Taxonomy of Financial Economics Decisions–A Revision Initiative

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***Abstract*—The background for financial economics decisions taxonomy presented offers an initiative to conceptualize a revision that incorporates a structure concept mapology. In doing so, the revised taxonomy synchronizes with a popular structured systems analysis and design method for more efficient communication in specifying requirements between systems specialists and end-users. Information technology being the key diver of change, the revised taxonomy is positioned to leverage on parallel progress with development of cognate tools and methods especially those that innovate thinking and learning about decision making.**

***Index Terms*—database system, financial economics, motivation, SSADM, taxonomy.**

I. Background and Introduction

Taxonomy refers to the technique of classification [1]. History has largely credited Aristotle as taxonomy's eldest[2] who gave roots to naming systems for just about anything [3]. Regarding learning, Bloom's taxonomy is a classification of learning objectives within education had since been revised once [4] with the latest development in Pedagogy 3.0 for STEM teaching. Evidently, change is imminent as advances in database technology had affected taxonomy in educational whenever there was major development in cognate processes [5] [6]. Taxonomy for Financial Economics Decisions (FED), being another professional education discipline likewise is symmetrically influenced by technological advances in educational technology, as have been in Pedagogy 3.0.

McKinsey's survey [7] reported that among stakeholders: 42% employers agreed graduates are job ready, 72% education providers perceived so whereas only 45% of youth agreed. All three stakeholders were not synchronized in their learning outcomes though the education providers thought there were. Company Relationship Management (CRM) between educational providers and industries are imminent to ensure relevant skills are learnt to increase graduates' employability. Professionalism and communication ability are part of the ten skills to get hired according to Cassely [8].

CPD as part of a taxonomy for FED's instructional pedagogy is evident by survey of six Asian nations in how they administered training in tandem with structural functionalism as those processes are responsible for engaging learners into contemporary practices and integration into the industry according to findings by Mok and McCatney [9]. On a broader scope, sustainability pedagogy index by taxonomy needed to find an equilibrium level with industries by co-existing in the lights of changing technology, structural functionalism, and social shift to professional class, cosmopolitanism and citizenry values.

The quick background had just shown technology driving changes; taxonomy being one. Guided by the revised Bloom's taxonomy [4], this paper first reports a taxonomy framework for the instructing and practice of FED capstone in relation to an overarching aim of enriching students' with the knowledge and skill of the 'What-How-When' dimensions in FED. Doing so, the practice emerged conceptual changes in the learning process [10] by graduating adults' self-directed attitude towards self-sustainability upon their prior knowledge in accounting, finance, economics and quantitative methods [11].

For the coming graduates from Generation Z (GenZ), the latest development in Pedagogy 3.0 [5] implied that how-to-teach-how-to-learn is being replaced with how-to-teach-how-they-want-to-learn. People's Republic of China (PRC) GenZ is particularly referred; PRC's GenZ has no pre-affluent history, born into an ongoing technology savvy period in a one-child policy. Although practicing knowledge is irreplaceable except continued in different format, it suggest that the art of sustaining motivation for learning is dedicated when seeking a balance between practice and rote learning [6]. The processes are linked for evaluating the taxonomy for FED pedagogic effectiveness on how knowledge is constructed towards decision making capability using the FED capstone thinking dimensions of 'What-How-When' (WHW). WHW rationalizes upon 4 disciplines that dealt repetitious with decision making; general economics, finance, accounting and quantitative methods.

The governance of the taxonomy is to consolidate the learning of these 4 disciplines for establishing professional practice whereby practicing the skills frees the scope of thinking into exploring revenue possibilities while in parallel also remembering lessons from recent financial fiascos [12]. The reasons for initiating revision of FED taxonomy are rationalized in section VIII after explaining its current application in 6 taxonomy levels from sections II to VII: knowledge, understanding, application, analysis, synthesis and evaluation. Section VIII also explains how the 4 levels of diagrams (Fig. 1 to Fig. 6) while complementing the 6 taxonomy levels has initiated revising the FED taxonomy by synchronizing it to 4 levels to complement Gane Sarson SSADM and in doing so would benefit from information technology development meant for Gane Sarson/SSADM.

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II. FED Taxonomy Level-1: Knowledge

Fig. 1 being FED taxonomy context Level-0 showed the FED capstone which needs the understanding of risks and the information to manage those risks which involve formal quantitative capabilities to optimize realizable return through abilities to marginalize risks and diversify resources. The construction of FED was derived from incapacitating the overarching aim of achieving a consolidated theoretical knowledge of 'What-How-When' for incapacitating FED with the understanding of elasticity in making risk/reward decisions [13].

Frequent FED have used Break-Even–Economics Equilibrium (BEEE) capstone in Fig. 1 as its learning epitome; the focus area being the distance from the Break-Even (BE) point to the Economics Equilibrium (EE) point. The distance between BE to EE represented the risk level that must be managed with FED knowledge. Combining BE and EE became the capstone equation Eyx [13] wherein EE was the maximum returns obtainable from best information available to ascertain the most possible peak price. Hence EE – BE = profit in a general sense. The onus between deterministic BE and probability EE is the distance representing risk to be managed thorough diversification or hedge in the event the project falls short of EE and cannot meet expected returns.

