

ORGANIZATIONAL LEADERSHIP PROCESS FOR UNIVERSITY EDUCATION

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ABSTRACT

This paper relates the "Agile School", an emerging archetype of the enterprise architecture: "Processes of Organizational Leadership" for leading and managing strategies, tactics and operations of forming in Higher Education Institutions. Agile School is a system for innovation and deep transformation of University Institutions in which it starts with the identity and it ends at the self-governance and social responsibility, around satisfaction and transcendence by the outcomes at environment, resources and people. Our work research is based on the "Executable Enterprise Architectures" using "Lean and Agile methodologies through of Serious Play paradigm" for linking the senses with emotional and cognitive areas as a means to accelerate identification, analysis and problem solving, enhance decision-making and develop commitment actions by all stakeholders. With Agile School, it is possible acknowledge and reach consensus to propose architectural solutions supported in the holistic views of individuals and collectives, using simulation scenarios of past and future, to build concrete and clear architectures that enable innovation and iterative improvement using information and communication technologies through of real and virtual environments. With this perspective it could ensure efficient and effective quality of design and development according of required products and services. Particularly, Agile School is based in the "Educational Process Maturity Model - EPMM/PE" with five high performance levels, in which products or services are on a continuous improvement due to innovation, competitiveness, flexibility and productivity.

KEYWORDS

Enterprise Architecture, Agile Methods, Simulation, Maturity Models, Quality Assurance.

1. INTRODUCTION

Our research on the development of the organization (Llamosa and Mendez, 2010), induce that systems must have an Enterprise Architecture:

- To integrate principles and specifications to influence her performance and development organizational [(Dickerson and Mavris, 2010), (The Open Group, 2013), (Tiwana, 2014), and (Zachman, 2014)].
- To structure a compound building blocks for encourage multidisciplinary work and develop and evolve, harmoniously, coherently and synchronously, the continent and content on the strategy, the logistics and the operation of the organization, following guidelines for efficient and flexible government, to develop products and services that are produced in an evolutionary and iterative manner (Bente et al, 2012).
- To have a set of principles, strategies and tactics to the learning and work collaborative to avoid the overhead and bureaucracy, and promote satisfaction on compliance and commitment to delivering value, and transcendence on adaptive management, leadership, solve problems and continuing improvement [(Ambler and Lines, 2012), (Cardinal, 2014), (Griffiths, 2012), (Schiel, 2010), and Wagener et al, 2011)].

This paper gives an account our research realized in the Laboratory of Integrated Organizational Systems (LASIO) using "Enterprise Architecture with Agile Methods (ARTEMA)" through developing a pilot of Agile School, which extends the "Process Management Model for Higher Education" (Llamosa and Méndez, 2010) to two courses with different levels of maturity: Probability and Statistics for Engineers (3th. semester) and Quality Engineering (7th. semester) of the program of Electrical and Electronic Engineering.

This paper is organized as follows:

- *Organizational leadership processes.* This section shows the "what" of the structural, functional and operational building blocks, or, enterprise architecture of the administrative management and strategic, tactical and operative administration of the "how", "where", "why", "when", "who", "how much" with which the feasibility and commitment of value is set.
- *Organizational Maturity Processes.* This paragraph describe how assessing compliance of organizational leadership processes to monitoring and realizing corrective actions of business continuity and preventive actions of research, innovation and development.
- *Agile School Model.* This section sets the patterns that serve as reference for organization and practices for a typical architecture of Higher Education Institution.
- *Agile School Pilot.* This paragraph shows the tailoring that serves as reference for measurement the organization and practices achieved by an Institution of Higher Education. This paragraph refers to the pilot as architecture type that it has served for the design, verification and validation of Agile School.
- *Conclusions.* This fragment recounts the retrospective assessment and future work of the project.
- *Acknowledgment.* This part refers the gratitude to those stakeholders contributed to this project.
- *References.* In last section include the bibliographic information used in this paper.

2. ORGANIZATIONAL LEADERSHIP PROCESSES

Organizational Leadership Processes -OLP- is the first level of our Enterprise Architecture model (Figure 1). It consists of an essential element called *Administrative Management*, which has three administrative building blocks: *Strategic, Tactical and Operational*. Each of the components is observed with holistic common perspectives in order to provide comprehensive interpretations of business modeling, and deploying processes, followed the perspective of intelligence and decision making, leadership, planning, monitoring and control (Figure 2), to develop the *tactical administration*, which in turn is responsible for providing logistics, manage resources, infrastructure, media and knowledge resources, for the *operational administration* of production of goods and the provision of services under the sustainable environment.

