

# Quality Management of Project Development Process

Northern (Arctic) Federal University n.a. M. Lomonosov  
*E. Shepeleva, I. Kuznetsova , E. Shepelev*

**Based on performed analysis concerning the notion “project development”, quality determination criteria of design products, classification of projects designed in universities and possible quality management tools applied in the project development process, application requirements are proposed for specific sub-processes with further operations manuals.**

**Key words:** *engineering, project, quality, process, control, management instruments.*



E. Shepeleva



I. Kuznetsova



E. Shepelev

Nowadays, Quality Management Systems (QMS) are steadily growing, which, in its turn, increases the competitiveness of this or that organization. However, in many cases, the development and certification itself resolves into a designed quality document pack, but now, it can be urgent to document QMS so that it is “transparent”, i.e. to verify documentarily (in written form) that this System should not only exist, but mainly, it should function. That is why one should not pursue to build non-demanded documents, but to build such documents which would become either “reference books” or “pocket books” for many executives.

Product Lifecycle (PLC) includes such a stage as “Project Development”[1] which, in its turn, is closely related to the term “project” and embraces two meanings: as a result and as a process, including project development. These two meanings are schematically depicted in Fig. 1, where “project development” is highlighted as a dot-dash line. The target of project development is to carry-out the requirements as to the new product or service, specified by the consumer, or specified by normative-

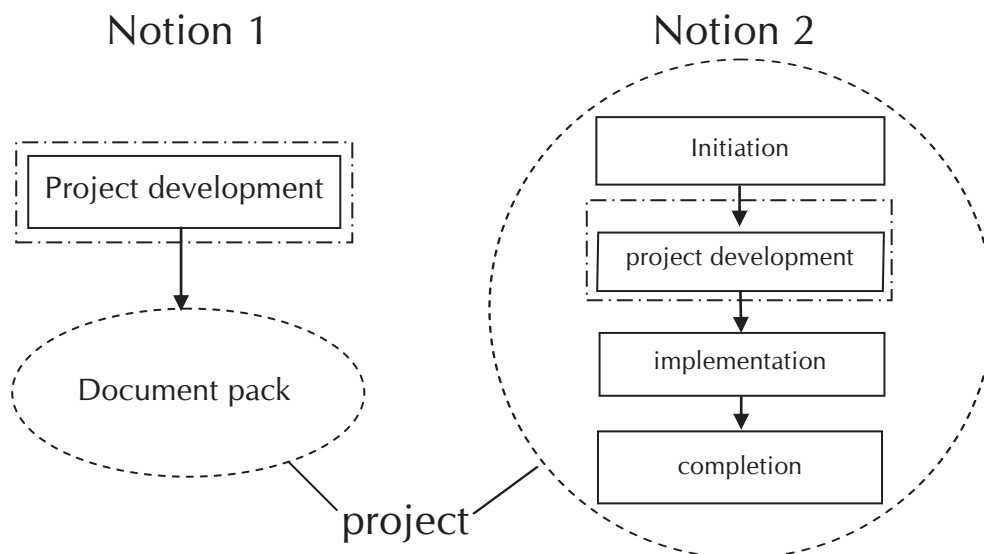
technical documentation, or revealed as a result of Marketing Study.

Project development is an integral part of any institution, including educational ones. Project development activities and curricula designing are based on the following: analysis of statistic reports in market expectations of education services, and perspective regional development plans, enquiry letters from employers, feedback of university graduates, as well as assessment of university procurement management, human resources and information support. Process results involve the designing of teaching and learning aids facilitating the training of students, Bachelor and Master degree students in specific specialties and qualifications.

Projects are classified in accordance to different attributes (in brackets examples for NAFU):

1. Type:

- technical (project in construction of training-laboratory building )
- organizational-technological (project in implementation of new management system; conference management);
- economic (project “Students-Sber-Bank”, within the framework of

**Fig. 1. Diagram of the term meanings “project”**


which students of NAFU and REFEI represent their projects concerning consumer loans, propose new service ideas and methods in improving bank office service quality);

- social ( project in increasing the amount of academic scholarships);
- combined.

2. Category:

- mono-project (projects in designing curricula of different specialties and qualifications, course wares, including discipline programs);
- multi-projects (project in university reformation);
- mega-project (project in developing Barents Island region in collaboration with NAFU).

3. Duration:

- short-term (design-project of university hall);
- mid-term ( project in building student campus);
- long-term (development project of Barents Island region).

4. Organization level:

- internal (projects in quality improvement of organization);
- external (project in developing contract-based project organization).

5. Mode:

- investment (university development project);
- innovative (competition of youth innovation projects KUMIR, student competition “Scientific-innovative projects to develop new types of effective business activities”, education project “CanSat in Russia”);
- research (unique project-“Floating University”: student training laboratory within marine expedition);
- academic ( term and diploma projects);
- combined (projects within the framework of European Union-Russia cooperation programs, including “Cold-Arctic- European Neighbourhood Partnership Instrument ”, “7th Framework Program in Research and Technological Development of European Union; 2007-2012” “TEMPUS”).