As a result, the context Level-0 concept map is decomposed into 3 parallel key conceptual diagrams; Fig. 2 to 4 which consolidate prior learning with the taxonomic process. In its course of disciplining the sort of critical thinking required of a beginner financial economist, the taxonomy bridges prior knowledge of WHW that were learned; each represented by the wholesome FED taxonomy in 3 sub-sections and synthesized in the final sub-section below.

A. Taxonomic Dimension of 'What'

Referring to Fig. 4, the taxonomy dimension of 'WHAT' explained to students' prior knowledge about business anticipation of improved opportunities derivable from the EE theory [14]. Since EE represented the sellable level, it therefore also represented the optimum earning expectation; beyond that was considered wastage due to absence of market demand. EE, bearing an anticipate nature has a probabilistic nature because what might be totally sold is not exactly known and producing beyond salability risks wasting resources. Understanding of EE was therefore among the core knowledge when changes in fiscal and monetary policies pricing are factored.

On the notion that EE being quantity supplied and quantity demanded, arriving at an EE situation required any change to market price to cause the forces of supply and demand to match. Excess demand or shortage existed when quantity demanded exceed quantity supplied at current price until they agreed and that agreement was termed as EE. When quantity demand was less than quantity available, price moved towards where quantity was demanded to equate quantity supplied. The basic characteristics of economic equilibrium form the purpose of managerial economics as a prerequisite for FED readiness to expand this knowledge into complex relativity in the magnitudes of change in supply and demand to determine the outcome of market equilibrium [14].

B. Taxonomic Dimension of 'How'

Referring to capital required for the investment, instructing the 'HOW' dimension in Fig. 2 relative to the accounting BE meant a position of no gain and no loss [15]. This established the thinking of 'bottom' or base level. The BE knowledge had a deterministic character as it is calculable by standard BE convention from prior learning. While the nature of profit was probabilistic in the mentioned EE, the distance between the deterministic BE and the probabilistic EE is the line to be managed according to best information that returns the most probable profit. In bidding for projects, BE dimensioned into costs that must be recovered first to begin realizing profit with the summary of cost behavior being composite in a project's variable costs, project's fixed costs and a project's bid price.

The BE equation comprises costs retrieved from each of the 11M+3S databases: Marketing, Money, Manpower, Materials, Methods, Machines, Measurement, Maintenance, Motivation, Motion, and Modification [16]. Fig. 6 shows the conceptual layout of these 11M+3S databases at Level-3. Level-3 being the level reserved for database map to complement the data stores of Gane Sarson Level 3 for data stores [17]. These costs were stored and retrieved according to standard accounting practices. The summary of cost behavior being variable cost changed along with business activity but per unit variable cost remained constant while fixed cost remained constant with business activity but per unit being fixed cost decreased as business activity increased [15].

C. Taxonomic Dimension of 'When'

Instructing the taxonomy of the 'When' dimension was by joining the mentioned two financial and economic theories to form the hypotenuse. Displaying the hypotenuse horizontally shows it as a normal distribution curve in Fig. 3. The connection of these two points forms a risk line known as the BEEE risk line and that must be governed to ensure securing returns of investment. By using students' prior knowledge in descriptive statistic, the measurement of central tendency and variability of risk along the standard distribution curve in Fig. 3 is revised. Doing so identified the characteristics of the nominal curve to guide insights into mental processing of kurtosis [18].

While the BE point on the left of Fig. 3 established a deterministic bottom value, the right end tapers to the EE point of lowest probability value. The explanation to students that deterministic value of BE became probabilistic as EE moves further from BE represented risk probability increment. The BE relationship is used to analyze effects of profit when changes happened to either one or all three items; sales price, variable cost or fixed costs. From the BE point, the knowledge expands into cost that must be recovered before realizing profit; albeit business activities effect upon cost dynamics. The characteristics of the BEEE risk line being elastic, therefore represented the probability to reach the desired price level. The characteristics of BEEE being both the angle and distance that the intended EE pointed away from BE; known as elasticity or Eyx which mitigates the process to conclude a price until its inelasticity. This

mitigation process is the intricate capstone thinking into estimating BEEE elasticity. From this thinking, the instructing takes on a higher level as the BEEE elastic factor Eyx in offering various dimensional views at the magnitude of risk because it demonstrates the combinatorial effects of both the 'BE' and 'EE' points while factoring risk premium in the efficient frontier [13].

Eyx being the measurement of risk elasticity provided the indication as to where and when risks premium were diversified in limiting working capital requirement. Being among common managerial finance applications BE answers cost behavioral in determining the quantity that must be sold to begin earning profit [19]. The onus between deterministic BE and probability EE was their distance representing risk to be managed thorough diversification or hedge in the event investments falls short of EE and cannot meet expected returns.