At the same time, the *tactical administration* is also responsible for providing logistics, manage resources and knowledge, and capture information, for and from, *the strategic administration* of the research, innovation and develop to implement strategies and operations for transforming the mission towards the vision, achieving objectives and goals under the framework of the organizational values and principles.

In summary, tactical administration is responsible for planning, supplying, monitoring and functional and organizational controls of logistic, knowledge, communications, technology, economy, people and, performance around of the Administrative Management of the strategy, the tactic and the operation. The Strategic Administration is responsible to improve the system, produce plans, programs and projects of research, innovation, improvement and development as a whole, from the environment and functional studies, information on the organizational behavior specifications, intelligence processes, vision, leadership and direction. The Operative Administration produces and provides missionary goods and services.

3. ORGANIZATIONAL MATURITY PROCESSES

Under the guidelines of *OLP* as Enterprise Architecture with architectures of business, information, and technology, *the Organizational Maturity Model of Processes -PEMM-* (Figure 4) is a tool to observe, verify and validate communication specifications and functional performance of components, practices and resources, before, during and after, of the processes execution to prove hypothesis and determine knowledge for achieve strategic, tactical and operational goals.

At this time, the *Integrated Communication Diagnosis (COIN)* is used to verify and validate inter-phases, channels, technology, and media, quality, quantity, connection, meaning, continent, content, transmission, and reception of messages (Figure 3) from emitters and receivers for doing preventive and corrective actions to improve organizational climate, environment, workplaces, and emotional communications between internal and external stakeholders of the organization.

Once the COIN is established, the *Tactical Administration* proceeds to make the organizational and functional assessment using the measurement methods of OPMM (Figure 4) for establishing the capacity and stability of enterprise architecture using benchmarking to verify conformities and unconformities supported by findings to develop projects within plans and programs according to the priorities of the organization.

