



ETAT

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**University
of Antwerp**

Quality Management in European Projects, a Case Study: ETAT

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Education & Training for Automation 4.0 in Thailand
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Foreword

A typical work package of projects funded by the European Union (e.g., the Erasmus+ Programme) is the one of quality management. Quality Management is often seen as a very administrative job that must be done but that isn't the core of the project. As a result, it is seen as a burden rather than a help to manage a project efficiently. In this document I start from the definition of quality and see how this can contribute to a better result for all the stakeholders. The ETAT project (Educational Training Center for Automation in Thailand) is given as an example.[1] I describe our experience with some of the quality tools used in that project and how they help in realizing the overall quality of the project.

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Contents

- Foreword - 2 -
- Contents - 3 -
- 1. Introduction..... - 4 -
- 2. Quality of a European Project - 4 -
 - 2.1 Definition of Quality - 4 -
 - 2.2 Stakeholders in a European Project - 5 -
- 3. Quality Management in the ETAT Project..... - 5 -
- 4. Quality Tools used in the ETAT Project - 8 -
 - 4.1 Timesheet and Joint Declaration..... - 8 -
 - 4.2 Overview Timesheets - 9 -
 - 4.3 Activity Document..... - 9 -
 - 4.4 Overview Activity Documents - 10 -
 - 4.5 Gantt Chart..... - 11 -
 - 4.6 Project Dashboard..... - 11 -
 - 4.7 Poster - 12 -
 - 4.8 Questionnaires - 13 -
- 5. Quality of the Deliverables - 13 -
- 6. Overview of Indicators - 13 -
- 7. Conclusion - 14 -
- 7. List of Abbreviations..... - 15 -
- 8. References..... - 15 -
- Attachment 1: Overview Activity Document (first period) - 16 -
- Attachment 2: Gantt Chart (Example: 09/2022) - 17 -
- Attachment 3: Project Dashboard (Example: 06/2021)..... - 18 -
- Attachment 4: Poster (June 2021) - 19 -
- Attachment 5: List of Project Indicators - 20 -

1. Introduction

“Education & Training for Automation 4.0 in Thailand” (ETAT) is an Erasmus+ Key Action 2 project (<https://etat-erasmus.com/>). Key Action 2 refers to “Cooperation for innovation and the exchange of good practices”. ETAT focusses hereby on capacity building in the field of higher education. The goal of the ETAT project is to enable the training and education of future Thai trainers for automation engineers, maintenance engineers, process workers and students. Non-classic teaching methods are used such as learning by doing, remote and mobile teaching with innovative technologies as well as LLL (Lifelong Learning). The experience of the European universities is an important input for the project. Each Thai HEI partner (higher education institute) is responsible for communication with enterprises and has made a survey that shows the high demand of specialists in modern Automation & Industry 4.0 technologies (**Automation 4.0**). [2] [3]



Figure 1: ETAT Smart Lab in Automation 4.0

To get grip on quality in a project such as ETAT, some basic rules are of vital importance. All partners must know what they must do. They must execute their job in the project according to what has been agreed. The **project description** given in the application, is of course the basis for this. All the jobs are be listed up and clarified not only during the first general meetings, but also during the whole project duration. Partners deliver the necessary input to the internal Quality Coordinator, the External Evaluator and Project Coordinator to get a clear overview of the status of these jobs.

A clear and transparent **communication** between all the partners, and by extension to all stakeholders, is very important. A collaboration platform and a website play an important role in this objective. The general concept of the quality plan is given in paragraph 2. The different quality tools, explained in paragraph 3, are developed to improve the communication and to support the quality of the project. The quality of the project is of course linked to the quality of the deliverables (see paragraph 5). Partners have been made aware of the importance of this. Qualitative and quantitative indicators help to keep the finger on the pulse (paragraph 6).

2. Quality of a European Project

The general definition of quality is our starting point to manage it in a European project.