D. Synthesis of WHW Dimension

Fig. 1 epitome the core knowledge content required in FED; BEEE being the tangent with the BE point between the adjacent and hypotenuse line and the EE as between the opposite and hypotenuse line. The hypotenuse being the distance between BE and EE represented incremental risk from BE to EE and needed decision management skill for BE is deterministic while EE is probabilistic. The adjacent line represented time to arrive at the expected returns on equity. The three dimensions of this tangent; BE, EE and hypotenuse (BEEE line) require basic tertiary knowledge of finance, economics and quantitative methods. Henceforth students in the FED program needed these pre-exist fundamental knowledge to be taught how to consolidate their prior learning before proceeding into their Continuous Professional Development (CPD) and Work Integrated Dissertation Effort (WIDE). Learning to consolidate pre-exist knowledge includes constructive dimensions of workshops, seminars, concept mapping skill and case studies to construct a wholesome approach.

While finance drew upon mathematical tools to ascertain position taking behavior in savings, investment and risk, economics study insights into allocating resources from competing process in exchanges and distribution [19]. In making FED according to variables that intervened with their ideas, the values that affect decisions are enriched by motives to retrieve information for construction decision. Therefore, between economics/finance and finance / accounting, thinking tools and experiences from CPD practices reinforce thinking process in making FED under uncertainties. Having the quantitative methods to measure and track the performance of the FED became the 'WHEN' dimension to achieve the desired return ('HOW' dimension) based on probabilistic demand of the opportunity ('WHAT' dimension). It might be puzzling that no explanation was found as to basic economic module or accounting module had remained untaught about the simplicity of merging these two theories even in their advance level; hence led to the establishment of the FED capstone [13].

III. FED Taxonomy Level-2: Understanding

The power of concept mapping assists the mind to warehouse thoughts and information in various perspectives and dimensions that made information retrieval more efficient; being the psychological foundation of concept map [20]. Fig. 5 illustrates a concept map about how cash begun from recording when cash received was paid and where those receipts and payments are subsequently recorded in the income statement and balance sheet such that the financial performance risk might be known immediately to impact the 'BEEE' concept map in Fig. 1 [21].

Novak and Canas [22] illustrated directional inquisitions to construct meaning and results flow in various concept maps, according to different professional needs, had directly relate studies; FED concept maps contextualize with lines, intersections and directional flow to indicate risks have considered these pointers in its taxonomy. Decision tree is another concept map frequently used as graphical tool for several applications; consolidating prior learning of economics to complement financial statement maps with probabilities appointments of success conditioned upon events. As direction pointers in identifying or selecting, decision tree develops mental rule for storing and retrieving knowledge [23]. Graphs are natural integral aspects in decision making courses so are grids and the illustration methods might enhance understanding [24]. Additionally, in both qualitative and quantitative analysis, the over reliance of numbers might cause one to be myopic in analysis by missing out the bigger aspect of what might suspiciously oversight issues [25]. The employment of concept mapping for finance has been wide according to few regular writers promoting illustrative active thinking [26]-[29].

IV. FED Taxonomy Level- 3: Application

How the mind receive, process and retain learning has been a timeless debate in cognitive studies about the span of immediate memory suggest that information gets dislodged when the mind is challenged to sustain ability in warehousing data in the mind for cognitive dissonance retrieval accuracy [30]. To focus on capturing immediate moments, an industry centric model can be one that emphasized learning as internally driven in a cooperative environment. The reason being that knowledge construction is wholesomely involving: from the student who wanted to learn and contribute to the profession, the facilitator who wanted to depart knowledge and to improve upon it and industries that encouraged building the particular body of knowledge. However, the reality of practices intertwined learning along with instructional pedagogy, organization, management and leadership [21].

Another reality was that industry stakeholders might not participate in tandem with the improvement process and this made it difficult to synchronize formal teaching/learning. The question then asked if internship was effective. Therefore, to analyze the possible solution from various perspectives, it might draw on few things like what were the challenges ahead of fundamental pedagogy from some successful experiences to make comparisons to move forward in the specific instructional pedagogy. Ottewill, Boredom, Falque and Wall [31] have suggested that organizational behavior and culture can challenge thinking about instructional pedagogy in different settings, yet

touching all taxonomic bases.

V. FED Taxonomy Level-4: Analysis

The wide case teaching method has been well propagated [32] because learning critical thinking requires shared instructional empowerment with students who has most class control to produce their results under time constraint. The collaborative intelligence of Pedagogy 3.0 [5] has the ability to enhance case facilitation collaboration between students and teachers [33] in generating cases by building knowledge upon knowledge. Technology being the enabler can dive taxonomy for interactive methodological learning to keep students engaged without extrinsic reward but develop constructs to reinforce intrinsic development. This meant that interactive learning facilitates constructs by instructing students to self-learn and in the process gave control of how students wanted to learn.