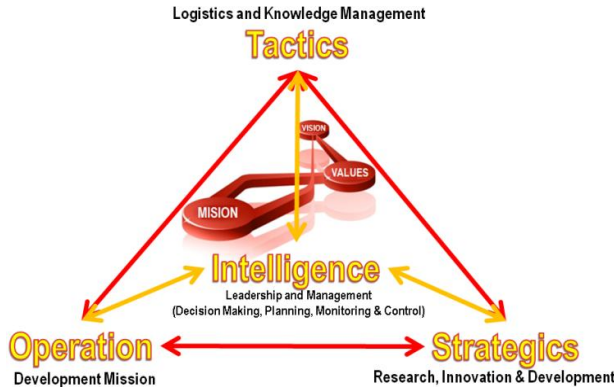


Figure 1. Administrative Management View

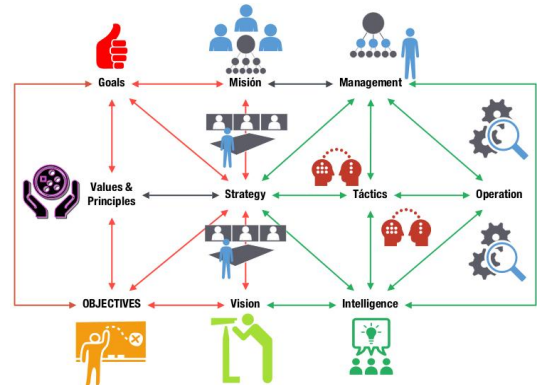


Figure 2. Administrative Management Components

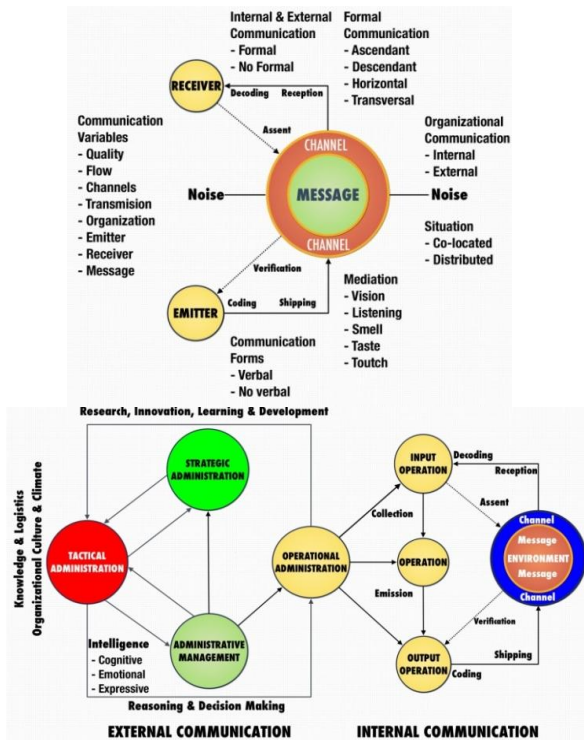


Figure 3. Organizational communications Evaluation

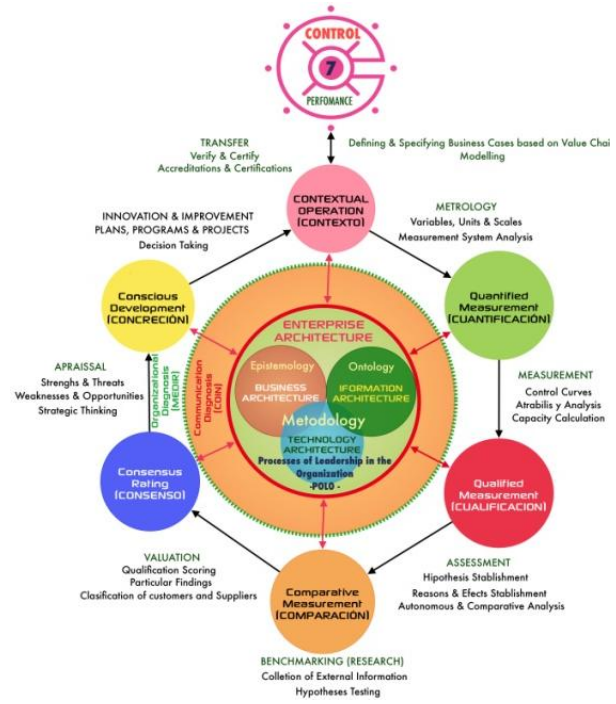


Figure 4. Organizational Processes Maturity

4. AGILE SCHOOL MODEL

The "Agile School" architecture has the following building blocks (Figure 5) [(Llamosa and Méndez, 2010), (Llamosa and Gómez, 2013), (Llamosa and Camacho, 2013), (Llamosa and Camacho, 2013)]:

- **The Administrative Management** directs and manages the government and strategic thinking; the research, innovation and development of goods and services, technology, content, and educational assessments; the resources, logistical and tactical; and, the operation of education services.

- **The Strategic Administrative** manages, operates and monitors the research, innovation, improvement and technological development projects of goods and services for all areas of the educational organization.
- **The Tactical Administrative** manages, provides and monitors all logistics resources, processes, technology, people, knowledge, intelligence, configuration, quality and infrastructure for all areas of the educational organization.
- **The Operational Administrative** provides and monitors all educational services of the authoring, instruction and assessment.