2.1 Definition of Quality

One can find a variety of definitions of quality. Depending on the perspective of the author the definition is focusing on a certain aspect, a certain dimension. [5] A good example of this multi-dimensional nature of quality is given by Garvin’s eight dimensions of product quality [6]: performance, features, reliability, conformance, durability, serviceability, aesthetics and

perceived quality. Quality' definitions are, as you can see in the one of Garvin, often focusing on the expectations of the customers. Quality is seen as meeting or exceeding customer expectations. [5] ISO 9000 states that the quality of an organization's products and services is determined by the ability to satisfy customers and the intended and unintended impact on relevant interested parties. [7] In line with this ISO definition we like to use the following one as the basis for this paper. **Quality is how far a product satisfies the demands of the customer in particular and of the society in general.** To get an idea of the quality of services, software, hardware, ... it is necessary to measure or to compare characteristics of them. These demands can be found in specifications, directives, results of surveys, laws, project applications, recommendations, ... The customer (a person, an organization, ...) will decide about the extent to which the product meets (or even exceeds) the expectations. To prevent that the customer is looking to narrow to his expectations, also the society in general is involved and it defines extra expectations. A good example of these are the safety regulations that a government describes in laws. A car needs to have safety belts (and you must use them) although you are convinced that you are a safe and responsible driver.

2.2 Stakeholders in a European Project

Based on the definitions in the former paragraph it necessary to get a clear view on the stakeholders ("customers" and "society"). In the case of the ETAT Erasmus+ programme of the European Union we can distinguish several **stakeholders**. The main transfer of knowledge and hardware is for the ETAT project towards Thailand. Thai students and universities involved in the project, but also the Thai higher education in general, are the major beneficiaries of the project. Thai companies will benefit on short, medium, and long term. The European universities are mainly the supplier of the experience and knowledge. Also, they have demands and needs that must be fulfilled when they are participating in the project. The European Union has, as financier of the project, also demands and needs.

3. Quality Management in the ETAT Project

The ETAT project is structured in several work packages. The main goal of the **quality work package (WP2)** is to ensure the coherence between all the tasks. The "quality task" will guard that production of results and deliverables (expectations of ...) are coordinated and that good communication flows are established between all actors of the different tasks. The quality work package involves a **Quality Coordinator (QC)**, an **External (Quality) Evaluator (EE)**, a **Project Coordinator (PC)** and **all the partners (P)**. The Quality Coordinator is a key participant of the managing team. During one of the first general meetings of the ETAT project therefore was decided to invite the Quality Coordinator also for the meetings of the Steering Committee. This copes with the suggestion mentioned in the survival kit of LLP projects that the Quality Coordinator should also be part of the management system ([8], p. 41). The **Steering Committee (SC)** is seen as a structural component of the project management and has a meeting on a regular basis (e.g., web meeting some weeks before a general meeting). The committee discusses the proposal made by the project coordinator of the agenda of the next general meeting. Issues, delays, etc. are also viewed during these meetings of the Steering Committee to define necessary measures and present them during the General Meeting (GM).

During the meetings of the Steering Committee also extra members can be invited depending on the needs.

The Internal Quality Coordinator will provide the managing team with the necessary input and tools to get a clear view on the status of the project. This is of course a **flow of information** in one direction, from the Quality Coordinator to the Project Coordinator, the Steering Committee and to all partners. Also, a flow of information in the opposite direction is essential. Partners must regularly deliver the necessary input. Exchange of information is hereby crucial. Quality documents are produced to ensure good information and transparency about the work development. Quality documents also evaluate the work and methodology adopted, using key indicators that have been set in the quality work package.

The ETAT **quality plan** is the bases for the deliverables of work package 2. The internal quality coordinator developed a quality plan for the project in close collaboration with the external evaluator and the project coordinator. The Quality Plan was presented to all the project partners at one of the first general meetings. The plan was upgraded during the first project year with some extra tools.

In the application of the project the following short description of the Quality Plan was given: "The quality document will report on the quality control, assessment, and improvement activities over the project duration. It will be a key information tool to the Executive Agency, on the potential problems arisen during the project duration, the solutions found, etc. The document will include few indicators to evaluate the success of the project development, management, WP coordination." The Quality Plan describes how quality management is organized in a project. It gives the necessary answers for the project on the well-known Kipling questions [4]:

- **Who** is involved in the planned quality assurance actions?
- **What** are these planned quality assurance actions?
- **Where** are these actions realized?
- **When** will they be realized?
- **How** are they realized?
- **Why** are they realized?

A quality plan isn't possible without clarifying some important terminology:

Monitoring is a continuous process of assessing the progress of the project in relation to the original project plan. It is a regular assessment to detect whether the planned deliverables are being developed to the *agreed quality, on time and within the allocated budget*. In the ETAT application this process was described as *quality control and quality assurance*.

