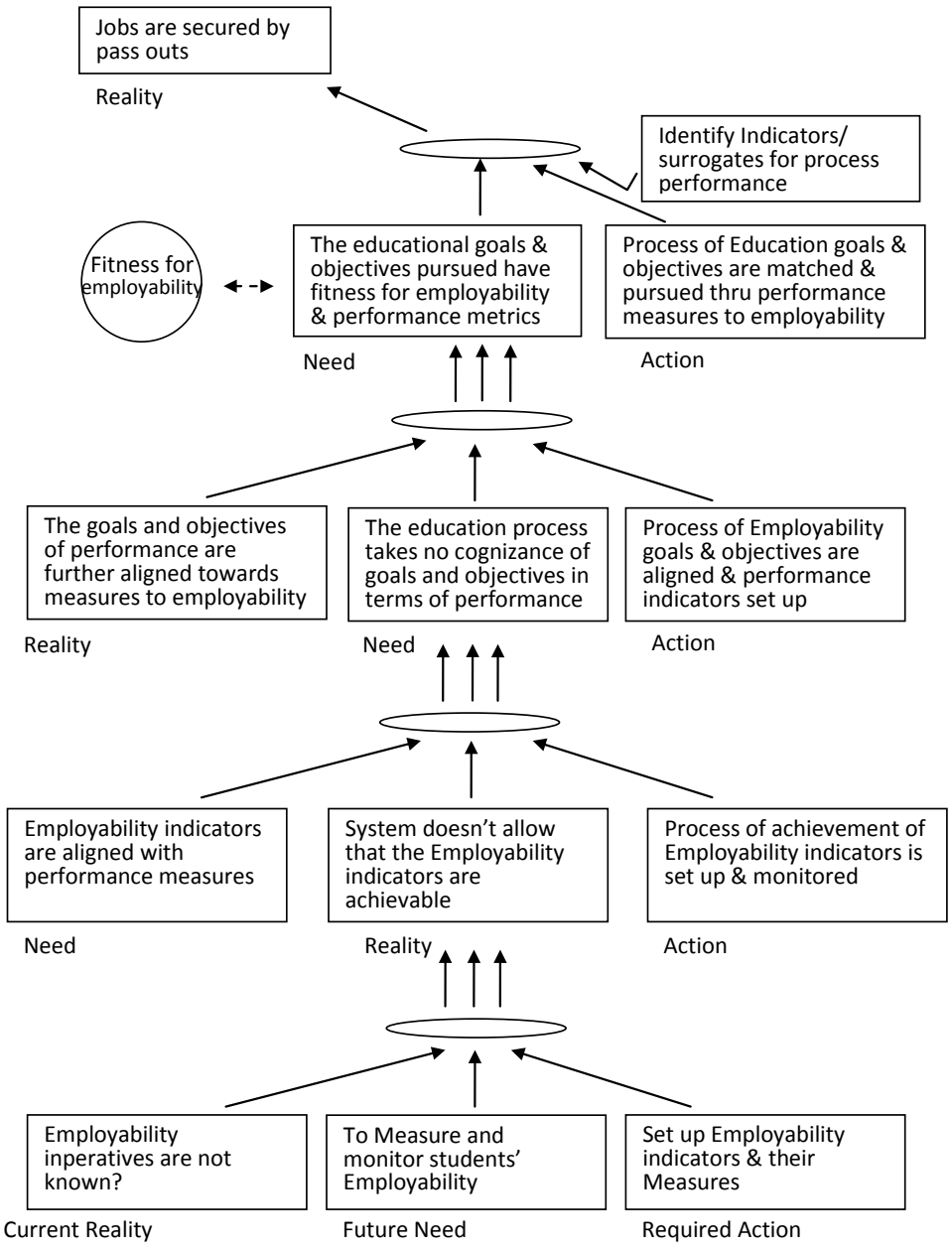


**Figure 5.Planning via Transition Tree Approach for Implementing Quality w.r.t Objectives (Say Employabiliy) – Stipulating 'Action' w.r.t. 'Need'**


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## The transition tree may be guided from the imperatives of

- Transformation approach
- Outcome approach, and the
- Customer's demand approach