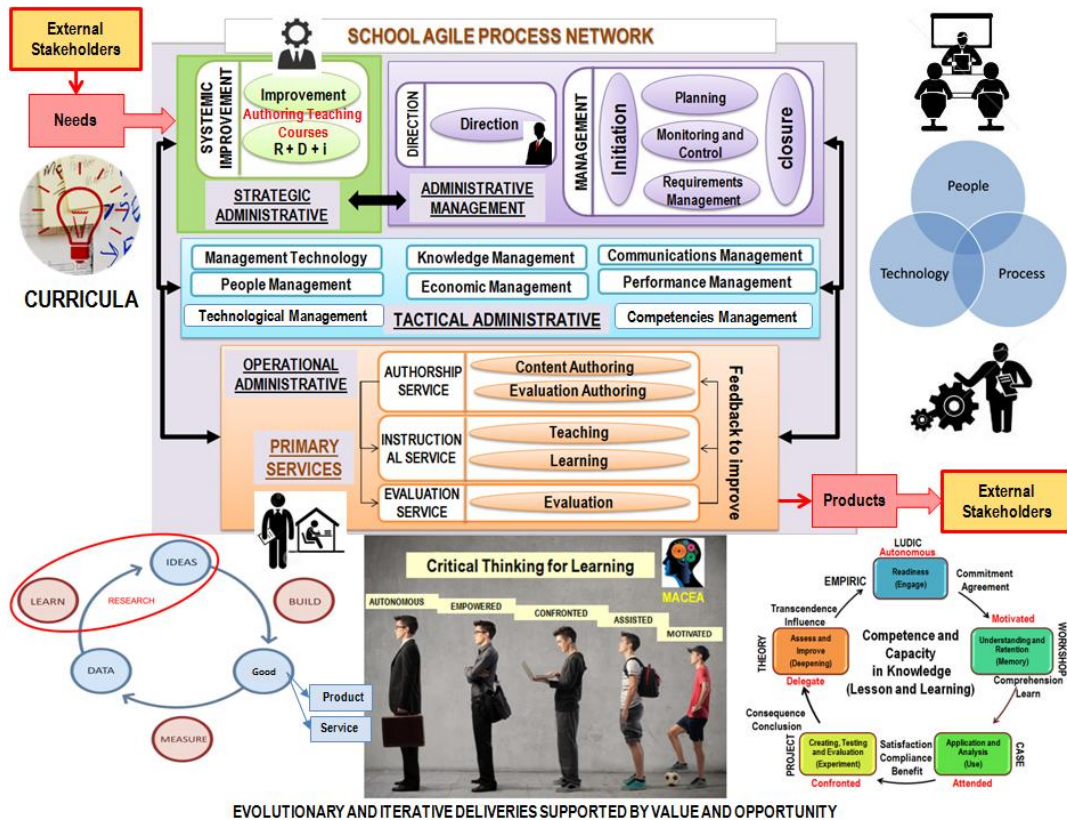


Figure 5. Higher Education Processes Network

The "Agile School" Architecture connects supplies, inputs, processes, resources (actors, technology, knowledge and infrastructure) and the products and beneficiaries. The processes are seen as a sequence of activities that start in the needs of external beneficiaries and end in results received by all beneficiaries.

The Table 1 shows the building blocks, activities and practices. Each practice has a maturity level and is associated with the roles of Administrator (Leader and Manager), Teacher (Mentor, Coach, Instructor, Trainer, Facilitator and Assistant), Learner (Leader, Member, and Student), Appraiser (Author and Internal, External and Proper Evaluator), Beneficiaries (External Stakeholders), all configuration resources, and infrastructure. Each of the practices has products and these products can be goods or services and they should have results for each of the beneficiaries and stakeholders.

The "Agile School" architecture competencies are composed by performance competencies of processes and performance competencies of resources. Each type of competency is broken down into units and elements of competency, performance criteria, knowledge, applications and evidence to certify skills and conformities. And each product is associated with tasks and results and there are a complete relation among processes, roles, resources, products and outcomes.

With this inventory of the elements of competency and their products and terms of outcome or impact, the compliance, satisfaction and control measures are set, and consequently, it is computable the potential capability and actual capability to estimate and control the Architecture [(Jurney, 2014, Sheikh, and Alnoukari,

2012)] under criteria of truth to admit, build and study cognitive phenomena, for justifying how it is generated, built, defined and institutionalized knowledge. Furthermore, it is validated the knower, the object known and the conditions of the educative value chain [(Mansourov and Campara, 2011) and (Martin, 2001)].

Table 1. Process: Building Block, Activities, Practices (Maturity Level) of Agile School

Processes		
Building Block	Activities	Practices (Maturity Level)
Administrative Management	Direction	1. Decision Analysis & Making (3) 2. Causes Analysis (5) 3. Educational Strategic (3)
	Management	4. Requirements Management (2) 5. Educational Planning (2) 6. Educational Monitoring/Control (2) 7. Risk Management (3) 8. Education Quantification (4)
Strategic Administrative	Systemic Improvement	9. Definition and Improvement (3) 10. Research, Innovation and Development (5)
Tactical Administrative	Quality Assurance	11. Configuration of Knowledge Assets Management (2) 12. Measurement and Analysis (2) 13. Quality Assurance (2) 14. Training (3) 15. Communications Management (3) 16. Performance Measurement (4)
Operational Administrative	Authoring	17. Requirements Definition (3) 18. Educational Design/Development (2) 19. Educational Verification (3) 20. Educational Validation (3)
	Instruction	21. Instruction Service Delivery (2) 22. Instruction Service Continuity (3) 23. Incident Resolution/Prevention (3)
	Evaluation	24. Evaluation (3)