Evaluation is a continuous process of using methods to assess and improve the planning, implementation, and impact of a project. It is focusing on all project's processes, outputs, and outcomes. This process was mend by *quality improvement* in the ETAT application.

Monitoring is rather the implementation of the principle “say what you do and do what you say”. It will result in just the desired quality, while evaluation will help your project to reach a higher quality level due to a process of continuous improvement (“exceeding customer expectation”).

Quality control and assurance activities will monitor and assess the coordination and coherence of the work at WP and sub-WP levels, according to the work plan set by the managing team. It will ensure and respect a good coordination of key indicators, key activities, deliverables, and timetables. Quality monitoring will ensure (non-exhaustive list) that the following qualitative monitoring indicators are respected:

- Do all partners understand the goal at partner, task, and project level?
- The organization at sub-WP level in term of material, platform, internal communication, and daily staff are clear and respect the budget.
- Meetings correspond to a phase of tuning development of a main task with the active partners involved.
- There is a balance between the repartition of work and use/repartition of budget.

The information gathered by **timesheets**, **activity documents** and during the meetings gives the main input for the monitoring process. The status of the project is visualized by a **Gantt Chart** and a **project dashboard**. They are updated every three months. More details about these tools are provided in paragraph 4.

In case of a delay, a problem, requiring a modification of the objectives, timetable, or blocking a deliverable envisaged, the quality team will quickly intervene, by setting up a dialogue process between the managing team and the partners involved. A list of quality activities are put in a **poster** (see paragraph 4.7). In this poster all problems but also all major improvements are listed up and linked to an owner. The poster is updated every three months.

In order to evaluate the training, project management, project meetings, ... detailed **questionnaires** are used.

An **External (Quality) Evaluator** guards the overall quality of the project. The evaluator obtains input from the Internal Quality Coordinator, Project Coordinator, and the rest of the consortium. A non-exhausting list of items to be audited by the External Evaluator, is mentioned in the application: the level of cooperation of the members in the consortium, the quality of the output and whether the aims and objectives of the project are reached.

The **reports** prepared by the External Evaluator are sent to the Project Coordinator. They are discussed with the Quality Coordinator and the Project Management. The conclusions are passed to the Consortium and if necessary, adjustments are made in the work process, agenda of the workgroups, etc.

4. Quality Tools used in the ETAT Project

In the former paragraph some quality tools were already mentioned. Here they are described more in detail. Also the experience of using them in the ETAT project is given.

4.1 Timesheet and Joint Declaration

All partners inform the Project Coordinator and the Internal Quality Coordinator about their progress, problems, delays, etc. They deliver every six months their **Timesheets** and the **Joint Declaration**. A template is provided for both documents by the Project Coordinator. The timesheets give a detailed monthly overview of the activities carried out by a collaborator of a project partner. It gives a list of activities with the related work packages, deliverables and the dates assigned to a certain staff Category (Manager, Lecturer, Administrative, ...). Both, Timesheets and Joint Declaration, give the Project Coordinator and the Quality Coordinator a clear view on the project. Timesheets are used to identify both “over-activity” and “under-activity” of partners, and to ensure in both cases a balanced repartition of the work and of the budget allocated between partners.

Table 1: Timesheet

Add Row		Delete Row		PROJECT TIMESHEET	
Project number :	610154-EPP-1-2019-1-DE-EPPKA2-CBHE-JP				
Surname :	Smet				
First Name :	Erwin				
Institution :	Universiteit Antwerpen				
Country :	Belgium				
Position :	Lecturer				
Staff Category :	Manager				
Year	Month	Number of Days	Work Package	Description of tasks performed and outputs produced	
2022	April	1	Quality	follow-up status project and timesheets (WP2, D2.1) - 01/04/2022 - 5 u.	
				steering Committee Meeting (W.P2, D2.1) - 07/04/2022 - 2 u	
				preparation of GM8 (WP2, D2.1) - 20/04/2022 - 4 u.	
		2		General Meeting 8 (W.P.2, D2.1) - 21 & 22/04/2022 - 12 u.	
			Preparation Development	follow-up status project and timesheets (WP2, D2.1) -27/04/2022 - 1 u.	
			Quality		
			Dissemination/Exploitation		
			Management		