Pedagogy 3.0 approach constructivism was another departure from traditional constructive learning wherein the facilitator can gradually be replaced by machine to dynamically interact with student. In doing so, students' progress can be tracked. Beneficiaries of CI are GenZ coming into higher education. If pedagogy taxonomy has departed from previous theories to a new dimension, then the three stages of rational decision making [6]; intelligence, design and choice using expected value decision tree had affected CI as provoking catalyst in engaging interactive learning and in so doing, leaps cognitive development to a higher order in metacognition [34]

Along the thoughts of Pedagogy 3.0, facilitation and workshops are among the construct of the FED program of which students' motives for learning are monitored to determine which variables are more effective in motivating learning by means of arranging variables in a force field format that provides a visual effect of the extent which constructivism variables can withstand external behavioral pressure.

VI. FED Taxonomy Level-5: Synthesis

An analysis of 12 exams for 2010 and 2011 in an accounting body at the Foundation Level, Professional Level 1 and Professional 2 Level, counted the command word 'advise' appeared 10 times [35]. 'Advise' refers to required competency that includes being comprehensive, critical in evaluating data to reflect detailed specialized knowledge and capability of acting independently and effectively. What was seen is graduates are expected to advise their companies above ability to describe and getting sufficient practice to advise by incapacitating their ability to consolidate learning for advising FED steer their minds into higher order of learning to meet career expectations.

VII. FED Taxonomy Level-6: Evaluation

The FED taxonomy included several items that in composite are responsible to consolidate prior learning. These items involved methods, procedure, concepts and motivators for instructing, learning, retaining and recalling knowledge. The taxonomy framework found literature support in best practices in CPD, work based dissertation, from the constructivism aspects of methods and procedures to enhance knowledge retention and retrieval. CPD has become one of the pedagogy enabler and a link between industry and universities through continuous CRM to narrow the unemployment gap, promote structural functionalism, and enable motivational influences that cause pedagogy's relevancy to meet the needs of those who employ and those who want to get employed. CPD bridge this purpose to identify theories and practices related to the behavioral and constructivist aspects of learning and training, the types of motives which link through intrinsic and extrinsic influences have to be measured within defined delimiters.

CPD is a mandatory aspect pedagogy requirement in professional program to bridge senior year student into the industrial world. In contrast with internship and co-op program, the CPD process involves tracking professional practices and mandatory workshops directly related to the practices updates example tax reform, legislation in accounting reporting and new accounting standards. The problem of lack of knowledge/skill of decision making among students in economics, finance and quantitative methods at tertiary level as the missing link to consolidate pre-exist knowledge with practices.

Without the CPD link, knowledge risk depreciation; while curriculum configures knowledge development where each part is logically connected to another to make a whole, there was no mentioned of how this cumulated knowledge were tested on actual practices. This was despite that taxonomy offered the closest critical thinking next to bridging theories with the real world [36]. By Deming's Quality Circle (DQC) definition, the taxonomy of case based pedagogy stops before the 'Act' stage. Practicing knowledge through CPD not only connects theories with practice, it also directly engaged graduates into their careers.

A CPD within WIDE arrangement completes the PDCA cycle as a low risk approach for a specific pedagogy in those said resolutions of apprenticeship, valuing multi-pathway, curriculum revision and transfer programs. The argument here suggested that curriculum relevancy is a symptom of slacks in decision making knowledge skill among seniors in economics and finance. Curriculum becomes a problem identity only when industry rejects the graduates. Unless there is CRM between universities and industries, taxonomy might mismatch curriculum relevancy, again confirming that market driven dimension for a taxonomy construct might be more effectively organized into universities core curriculum, where FED might expound positive impacts.

The call for market-driven pedagogy boldly emphasized responsive employment economics that befits youth's desire to sustain their self-worth rather than permeate frustration through social e-commerce. While far-fetched pro-active strategies were needed to narrow unemployment, sustaining values of learning and career prospects that eliminate youth's predicaments of rights to jobs, might sustain knowledge worthiness and shoring human capital shortage with governance for specific FED taxonomy that encompasses local best practices CPD within WIDE. In totality that might

be the important missing, interlink phase not much mentioned about knowledge consolidation.

The model CPD practiced is adopted from ICAEW's renowned 'Reflect, Act, Impact, Declare', RAID approach that requires members to declare their statement of compliance, [37] wherein members self-supervise their practice journals that declare their CPD time sheet. Wrongful declaration when detected have resulted in those validated period nullified. The ICAEW's CPD has constructivism dimension of continuous evaluation with punitive behavioral dimension to enable self-supervision. Hardly was there an accountant without a job because the CPD dimension already linked the graduate although there is less extrinsic in the start-up stage of the career, therefore to enhance graduates' employability, the CPD pathway was a proven linkage to employment for professional programs.

Experiential learning became possible to consolidate and to build on these pre-exist knowledge. Prior fundamental economics knowledge allowed understanding of how to resolve conflicts between expectations for higher returns and limited resources to meet those expectation from a FED oriented pedagogy that emphasize consequences of financial mishaps.