Say, individual transformation may mean moving from a state of unemployment to study or employment. Thus, transformative graduates anticipate change and lead others through change.[96] Moving from one occupation to another along a chosen career pathway of lifelong learning is also a form of transformation.[97] It is important even for academic to dynamically interweave in one's life roles. The roles of academic includes preparing professional students for a future society, assisting students with the development of knowledge and skills, such as awareness of their own learning and performance (especially as independent learners), empowering students to self-assess their own progress and achievements; to serve them not just in the immediate future but also in an unpredictable world of work and citizenship and providing links between students as learners and the learning community and society of which they are a part.[31] The quintessence is the development of mind and getting the beginnings of wisdom by differentiating what is of ultimate good from what may be perceived as good.

Melrose[31] assigns 'Quality as transformation' a critical role for the academic through a paradigm in the evaluation of teaching and learning. Accordingly, it is vital that the academic keeps herself as being more informed and emancipated as evaluators…becoming better at involving a range of stakeholders in evaluation and development… and improvers of their own practice. These imperatives are evident in the various objectives of improvement as in the transition chart.

Aptly, the meta-concept of quality as transformation is synchronous with ideas of empowerment, capability development for employability and career development over a lifetime.

Appropriate action in the transition chart leads to current (or future) reality, which when successful, matched (or, will match) outcome.

Outcome is the culminating demonstration of learning that accrues, when measured in terms of output from customer's angle. The measurement is essentially an internal, or longitudinal benchmarking that, over time, compares and evaluates say, w.r.t. employment of graduates against input and process (effort in developing employability opportunities).[98] The long-range performance will eventually be considered as a quality that incorporates transformation. It entails developing a system that emphasizes quality assurance (in preference to quality control) incorporating a process whereby measures are built-in to ensure that the required quality outcomes are achieved. The gap analysis and recommended action are followed as per transition tree until tangible outcomes have emerged. The quality of examinations, administering of examinations and teaching practice and the examination quality management processes should be refined to superlative standard(s).[99] External examiners and/or auditors' reports show an overall improvement in the quality of the work done at implementation and/or management levels respectively.

## The most important conditions of successful quality management implementation are

- The leaders, teachers and students should see exactly the principles of the quality management system and their roles within it
- Have clear perception of outcomes and follow a pragmatic approach to excellence rather than fault finding and accusations
- Use a system of risk management so as to be ready to cope with most difficult situations. It is the underpinning principle behind the 2015 version of quality management system standard per ISO 9001:2015. The most likely risks are objections coming from top management (lack of support, increase of costs) and from the staff (too much documentation, no improvement of the quality level, conflicting rules, etc.).[100]

Historically, the multiplicity of obstacles to system-wide improvements have been identified that form a part of the initial landscape for reforms. The encountered challenges are of type; poor and ineffective leadership; lack of funding and resources; insubordination of workforce; lack of management commitment; poor and ineffective planning; poor teacher morale; political interference; poor performance of PTAs; poor infrastructural facilities; lack of competent teaching staff a high proportion of inexperienced teachers compounded by frequent turnover;[101] disparity in the capacities of teaching staff in schools serving different student populations, lack of program and instructional coherence, unstable curriculum and/or low expectations and a lack of demanding curricula by minority students; basic necessities to operate schools and classrooms including unfavorable schools' environment; and poor availability of textbooks and instructional materials. Weak alignment with state standards, for these actions need be recommended in line with both short-term and long-term goals and objectives.

## Conclusions

- The divide between quality aspects of education and education of quality is hazy because of the interdependency of each. One strengthens or weakens the other. While this work attempts to integrate the

requirements in each w.r.t. the excellence in institution management, the larger purpose remains to guide a pathway for implementation of excellence as the environment-supporting processes.

- The education has been considered w.r.t applicable definitions of quality. Primarily, the focus has been limited to three defines namely (fitness of use (also Purpose), "conformance to requirements" – customer's requirements (employability, outcome), and "the totality of characteristics of an entity that bear on its ability to satisfy stated and implied need" – ISO 8402 (excellence). The three attributes have been discussed so as to illuminate the hazy boundaries.
- Utilizing the transition tree approach, a road map to process quality has been illustrated taking the case of improving, say, employability.

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