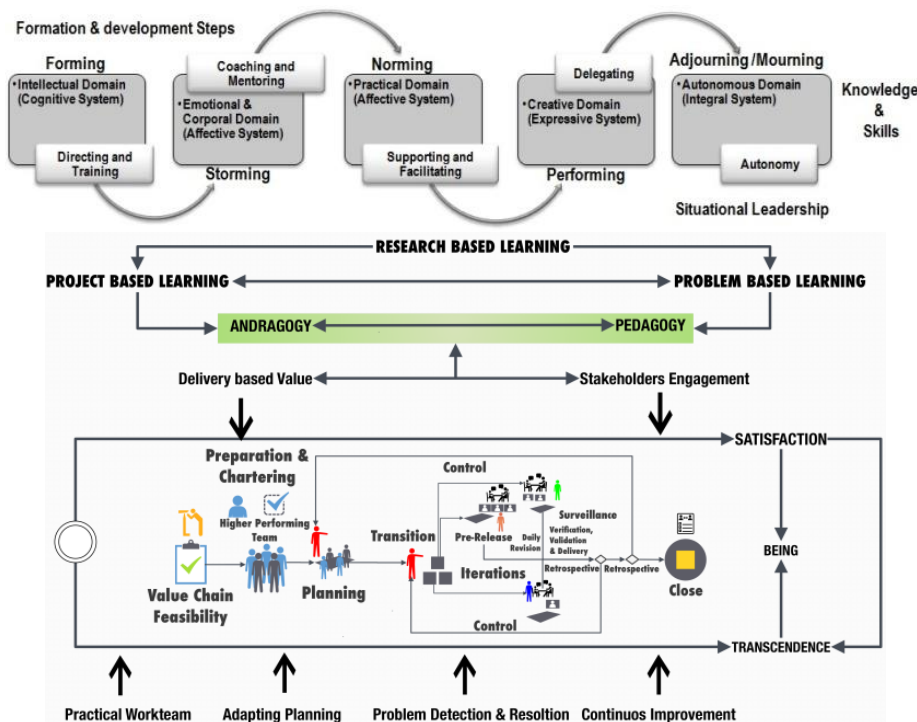


Figure 6. Teaching - Learning Process

Finally, it is important to note that each stage of the educational process requires to achieve a gradual iterative training in knowledge and skills and all phases of the teaching-learning activities covers (Button Figure 5 and Top Figure 6) (Barron et al, 2011): **The Intellectual Domain** (cognitive system) in which the learner receives direction and training; **Emotional and Physical Domain** (emotional system) in which the learner, with the support of an educational coach and a facilitator, publicly confronts his learned achieved in the cognitive system; **The Practical Domain** (emotional system) in which the learner, with the support of educational assistants and facilitators, get experience, skill and maturity as practitioners; **The Domain Creative** (expression system) in which the learner is delegate to perform own creations; and, **The Autonomous Domain** (Integrated system) in which the learner is free to make her own practices.

5. AGILE SCHOOL PILOT

With the "Agile School" architecture specified, a pilot was established in the Moodle platform of the Industrial University of Santander, and then, the provision of educational services of government, teaching-learning, consulting and advisory, was provided in the Information Centre of Technology and Communications and the CIDLIS.

With the pilot produced from the "Agile School" architecture (Button Figure 6) they were established the following activities:

1) It tested and validated the value chain of the educational process and its products with stakeholders, resources, activities, time required and products, and the outcomes were satisfactory (value commitment) and transcendental (management, problem solving, teamwork and improvement).

2) The introduction of competencies of processes performance, resources and products were evidenced in processes assessment and validation, the optimal use of resources, the elimination of wastes and lead time, timely response to requests, continuity and control of processes, evolutionary and iterative delivery of product releases, validate methods and media of communication, achieving competencies, and, the measurement of the potential and actual capability level of processes, resources and products.

3) It constituted the teaching-learning team: authors, instructors, facilitators, assistants, coaches, mentors, auxiliaries and students, and synchronously, the required products and activities, were proposed and were developed in each of the teaching-learning cases and projects in each of the educational process iteration.

4) The educational process iterations involved the synchronization of processes, requirements and conditions of learning development by each case and project through instruction, executions, iterations, daily checks, verifications, validations, transferences, retrospectives, improvements and innovations. This exercise was fulfilled when it achieved the scope established for each activity.

5) When the last cycle of execution of "case-project" was closed, it was necessary to do an overall retrospective for innovations, enhancements and improvements.