VIII. FED Taxonomy Revision Initiative

Steel and Konig [38] were of the opinion that wholesome learning that has motivational designs is more important. They argued that social motive had contributed to pedagogy as there was a limit of how much cognitive effort can be motivate classroom activities missed by taxonomy. With the aim of keeping students engaged, the taxonomic arrangement include extrinsic motivators to reward performing students might eventually detract from its purpose when the rewards continuously fall on a few students giving those behind no opportunity to be rewarded when categorizing motivation as either intrinsic or extrinsic [39]. An extrinsically motivated student felt wanting to act towards receiving something that demonstrates feeling of significance from obtaining the knowledge. For that matter, curriculum and activity development are recommended to direct at students' internal locus of control [40] when evolving taxonomy towards metacognitive level.

However critical thinking and problem solving capability required by industry is acknowledged by students' motive in identifying thinking tools as important to their career development; students rated direct and indirect instructional methods higher than other factors for learning about decision making [41]. Since the epitome of the FED taxonomy was students' cognitive ability to practice, therefore consolidating learning by adding new knowledge to prior learning is motivation for cognitive development as mentioned by Russell [42]. Seemingly, that relates to innovating instructional delivery methods as prime factors to deliver the best in understanding fundamental knowledge should be the more important core of the taxonomy for motivating students' learning behavior when they sensed that it was directed at their goals to enhance their thinking performance [43].

This paper's initiative is in pinning the FED taxonomy for motivating the confluence of learning and practice by intrinsic cognitive dimension provisions that enable faster retrieval and processing of information towards meeting how GenZ wish to learn. A revised taxonomy for FED can parallel development in learning/teaching as had happened for STEM by Pedagogy 3.0 which attempted to remove fear or attraction as external stimuli for learning [44]. Proceeding forward with 4 levels as opposed to the current practice of 6 levels is argued for better cognate leverage that by synchronizing to industry's popularity of 4 levels, there is complementary synchronization with Gane Sarson leadership in Structured Systems Analysis and Design Methodology (SSADM) might gradually position the taxonomy more effectively towards the future of machine learning and machine based learning.

A. Four Levels Initiatives

Table I depicts a comparison of popular instructional pedagogy [21] practiced by industries in the form of standard operation systems (SOP) capped at 4 levels such as that of DQA [45], Toyota's production system SOP, Gane Sarson's SOP for structured system analysis and design [46], Kirkpatrick [47] training evaluation. Why 4 levels seemed popular comparative to the revised Bloom's taxonomy of 6 levels might be answered by the Miller's [30] 'seven plus minus two' psychology of developing mental organization efficiency.

TABLE I: Four Levels and Best Practices in Industries

Industry	1. Automotive assembly	2. Training	3. Quality	4. SSADM	5. Generic
Practices	Toyota Production System	Kirkpatrick	Deming's Circle	Gane Sarson	Financial Economics Decisions
Objectives	Instructional Quality throughput	Produce learning	Product Quality (Defect reduction)	Structural integration & processing	Synchronize Taxonomy to SSADM
Level 0:	Plant View	Training context	Plan	Context application	Knowledge
Level 1	Assembly line view	React	Do (try out)	Decomposed DFD	Understanding for Analysis
Level 2	SOP of each station in a line	Learn	Check (error correction)	DIADs/Pseudo English	Application
Level 3	Each SOP's work instructions	Perform	Act	Data stores	Synthesis and Evaluation

If markets are the best judges of popularity, then Toyota being top automotive producer is no coincidence but mostly attributed to its quality Just-In-Time assembly instructional process, based on best combinatorial practices in manufacturing methods [48]. Level 1 of an automobile assembly line illustrates a section view of the line which consists of a collation of Level 2 SOP which cascade to Level 3 and 4 within the same page.

In Kirkpatrick's model, Level 1 summarized students reaction to the learning process, Level 2 described the extent of students' improvement in knowledge, skills and attitude as a result of the training, Level 3 referred to the extent of students' capability in improving their performance related to practicing skills learned while at their internship company as a result of the training. Level 4 described the degree of positive or negative benefits resulting from the training. Kirkpatrick's [47] model offered a simpler administration and analysis approach relative to balanced scorecard [49] or the Six Disciplines of Breakthrough Learning [50] because they consider much more at various impacts of financial, customer, internal processes and organizational change. The fact that Kirkpatrick's model had been popular was proof of sustainability across many applications which required a training assessment method that was not difficult to administer and effective for analysis. Kirkpatrick had advance his model into continuous evaluation wherein current assessment is added upon previous assessment in the same control group as a form of measure of effectiveness from previous learning upon new environment [51] and therefore extending application with repeated measurement..

