EMBEDDED-IMPROVEMENT BASED ON EMBEDDED-CONSULTATION IN HE IN LINE WITH ENQA-ESG, QUALITY AND BPM STANDARDS

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ABSTRACT

This study is a look at ENQA-ESG [1] from the angle of European Higher Education Quality Space (EHE-QS) which covers several quality standards, models, frameworks and methodologies for the sake of embedded-improvement. EHE-QS is a new concept laid down with this study and will be embodied during the paper. With the version of May-2015, ESG is more close to team playing and more sensitive to the environment (Bologna tools like National Qualifications-NQ frameworks, European Credit Transfer System-ECTS, Diploma Supplement-DS) [2] in which it is expected to play. There are also other quality standards and models which span whole HE activities as well as the area, where ESG is involved in particular. It can be said that ESG is just a quality player in European HE Area like ISO 9001, EFQM and etc., which form EHE-QS. These quality players should pay regard to each other, communicate and collaborate with and integrate to each other in melting point. The basic question in the study is that "what is the main quality playmaker" in this EHE-QS, is it ESG, ISO 9001 [3] or EFQM [4] or other programme-unique quality players like EUR-ACE [5]? After determining main quality player, the next question is how "Embedded- Improvement based on Embedded-Consultation" will be embodied with the main quality structure in line with ESG, ISO 9001 and BPM standards [6]. All issues in the study will be taken in the light of the experiences gained in Mersin University

Keywords: ISO 9001, ESG, BPM in HE, Embedded-Improvement, Embedded-Consultation, Quality Watchdog, RACI, 6 Sigma, Mersin University.

INTRODUCTION

For embedded-improvement based on embedded-consultation (EI-EC), we need to give some initial information about the quality players, those Higher Education Institutions (HEIs) are faced with in European Higher Education Quality Space. Every HEI, as such, has a different quality culture and understanding and tends to be different from the others in implementation of quality. This gets other quality players, such as ISO 9001, EFQM to the playground beside ESG. But sometimes, apart from trying to be different, working with different quality players becomes a necessity to be competitive among the others in managing HEIs' routines (mission-based) and expectations (vision-based). This study stands in competitive side.

It can be said that ISO 9001 (Ver.2015) is a "Quality Watchdog" that is stick to an institution or university (outboard) which masterminds universities' whole activities based on business process structure and continuously nudges top-management for sustainable and continuous improvement with its improvement tools. It does this from outboard without intervening institution's formal structure (legitimacy) unlike ESG. With its horizontal lines (process structure), ISO 9001 is a kind of house keeper for other quality players and makes a bedplate for them. Without it, other quality players hang in air since they are not a quality system like ISO 9001. So, ISO 9001 is the main playmaker in EHE-QS which is open and maybe much experienced to collaborations coming from other quality players. ISO 9001 stipulates institutions move to process structure and have business processes (BPs). BPs in ISO 9001 is highways of Quality Management System and all activities should be put across. ISO 9001 is not an easy-to-implement standard since it brings excessive bureaucratization and inflexibility [7] into HEI. This is very normal since it is mission-oriented and established in managing routine. Managing routine requests robustness and mightiness.

Like ISO 9001, ESG also mentions about processes [part 1, 1.1] and spans all activities in an HE institution within the continuous improvement cycle (ESG page 5) based on accountability and enhancement. Processes mentioned in ESG are not business processes like the ones in ISO 9001 and they are in need of a methodology for being discovered and implementation. With the current standing in the EHE-QS, ESG does not force institutions to make a shift from functional structure to process structure (like ISO 9001) and enables them to provide quality assurance for their activities as they are. The practical meaning of this standing is that there are approximately three hundreds business flows in functional structure and these business flows should be quality-assured against three business processes in process structure regarding Turkish Universities.