Table 2: Joint Declaration

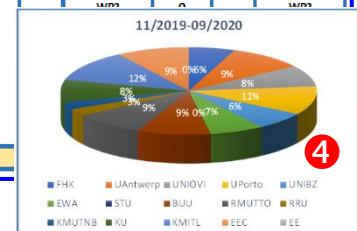
JOINT DECLARATION	
Ref. No.....	Project No. 610154-EPP-1-2019-1-DE-EPPKA2-CBHE-JP
The reference number must correspond to the progressive numbering indicated in the financial statements of the final report	
FROM	Universiteit Antwerpen Hereinafter "the Institution"
AND	Name: Erwin Smet Address: Gerard van Laethemlaan 11 2650 Edegem (Belgium) Hereinafter "the Staff member"
THE INSTITUTION AND THE STAFF MEMBER HEREBY CERTIFY THAT:	
1. The Institution is a member of the partnership for the above-mentioned project.	
2. The Staff member is either:	
- employed by the Institution YES/NO	
or	
- a natural person ** assigned to the project on the basis of a contract against payment YES/NO	
3. The Institution and Staff member agree that the Staff member has worked on this project and performed the following duties during the project's eligibility period.	
dd/mm/yy	dd/mm/yy
FROM	TO
01/11/2021	30/04/2022
Please describe the outputs produced (short overall indication since detailed information has to be given in the accompanying time-sheet):	
Preparing, attending and follow-up GM7 & GM8, attending Steering Committee Meetings, follow-up status project	
4. Please complete the following information.	

4.2 Overview Timesheets

To get a better overview on the **work balance** a new document was developed after the 3rd General ETAT Meeting. The document is based on the Timesheets and shows for every partner the number of days spent in a certain period on the project (❷). Based on the total number of days that are provided (❶), a percentage is calculate. This percentage (❸) gives the part of the total number of days allocated to that partner, that is used until the beginning of the project. A pie chart (❹) shows the distribution over the partners for a certain period (e.g., the chart of table 3 shows the partition for the first period). This overview document is uploaded on the collaboration platform.

Table 3: Overview of Timesheets

ETAT				Co-funded by the Erasmus+ Programme of the European Union		Status: 18/05/2021	Work Balance based on Timesheets									
Partner				Person	Staff Category	Total days	11/2019-09/2020			10/2020-04/2021						
							# days	%	WP	# days	%	WP				
Fachhochschule Kärnten	FHK	Villach (Austria)	P1	C	Manager	312	4		WP1	14		WP1-Dev				
				C	Researcher/Teacher		3		WP1-DEV	21		Dev				
				A	Researcher/Teacher		0			3		WP1-WP2				
				A	Technical		6		WP1	12		WP1				
				M	Technical		1		WP1	1		WP1				
				T	Manager		1		WP1	1		Dev				
				M	Technical		1		WP1	1		WP1				
				C	Researcher/Teacher		1		DEV	2		Dev				
										17	5%		55	23%		
										233	28					
University of Antwerp	UAntwerp	Antwerp (Belgium)	P2	E	Manager	233	5									
				E	Researcher/Teacher		1									
				S	Manager		4									
				S	Administrative		4									
				C	Researcher/Teacher		7									
				S	Researcher/Teacher		4									
				D	Researcher/Teacher		3									






4.3 Activity Document

Only a timesheet and a Joint Declaration don't give a clear overview of the activities done by a partner. Therefore we (Project Coordinator and Quality Coordinator) decided to create an Activity Document. This document gives an overview of the last 6 months of the activities of one partner. An example of an activity document is shown on next page. This was the first one we have collected and therefore covers 12 months. The document consists of a bulleted list with planned activities and additional activities (e.g. lab tours that were originally not foreseen in the application, but are very useful to get an idea of the focus of every Thai partner) linked to deliverables, results, outcomes, ... During the 5th General Meeting we decided that every activity should be linked to a deliverable. The "x" that still can be seen in table 4 (left part, last column) should be avoided. Therefore, we adapted already the template of this document to avoid that an "x" can be selected. As well, problems, delays, and issues can be mentioned in this document. They will be discussed during meetings and eventually put in the poster (paragraph 4.7). We explained the partnership that reporting is not entirely about spreading good news and success stories. "Problems, obstacles, and failures are much more relevant, as it is this kind of news which requires remedial action. It is from the

shortcomings in particular that the whole team can learn the most valuable lessons and improve the overall project performance.” ([8], p. 54)

In table 4 can be seen that partners are also asked to describe how they guarantee the quality of their outcomes and deliverables.