Practically, all activities in organizing the process and further assessing the quality of project documentation and decisions are relevant to the project executive competencies (i.e. manager, chief project engineer and others) who frequently take on several projects simultaneously. However, it should be noted that the most significant problem is the existing confusion in project development results of different specialists, functional areas and even project organizations.

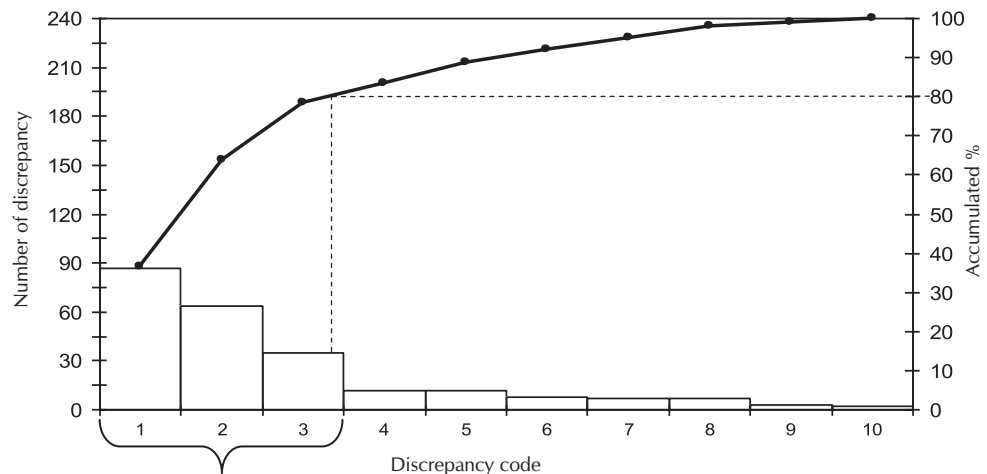
Most commonly, the quality of project documentation itself is analyzed either when submitting it to the customer or during expertizing. However, issues concerning quality should be highlighted throughout the project development process and so executing the monitoring of the project itself. In this case, the quality of the project product is restricted neither to the observance of normative documents and project development duration-period, nor compliance with the standard requirements of unified design documentation system. In many cases the quality of the project documentation is considered from the point of view of the number and significance of reclamations from customers, producers and organizations operating this or that project product. That is those discrepancies should be worked out and worked

at. In view of this it is vital to apply quality management tools which have been described in numerous publications [2]. Although, there is a lack of explanation in the question: how to apply these tools. There arises the question: "We have plotted the diagram, further what?" This is the issue that must be carefully examined and analyzed as it further would show how to apply this or that tool. Considering the sequence principle identified in the Deming cycle (PDSA: plan-do-study-act), what tool should be applied in what process is determined and proposed (Table 1).

(d) sharing knowledge and experience – inner benchmarking (in significant design organizations), which can select partners according to the specific criteria and, thereafter, study, evaluate and apply the knowledge and experience of these partners.

Thus, the application of quality management tools improves the level of quality control of the project development process in any area not only during entry and exit actions but also within the framework of this process itself, i.e. executing monitoring and measurement [1]. Such designed application methods results in high effectiveness during significant decrease of time-consuming monitoring and corrective actions.

**Fig. 2. Pareto diagram to Number of Detected Discrepancy**



**Table 1. Application of Quality Management Tools**

Cycle stage	Process	Tool
P (plan) – planning	Process planning	Arrow diagram (Gant diagram)
		Just-in-time (compliance with a deadline)
	Distribution of responsibilities	Matrix diagram
	Engaging highly-qualified employ-ees	Characteristic indicators of em- ployees
		Employee rating (flow chart)
	Determination of factors, influencing the process quality	Matrix diagram
		Communication diagram
	Determination of potential discrep- ancy, designing preventive actions	Decision-making program (plan)
Analysis of reasons and consequences of potential discrepancy and failures	FMEA-analysis	
Recording requirements of specific or potential consumers	QFD («House of Quality», Quality Function Deployment)	
D (do) – implementation	Determining execution sequence	Data-flow diagram (Flow diagram )
C (check) – control	Data concentration of discrepancies	Log sheets
	Identifying most substantial dis- crepancies	Pareto diagram
	Determining the causes of emerging discrepancies	Cause-and-effect diagram (Ishi- kawa\ fishbone diagram)
A (act) – action	Deployment of discrepancies	Affinity diagram
	Analysis of cause-and-effect failures	FMEA-analysis
	Recording and analysis of consumer satisfaction	QFD («House of Quality», Quality Function Deployment)
P'	Determining improvement targets	Tree diagram (Target-tree )
	Sharing knowledge and experience	Benchmarking
		Priority matrix
Refer to "P"		

**REFERENCES**

1. GOST ISO 9001–2011. Quality Management System. Requirements. Introduction. 2013–01–01. M., 2012. P. 27 (only in Russian)
2. Statistic Methods in Quality Improvement (1990) Ed. Hitostu Kume. M. P. 304