DQC taxonomy 4 levels: Plan, Do, Check, Act (PDCA), which touches all bases by thinking, doing, checking and acting. DQC was perhaps the only sustainable and widely acceptable learning model as well as its control charts application in error correction, and increasingly adopted by Japanese industries and American universities [52] as its nature resembles Socrates prompting method of engaging by constructivism within peer collaboration and the trainer's role as facilitator [53] Prompting students in thinking and same time the uses of concept maps engage their listening to follow the logic being drawn. In Level 2, 'DO' refers to 'try out' or practice before implementation, another requirement in Good Manufacturing Practices. In the context of training the tool that engaged trying out scenario plans for possible best out-comes. In Level 3, 'CHECK' reviews if work had performed accurately. To verify, it involved more thinking than doing and if something went wrong, then a return to the 'DO' Level is required instead of proceeding to the ACT Level. On confidence of correctness, the Act Level referred to real actual. Collaborative review of students' learning was a form of checking together. The final Level 4, 'ACT' was where nothing must go wrong but in reality things sometimes do go wrong due to unforeseen circumstances or negligence perhaps at previous stage. Errors, having identified, are analyzed and solution determined on Pareto basis [54]. In the taxonomy context, this was the post-test evaluation.

The time-tested success in automotive 4 Levels SOP applies to SSADM practices wherein IBM Corp. [46] mentioned the practice leadership of Gane Sarson vis-à-vis Yourdon and De Marco since 1979. These 4 Levels in a Data Flow Diagram schema represent functional waterfall effect top-down demarcating context boundary as Level 0, process decomposition as Level 1, access procedures as Level 3 and database attributes as Level 4 [50].

An efficient taxonomy might give a balanced metric in four structural levels information managed expendably along with value add [55] unto students because all bases were touched through the interlinking dimensions that inspire learning by discovery and accidental from doing rather than by taught by formal lessons [56]. Allowing criticism and popular acceptability sort out the best among themselves to produce the best practices to form a low risk foundation to formulate an industry centric instructional delivery system of FED [21] based on 4 levels of SOP. As there is no difference between producing a product or a service; producing learning is just another form of production and revising taxonomy of FED considers that.

From the art of formal classroom delivery to real social challenges, the taxonomy intent was to lead in thinking about thinking without motivating by recitals but to identify practices that sustain interest in creative teaching. This had led Hewlett-Packard into a macro collaborative global cluster network of educational value chain known as a catalyst initiative (CI) to produce best practices for future STEM educators for 21st century students [57]. GenZ, being 21st century borne are a collective cultural force that might demand pedagogy taxonomy suits their learning needs along with the ongoing social e-learning culture. Therefore, learning outside of lecture room had to be seriously considered by higher education and reflective in revising the taxonomy to 4 levels.

From the above discussion on FED taxonomy revision initiative and that the structure concept maps had already taken effect in current levels seen in Fig. 1 to Fig. 6, the natural progression suggest revision from 6 to 4 levels indicated in the right column of Table I: Level-0 remains, Level-1 consolidates previous 2 stages of Understand and Analysis, Level-3 consolidates 2 previous stages of Application and Synthesis. Level-4 assumes previous Evaluation stage.

The parallel importance of revising the taxonomy is to complement Gane Sarson to improve communication with end-users in determining functional specifications especially for higher level applications with a structured concept mapology demonstrated in Fig.1 to Fig. 6 by the revised FED taxonomy according to Avison and Taylor [58].

TABLE II: FED STRUCTURED CONCEPT MAPOLOGY TAXONOMY

Industry	SSADM	Summarized FED System Prototype Specification Reference
Practices	Gane Sarson	FED Taxonomy
Objectives	Structural integration & processing	Communication with SSADM practitioners
Level 0:	Context to application	Contextual map for WHW (Excel VBA scripts to combine plot Fig 2-4 to form Fig 1)
Level 1	Decomposed DFD	Decomposed concept maps (Excel VBA scripts for retrieval rules to individually plot Fig 2-4)
Level 2	DIADs/ Pseudo English	Decision tree map (Excel VBA scripts for retrieval rule to illustrate Fig. 5)
Level 3	Data stores	Database layout (Access database conventions for voucher entry system based on standard double entry accounting book keeping rule for 11M+3S database in Fig. 6)

B. Schema Descriptions

Parallel to Gane Sarson Level 3, would be the structured conceptual database map of 11M+3S database. Level 2 of

Gane Sarson being DIADs would be reflected as structured decision tree maps of data directions retrieval rules for plotting EE, EE and BEEE curves as base diagrams storable as vectors for later fast overlaying [59]. The base diagram is needed for second plots to overlay decision scenarios curves. Still a third set of hypothetical inputs about competitions' financials can form the second overlay.

The data retrieval rules to calculate BE and EE are obtainable from an intelligent 11M+3S databases from which unique decision rules from an indexed library capable of determining accountability ownership. Intelligence can be expected by a comprehensive chart-of-account design capable of generating unique key to update and retrieve cost elements. Jaxworks [60] provides some working ideas to plot BE and EE.

Using Excel VBA® to script the whole purposive linkages from Level-0 to Level-3 to access the 11M+3S Access ® database which uses Excel for database creation is the safest way forward. Eleven databases needed to be created to maintain various cost categories mentioned in Fig. 6 to provide intuitive advantage in fast decisive evaluations with cost details for each 11M+3S factors.