Table 4: Activity Document

 ACTIVITY DOCUMENT 				
The goal of this document is to get an overview of all activities, results and outcomes of one partner during the period considered. Also give the problems and issues you have met during this period.			es of one partner ng this period.	
Make your choice from the <u>pull-down menu</u> to select partner and period.				
Projectnumber: 610154-EPP-1-2019-1-DE-EPPKA2-CBHE-JP				
Partner: P2 University of Antwerp (Uantwerp)				
Period: 11/2019-11/2020				
Activities, results, outcomes:	WP:	Deliverable:	WP:	Deliverable:
• internal preparatory meetings	X	X	WP1	D1.2
• preparation, participation and follow-up of General Meetings	WP1	D1.2	WP1	D1.2
• attending online lab tours	WP4	X	WP4	D4.1
• administration (timesheets, ...), internal arrangements in our university	WP1	D1.3	WP1	D1.3
• developing concept of quality plan and several quality tools	WP2	X	WP2	D2.1
• administration (partnership agreement, ...)	WP1	X	WP1	D1.1
• preparation, participation and follow-up of Steering Committee Meetings	WP1	X	WP1	D1.2
• research about robots as "technological process linked to ESLs	WP3	D3.2	WP3	D3.2
• research about robots as "technological process linked to ESLs	WP4	D4.1	WP4	D4.1
•				
•				
•				
Problems, issues, ...:	WP:	Deliverable:	WP:	Deliverable:
• internal arrangements regarding "time-writing" => problem solved	WP1	X	WP1	D1.1
•				
•				
How is the quality of the outcome/deliverable guaranteed?	WP:	Deliverable:	WP:	Deliverable:
The quality plan is based on the experience of the QC in former international projects. Several of the quality tools were also used succesfully in these project. The tools help the PC and the QC to keep an overview on the project and the work done by the partners.	WP2	D2.1	WP2	D2.1
•				
•				

4.4 Overview Activity Documents

This overview document was introduced during the preparation of the 5th GM. It is based on the uploaded Activity Documents by the partners (see attachment 1). The document is shown at the general meetings to give the partners a quick idea of the submitted documents and to stimulate the partners that still must upload their document.

4.5 Gantt Chart

A main tool to monitor and visualize the project quality is the Gantt Chart. This is one of the management tools that is suggested in the survival kit of projects ([8], p. 28). The information gathered by the timesheets and during the meetings provides the main input for this monitoring process. The chart shows in a very clear way the progress and the delays of the different Work Packages (WP) and sub-work package (tasks), the lead partners, the partners participating and the status along a timeline. Milestones are highlighted in the chart. The bar behind a WP shows the period activities are planned and the status (see attachment 2): green means “activities executed as planned”, red means “activities are delayed”, dark blue means “activities planned”, light blue means “adapted planning”, ... During meetings the planning can be updated together with the partners using the Gantt Chart as visualization tool. The effect of changes of a certain job on related jobs can easily be seen in the chart (see table 5). “What-if” simulations help to find the best modifications in the project plan. The shift of the concept analysis in ETAT with almost one year causes of course an almost similar shift in the preparation and adaptation of teaching materials. An impression of a complete Gantt Chart and all the color-codes (legend) used in the chart can be found in attachment 2. Also, the milestones get a certain color depending on their status. The chart is updated every three months. The Gantt Chart is available on the collaboration platform and systematically used during the project meetings.

Table 5: Adapted planning in the Gantt Chart

ETAT		Education & Training for Automation 4.0 in Thailand		2020												2021															
Status: 03/2021		610154-EPP-1-2019-1-DE-EPPKA2-CBHE-JP		11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	
WP #	WP Title	Role and tasks (Deliverables D...)	Participating	Lead partner	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
3	Developing of module	Mobile Lab teaching possibilities - Content Analysis (D3.3)	P5; P8-P13	UNIOVI																											
3	Developing of module	Preparation/Adoption of teaching materials - theory (D3.4)	P5; P8-P13	UNIOVI																											
3	Developing of module	Preparation/Adoption of teaching materials - practice (D3.5)	P5; P8-P13	UNIOVI																											
3	Developing of module	Preparation/Adoption of teaching materials - E-learning (D3.6)	P5; P8-P13	UNIOVI																											

4.6 Project Dashboard

The status of the project is also visualized in a **project dashboard** (see attachment 3). The dashboard is updated every three months. The dashboard is a typical management tool that gives on one page the main aspects of a project. Seven qualitative and four quantitative key indicators (KI) are given.