ESG is a Quality Assurance (QA) framework, fully European [8] but ISO 9001 is a Quality Management (QM) system, fully international (as its name implies). QA versus QM means control versus performance, strategic versus operational respectively. ESG is HE-Specific but ISO 9001 is generic standard for all sectors including HE [9]. QA takes all written at top management in its care (white collar) and hands over to below (to blue collar) with a controlled-way; QM takes over the things coming down and manages them with a performance-way. QM can cover totality but QA takes all in particular. So, ESG divides HE into ten parts and controls them with ten standards and guidelines while ISO 9001 manages all activities holistically with imperative system procedures. System procedures determine whether the standard is a quality system or quality assurance. ESG discovered this in its 2015 version and took off "procedures" from its text written in its previous version (ESG-2005, Clause 1.1) [10]. Embedded Improvement based on Embedded Consultation therefore should be taken separately for every HE activity or HE process which gathers several inter-related activities in one flow. In this study, EI will be taken for HE Processes for the sake of integration with ISO 9001. In that way, HE Business Processes having EI will serve to ESG too.

Business Process Management (BPM) is "a field of knowledge at the intersection between Business and Information technology" [11]. It is a business methodology and having the related technologies. BPM is a combination of both methodology and technology that can be understood by business analysts (discovering and documenting processes) and technical developers (performing processes with technology). BPM notation (BPMN) is fully entrusted with business process management and helps institutions bring about paradigm shift to process-oriented management. This is a helping hand for ESG to provide "assurance of conformity to customer and applicable statutory and regulatory requirements (legal requirements ISO 9001:2015 1-Scope)". BPM is a complementary to ISO 9001 [12]. ISO 9001 asks HEIs to document their processes in paper, BPM do the same in digital (together with paper works). Where BPM enters ISO 9001 is clause 4.4 in 2015 version. Clause 4.4 asks HEIs to document all processes and process-related activities but does not stipulate any methodology on how to do. BPM is a methodology and technology which interprets 4.4 very well and fulfils what needs to be done in digital. Jeston and Nelis (2008) define BPM as the achievement of an organization's objectives through the improvement, management and control of essential business processes. Like BPM, ISO 9001 requests institutions the same, document "processes", no matter these are business processes or just processes and adopt the process approach (ISO 9001:2015, 0.2 Quality Management Principles)

In the light of text above; it can be said that EI (for HEIs) based on EC needs the trio of standards, ESG, ISO 9001 and BPMN with their latest versions. As ISO 9001 collaborates with EFQM in HE [13], ESG needs ISO 9001 too, as house keeper. ISO 9001 needs BPM for the best process management practice which embodies EI and EC. EI in terms of quality assurance is best done with BPM methodology since this methodology has an internationally-recognised modelling standard, BPMN 2.0 (ISO/IEC 19510:2013 identical to OMG BPMN 2.0.1 [14]). BPM enhances the functionality of ISO 9001 and best serves to ESG regarding EI-EC.

Consultation Sides; (as part of improvement in a university process);

- Students (ESG 1.3, student complaints)
- Lecturers (ESG Scope and Concepts, stakeholders)
- Administrative staff (ESG Scope and Concepts, stakeholders)
- End users of the service HE provides (ESG Scope and Concepts, external stakeholders)
- Top university management (ESG 1.9, periodically review, ISO 9001:2015, 9.3 Management Reviews)
- Law and Regulations (legal requirements)
- Requirements of ISO 9001 standard (embodying other management standards like ISO 14001, 27001 etc)
- Terms of HEI
- Process-related risks (Internal Control Standards-ICS) – this issue is out of scope for this study

According to the one of the four principles on which ESG is based, Quality Assurance (ESG page 6) takes into account the needs and expectations of students, all other stakeholders and society. This ESG principle fully supports the items written in consultation side above.