Conceptually phase 1 design resembles silent management game with scripted prompts while keeping tap on performance scores within time constrain and manually facilitated by instructors. Upon success, phase-II may plan for scripted interactive voice with minimize manual instructor facilitation. The development's waterfall effects can further advance Gane Sarson design philosophy into machine learning with generalized data mining algorithm to acquire knowledge about FED experiences. In doing so, machine becomes pseudo thinkers that overtime can be refined to assist human facilitation when "a computer program is said to learn from experience 'E' with respect to some class of tasks 'T' and performance measure 'P', if its performance at tasks in T, as measured by P, improves with experience E" according to Mitchell [61].

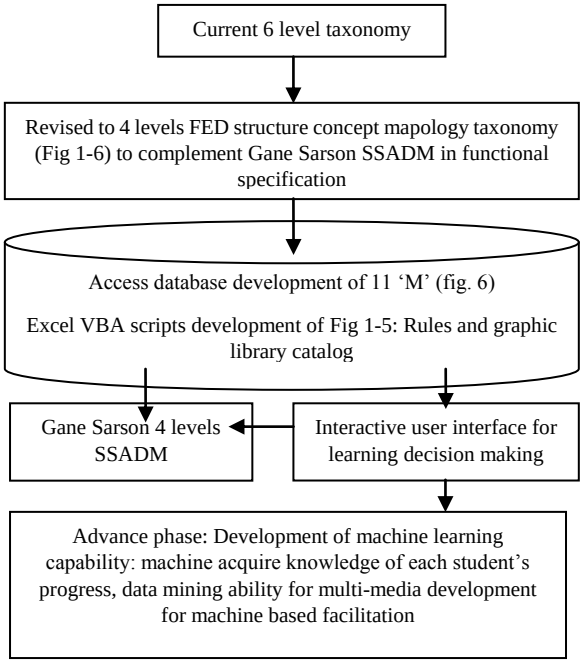

Fig. 7. High level schematic FED system design and development.

IX. Concluding Significances

The advent of technology for education that redefined instructional pedagogy for STEM through Pedagogy 3.0 can be expected to come upon FED through revising its taxonomy and therefore raising prospect of machine based teaching/learning of FED. Converging learning towards machine centric instruction would satisfy social motive as suggested by the growing reliance on learning outside of formal lectures. Perceivably, the blue-print for machine teaching and learning of FED might require a taxonomic design that considers blending of computer generated decomposed structured concept maps and rules that update and retrieval from integrated databases.

Micro CI initiatives seen in some non-STEM initiatives [62], seemed very possible for taxonomic effort to institute computer based FED learning towards achieving WHW competence in the learning of FED relative to the larger success of HP's CI and Pedagogy 3.0. In doing so, critical thinking techniques for decision making might see advancement towards metacognition in developing knowledge management to recollect, reflect and applying prior learning [63]. Given the advent of computing technology, revision on taxonomy about thinking about learning might be what that would excite GenZ thinking about how their learning would be facilitated. If instructors choose to synchronize with GenZ about their ways of wanting to learn by social constructivism, what might be the appropriate timeliness to train facilitators in new ways of engaging the way GenZ thinks?

TABLE III: Legends for Figure 1 to Figure 6

Income Statement item	Balance Sheet items
COGS = Cost of Goods sold Op Exp = Operating Expenses EBITAD = Earnings Before Interest, Tax, Amortization & Depreciation A&D&I = Amotization + Depreciation + Interests EBT = Earnings Before Tax EAT = Earnings After Tax Div = Dividends EATD = Earnings After Tax & Dividends	LT = Long term R/E = Retained Earning WACC = Weighted Average Cost of Captial
11M Cost Accounting Databases	3S Supply Databases
1. Manpower (staffing) 2. Marketing (selling exp) 3. Money (cost of funds) 4. Methods (systems related) 5. Material (direct/indirect) 6. Machine (plants & machinery) 7. Measurement (quality control & assurance related) 8. Maintenance (service contracts & depreciation) 9. Motivation (training) 10. Motion (idle cost) 11. Modification (engineering change)	1. 50% 2. 30% 3. 20%

Additional support of that implication is relied on PRC GenZ demography's inclination towards computing technology which form the basis of machine based learning seen in Pedagogy 3.0. This implied that changes in learning styles seems to converge towards technology enabled learning and teaching; evident by recent CI for STEM as expanding network technology becomes the imminent

motivating induction factor for incapacitating social learning in teaching and learning about thinking in FED. Felder and Silverman [64] suggested learning style is not static but fluctuates within a possible matrix of thirty-two dimensions of learning and teaching styles according to the type of motivation received to trigger the motive for the learning behavior.

How students might be positively incentivized by taxonomy influence upon pedagogy has been seen in CI and Pedagogy 3.0 such that the wholesome involvement of all variables mentioned in this paper favoring revision of the current 6 levels taxonomy to 4 levels. The taxonomic arrangement of 4 levels represented in Fig 1 to 6 while complementarity synchronize with the leadership of Gane Sarson SSADM will favorably position the design for advancement whenever Gane Sarson advances or perhaps advance ahead with machine learning for machine based learning towards metacognition development.