- KI 1:** all partners understand the goal at partner, task and project level
- KI 2:** the organization at sub-WP level in term of material, platform, internal communication and daily staff are clear
- KI 3:** meetings correspond to a phase of tuning development of a main task with the active partners involved
- KI 4:** the project has no considerable delays on the level of WP or sub-WP
- KI 5:** the organization at sub-WP respects the budget
- KI 6:** there is a good balance between the repartition of work and use/repartition of budget

KI 7: the problems that appear during the project are “in control”

KI 8: number of deliverables completed

KI 9: number of delayed deliverables

KI 10: number of meetings to go

KI 11: number of months to go

The project dashboards are available on the collaboration platform. This is not the first time we use this tool to monitor a project, but it shows again that it is a great help to get an easy overview. The different elements of the dashboard seem to be satisfactory and there is no need to adapt the dashboard itself. Of course, the same remarks as before must be made: an accurate input delivered in time by all partners is needed.

4.7 Poster

Project evaluation (quality control, assurance and improvement) is a continuous process of using methods to assess and improve the planning, implementation, and impact of a project. Quality actions should ensure a rapid solution and the smooth development of the specific task, keeping in mind the potential consequences on other work packages and overall project development. Activities of quality control, assurance and improvement are made visible in a **poster** to guarantee the necessary follow-up and attention (see attachment 4).

The main goals of this tool poster are:

- give an up-to-date overview of the project problems and improvement actions;
- visualize the actual situation of the project problems and improvement actions;
- visualize the engagements very clear;
- work in a systematic way to solve the problems (according to the steps of the Deming Wheel: Plan - Do – Check - Act) or to execute the improvement actions;
- visualize when process is getting stuck.

Table 6: Steps of the Deming Wheel

PLAN	design a plan for improvement: define the problem/improvement actions, analyze the problem, look for causes, find solutions, plan actions to implement the solutions, ...
DO	execute that plan
CHECK	check whether the suggested improvement has been realized
ACT	make sure that the problem cannot occur again, that the gains are hold by defining or adapting standards

When a problem appears or an improvement action is detected, a project will be defined and added to this list (“poster”). The Quality Coordinator will put new projects on the list, e.g. based on the input from the partners. A project consists of a short description and a coordinator (“owner”). According to the Deming Wheel different phases must be defined. The status of the projects is monitored: blue = executed as planned; red = delayed. When a project is delayed, the owner has to look, together with the project management and the

other project members, for measures. The poster is updated every three months and put on the website, visible for all partners.

In the ETAT project we have the same experience as in other projects in which we used a poster with problems and improvement activities. At the beginning partners are reluctant to put a topic on it. As Quality Manager, you must convince them that the poster is a useful help to have an overview and to see the status and evolution of the major issues and improvement actions. We don't want a blame and shame culture but that should not prevent us from showing problems and issues. It is rather a way to inform all the partnership. It's off course everybody's task in the partnership to help were possible.

4.8 Questionnaires

During the ETAT project several international **workshops** and **trainings** are planned. As soon as the didactical materials for training centers are ready, they will be tested on students by integrating them into the curricula. To evaluate the training, detailed **questionnaires** are used, covering the following topics: course content, methodology, learning behavior, etc. The data collected in the questionnaires is processed and used to write a **report** with suggestions. Also, the input of different stakeholders is collected. As a result, improvements and adaptations are made.

During two meetings (one online and one face-to-face) partners were asked about their involvement and satisfaction. In the questionnaires information was collected about communication, involvement in the project, satisfaction, The feedback about the general meetings is very useful to keep in mind for the rest of the project (e.g. "as soon as possible physical meetings", "give information in advance", "communicate the expectations in a clear way", "keeping deadlines", "language barrier"). The diversity of the partners (with their experience), the collaboration of the partners and the project management is seen as the strengths of the ETAT project.