All requests coming from these consultation sides can be acquired via a corrective and preventive activity (ISO 9001 v.2015, clause 10) and "wishes and suggestions system" that is stick to every HE business processes. In that way, improvement will be managed and done separately (and autonomously) for every process since every

HE process has a different management team (RACI matrix referenced below) and as such, different improvement approach. Consultation side will have a kind of dashboard on which all consultation results will be available in a filtered way and ready for the improvement and further processing.

Improvement Sides

What criteria should be taken into account in improvement is as follows (as per ISO 9001:2015, 9.1.3);

- conformity (*conformance to and compliance with legal and quality requirements*)
- effectiveness (*fit for purpose*)
- performance against efficiency (*money for value*)
- satisfaction (*user comfort of receiving service*)

These four criteria should be determined for every HE Process separately and every process team should be very aware of these criteria. Quality Assurance in logic looks at processes separately and tries to establish the Quality Assurance for every process. In brief, QA is for every activity (or process) but QM is for whole institute. It can be said here that ESG is framework covering ten Quality Assurance standards while ISO 9001 is a standard having ten requirements for Quality Management System.

Every criterion can have several Key Performance Indicators-KPIs. KPIs can be process-specific, national or internationally-approved or fixed indicators. ENQA-ESG gives several clues about what the KPIs should be in its guidelines.

Improvement Team to be embedded into the HE Processes
Improvement team should also be embedded to the process via a RACI matrix [15] with a role seen in the table below. In that way, an improvement cycle will have been established; this continuously pays regard to the processes running.

RACI Matrix – handing over all processes' roles to RACI team

R - Who Is Responsible?, The person who is assigned to do the work (Doer) [19] A - Who Is Accountable?, The person who makes the final decision and has ultimate ownership (owner) C - Who Is Consulted?, The person who must be consulted before a decision or action is taken (consultant) I - Who Is Informed?, The person who must be informed that a decision or action has taken (reporter)	Bachelor Process	Master of Science	Doctorate Process
Establishing QA team for Higher Education Processes – one example			
Rector of university	A	A	A
Dean of Faculty with deputy deans	R	R	R
Secretary of Faculty (part of consultation team)	C	C	C
Academic Board of Faculty (part of consultation team)	C	C	C
Managerial Board of Faculty (part of consultation team)	C	C	C
Academic – 1 (sub doers)	R	R	R
Academic – 2 (sub doers)	R	R	R
Academic – 3 (sub doers)	R	R	R
Quality Assurance Coordinator or manager	I	I	I

The responsibilities about R, A, C, I can be shared or sub-divided.

Every HE process should have a statement like the one below for quality assurance (in improving cycle);

"At least two weeks before management review (ISO 9001:2015 Clause 9.3); the R comes together with her/his team and prepares a report to be presented to the I, who is QA coordinator. The informed (I) takes this report, along with other management review inputs, to the management review meeting for discussing whether or not HE Processes need something for the sake of improvement. The R can prepare a report covering fully text or some analysis about business process, which is responsible for, and present this analysis to I (Informed). There is no format for this. In that way, the A, owner of the processes, is informed of what is happening about the HE Processes in the management review meeting. RACI matrix is run dynamically after embedding it to the BPM-ed

processes and managed over the dashboard of the related process. The I (informed) is the main actor to do improvements based on consultation and reports from RACI team.

Technology sides for embedded-improvement

BPM and BPM notation (BPMN) mentioned in previous sections have two facets and gather sides, business analyst and technologist for the solution. BPMN [16] is a standard used in business process modelling and there is several open source or proprietary programmes or tools in sector in compliance with BPMN. Oriented on no-code bases (as possible as it can be), these tools or programmes enable modelling and executing business processes. For embedded-improvement, some practical studies in paper and digital should be done as follows*;

- SIPOC Diagram [17] for HE Business Processes
- Process Ontology for HE
- Process flows and definitions – in BPM-ed HE Business Processes
- Performance tables, Key Performance Indicators - embedded to BPM-ed HE Business Processes
- XML Schemas (XSD) – as part of modeling business processes
- Process mapping – for ISO 9001
- Business Process Database - in BPM-ed HE Business Processes
- RACI matrix – embedded to BPM-ed HE Business Processes
- Preventive and corrective + suggestion system - embedded to BPM-ed HE Business Processes
- BPM-ed HE Business Processes – modelled in line with BPMN 2.0
- Execution of BPM-ed processes via BPM suites
- Embedded-improvement structure based on consultation via process dashboard.