The pilot (Figure 7) was applied to two courses to obtain an experimentation appropriate sample. The courses were: Quality Engineering (Top level: 7th semester) and Statistics and Probability for Engineers (Button level: 3th Semester) at "Electrical and Electronics Engineering School" of the Universidad Industrial de Santander. The students' activities were linked by work team of six students, two of the top-level course, and four of lower-level course. Both classes had a common interface module with statistics tools for synchronization and promotion of knowledge, skills, tools, techniques and abilities. Situation, which allowed a comprehensive teaching-learning project and cases in the domain of students and although being on different levels, they developed learning collaborative and work complementary with projects and cases covering a single purpose improving products and processes, achieving common scope.

The directly and indirectly measurement system of processes, competencies and products included tools supported in rubrics and test to apply to reports, daily revision, exams and retrospectives, for each module, case and project of the courses whole content. The value chain included measurements of processing times, waiting times, and times of transition. On inputs of each phase were detected errors, defects, faults and failings, produced by the predecessor stages and it was detected products without providers and consumers.

The products of the teachers, authors, mentors, coaches and students were checked by the beneficiaries, who in turn expressed their assessment, findings and suggestions in each case.

From the perspective of leadership, management and administration got in Agile School pilot (Figure 8):

- Under the "planning - monitoring - control" under the "lean - agile" approach, the stakeholders were integrated with general and specific teaching-learning attainments of work teams. All achievements were evidenced through products and behaviors recorded as formal issues in each phase of the course.
- All activities were motivated under the "serious game" approach for encouraging the listening, hearing, touch, and taste for the analysis, reasoning, and synthesis for achieving sustained behavior in emotional intelligence about "strategy - tactics - operation" supported by teamwork engaged for authoring and teaching - learning under the satisfaction perspective by the value creation and stakeholders commitment in results, and transcendence by problems management and continuous improvement

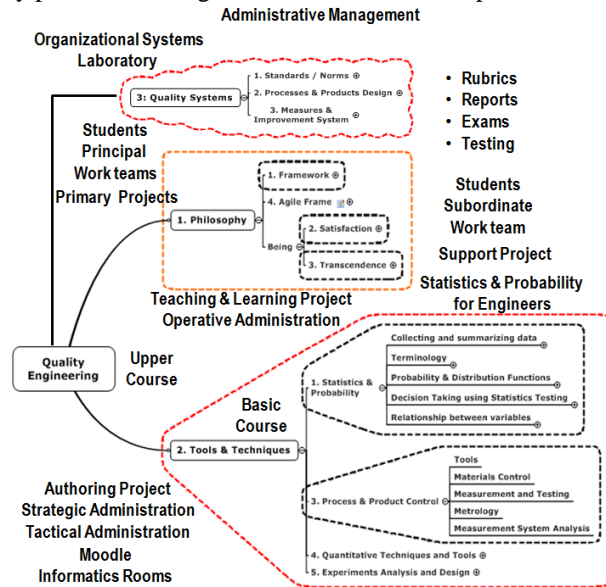


Figure 7. Agile School Pilot



Figure 8. Courses Work Teams

- The capacity of the courses (Figure 9) was above 71%. The result of the evaluation of the capabilities for each of the tested courses has generated improvements to our work environment.

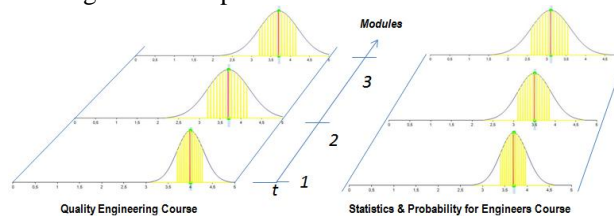


Figure 9. Performance Evaluation of students

6. CONCLUSIONS

Lessons learned by the use of the Agile School Architecture enhances the Teaching-Learning process to create a dynamic, agile, and collaborative learning and integration with the environment, a fact that motivates and creates value for all those involved in the educational process.

The achievements of the methodological performance of the "Agile School" architecture are translated into discipline to internalize the processes and principles of performance and accountability whereby by any action is made spontaneously by all teams, as an integral whole.

Future work Agile School argues to extend the model to the scenarios of simulation to work components as educational units on which their structures and behavior is not known, in order to perform intelligence to create influenced collaborative environments using the paradigms of systems of systems.

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