APPENDIX

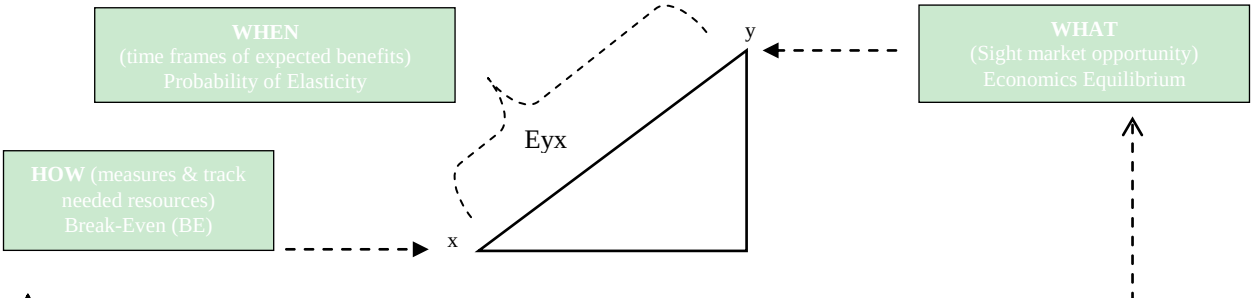

Fig. 1. Level-0 context diagram for Break-Even-Economics-Equilibrium (BEEE)

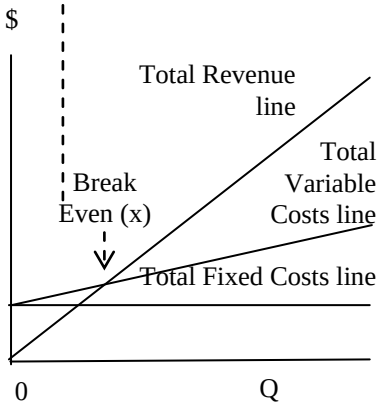

Fig. 2. Level-1 decomposed Beak Even (BE) chart for 'How' dimension

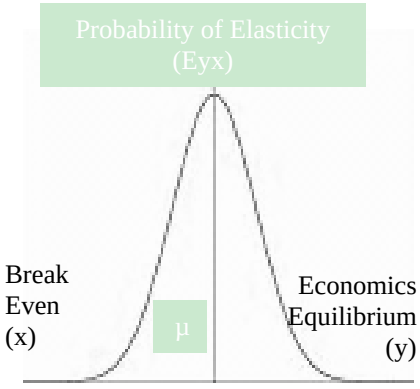

Fig. 3. Level-1 decomposed nominal distribution curve of BEEE risk for 'When' dimension

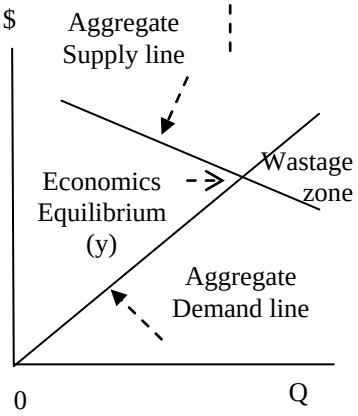

Fig. 4. Level-1 decomposed Economics Equilibrium (EE) chart for 'What' dimension

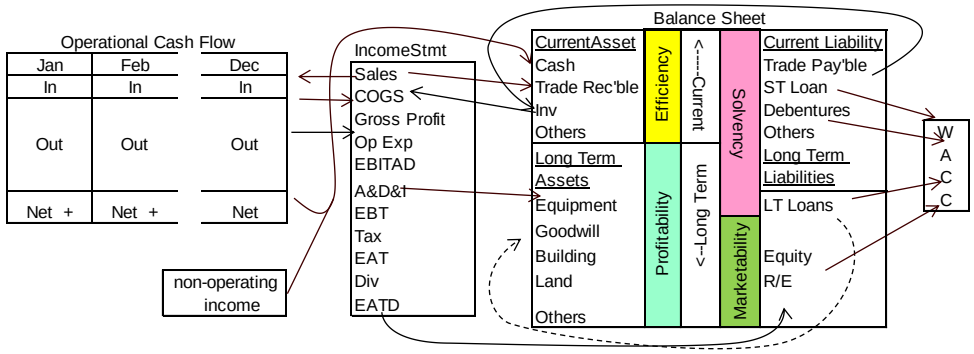

Fig. 5. Level-2 database access rule map.

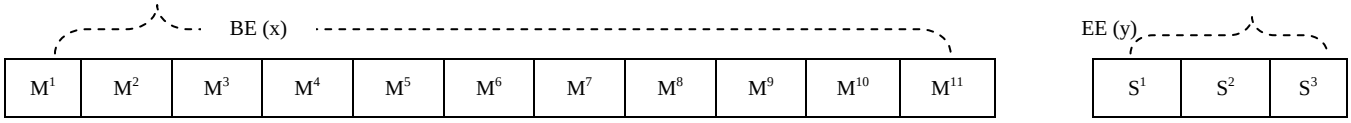

Fig. 6. Level-1 conceptual database schema map.

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