And technology infrastructure* (for processes modeling and embedded improvement);

- Java JDK SE (Java Development Kit Standard Edition)
- Apache Tomcat (web server)
- Eclipse (open source, integrated development environment-IDE)
- H2 (in-memory H2 database by default)
- Activiti BPM, Activiti Explorer
- Spring Framework (Application development framework for Java)
- Spring Data
- Bootsrap (front-end framework for web development)
- Angular js (Jquery framework)
- Jenkins (continuous integration tool)
- Selenium (web browser automation)

*Note: All these items are taken from a project, presented to TUBITAK (ID-308950)

When it comes to functional management;

HE Processes are the ones, Bachelor of Science, Master of Science and Doctorate, not more. More means that activities are seen as business process. Modelling these processes with BPM and then running them online means that they pay regard to all stakeholders' requirements (ESG, page 5) while doing what they are supposed to do.

The rest is the areas left out of HE Business Processes (Bachelor, Ms, and Doctorate) and can be managed in functional manner based on business flows. EI is still valid for every business flows, ESG pays attention to them too but these areas are out of the scope for this study. Processes can be in two forms, business processes or just processes. Master of science is a business process for HE but policy making process, academic calendar planning process are just processes and can cover workflows, definitions some other parameters like business processes but they are not business processes. This distinction between business processes and processes is very important in managing HE in right plane, Mixing them drives HEIs into segregation rather than integration.

In embedded-improvement, BPM-ed processes should pay regard and be sensitive to what is happening around. For example, a business process, being used in engineering faculty, should be very aware of requirements of an area-specific quality assurance standard labelled as EUR-ACE® and internalize its sayings (requirements and requests) as well as other quality standards like ESG, ISO 9001, ICS (Internal Control Standards) together with BPMN. So, a BPM-ed process is a smart HE worker managing HE routines at its best.

Analysing an average Turkish University (Mersin University, 35.000 students and 3.000 academics, including staff); we want to conclude our study. There are 550 forms (in average, in doc format) in total, in which whole university active content resides. These forms in doc format are accessed and used via a Quality Management System by whole users. Of these 550 forms, 107 are actively being used in three HE Business Processes, BSc, MSc and PhD. These 107 forms, when embedded into related business process which are modelled with BPMN, will manage university's routine (mission-critical dynamic business side). These are the forms which serve to the main processes of a university and rank % 20 in average (more or less). This reminds us of "Pareto Analysis" and its 80/20 rule [18]. This analysis shows where attention should be paid to while doing improvement.

Note: BPM-ed business processes should be on board in a university since it is the main machine (process engine) doing the real business while ISO 9001 outboard as "Quality Watchdog".

CONCLUSIONS AND SUGGESTIONS

There are 300 workflows in average in a Turkish University when it is configured in functional structure and 3 business processes when configured in business process structure. This is a junction point regarding where to go and how to implement embedded-improvement based on embedded-consultation. Providing Quality Assurance for all activities in a university in line with ESG is easier in process structure since main tasks related to mission-critical reside in university business processes, Bachelor of Science, Master of Science and Doctorate. Focusing on three university processes makes the integration easier too with other quality players, like ISO 9001, EFQM etc. in EHE-QS. Modelling these processes with BPMN standard, HE Business Processes becomes a real bedplate for embedded-improvement based on embedded-consultation. Risk management coming from Internal Control Standards [20] can also be embedded into the study to cover process risks.

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