5. Quality of the Deliverables

To guarantee the quality of the products of the project all work package leaders must define how they can describe the quality of their deliverable. In the reports they must give a brief description of these characteristics. As already mentioned in paragraph 4.3, via the Activity Document partners are invited to think about this already during the project and to report on it (see Table 4).

6. Overview of Indicators

It is necessary for the European Commission, the project management, and all partners in the project to get a clear view on the evolution and the results of the ETAT-project. For that reason, a list of project indicators was defined in the project proposal (Logical Framework Matrix). Besides these indicators the ETAT partners decide to add some extra relevant

indicators. [10] gives a clear description of two major types of indicators. For a quantitative indicator one needs to count or to measure a parameter to indicate change. Qualitative indicators are describing the changes of evolution in a narrative way using predetermined criteria. In the ETAT project different partners are responsible for collecting the indicators for fixed periods. In the table of attachment 5 quantitative indicators get the symbol N_x and the qualitative ones the symbol L_x .

7. Conclusion

The ETAT project was strongly influenced by the restriction caused by the Covid-19 pandemic. It is therefore not surprising that good time management was the key to guaranty the quality of the project. The different quality tools were a great help to do that, although these tools were new for most of the partners. The Gantt Chart turned out to be an excellent tool to do several “what-if” simulations before updating the planning. The timesheets gave an idea of the work done by the different partners. Nevertheless, an Activity Document was launched to get a better overview. That document should also stimulate the partners to think about the quality of their deliverables. Making a project dashboard every three months helps to look at the major indicators of a project. Until now only a few actions were put in the poster. They were of course dealing with the major issues of the ETAT project. Two new documents were launched to give the Project Coordinator a better overview of the activities of the partners (Overview Timesheets, Overview Activity Documents). Based on the input collected via the different tools, via the questionnaire, via the individual contact with partners and of course via the several meetings, we can come to the conclusion that the project is “in control”. Clear and transparent communication helped to realize the quality plan and contributes to a better result for all the stakeholders. This was done by using an extended set of quality tools.


7. List of Abbreviations

D	Deliverable
EE	External (Quality) Evaluator
ETAT	Education & Training for Automation 4.0 in Thailand
GM	General Meeting
HEI	Higher Education Institute
KI	Key Indicator
LLL	Lifelong Learning
LLP	Lifelong Learning Programme
P	Partner
PC	Project Coordinator
QC	Quality Coordinator
SC	Steering Committee
WP	Work Package
WPL	Work Package Leaders

8. References

- [1] ETAT, Educational Training Center for Automation in Thailand, <https://cgm.informatics.buu.ac.th/~etat/> (Accessed: 14/10/2022).
- [2] Final Survey Needs Analysis Report, <https://cgm.informatics.buu.ac.th/~etat/wp-content/uploads/2022/02/Final-Survey-Needs-Analysis-Report-ETAT-17.11.2020.pdf> (Accessed: 14/10/2022).
- [3] ETAT Survey Results, <https://cgm.informatics.buu.ac.th/~etat/wp-content/uploads/2021/02/ETAT-Survey-results.pdf> (Accessed: 14/10/2022).
- [4] Creating Minds, “The Kipling method (5W1H)”, <http://creatingminds.org/tools/kipling.htm> (11/02/2014).
- [5] Sower V.E., The Definition(s) of Quality (Notes of lessons), <https://www.shsu.edu/~mgt ves/mgt481/lesson1/lesson1.htm> (Accessed: 03/12/2021).
- [6] Garvin, D.A., Competing on the Eight Dimensions of Quality”, from the Magazine, November 1987, <https://hbr.org/1987/11/competing-on-the-eight-dimensions-of-quality> (Accessed: 03/12/2021).
- [7] Quality management systems – Fundamentals and vocabulary (ISO 9000:2015).
- [8] Bienzle, e.a. , “Survival Kit. Managing Multilateral Projects in the Lifelong Learning Programme” (ISBN: 978-3-9502772-3-4), Wien, 2010.
- [9] Smet, E., Integrale Kwaliteitszorg – capita selecta, second edition, ISBN 978 90 3370 1832.
- [10] DG Office, "HANDBOOK ON QUALITATIVE INDICATORS", Washington, March 2005

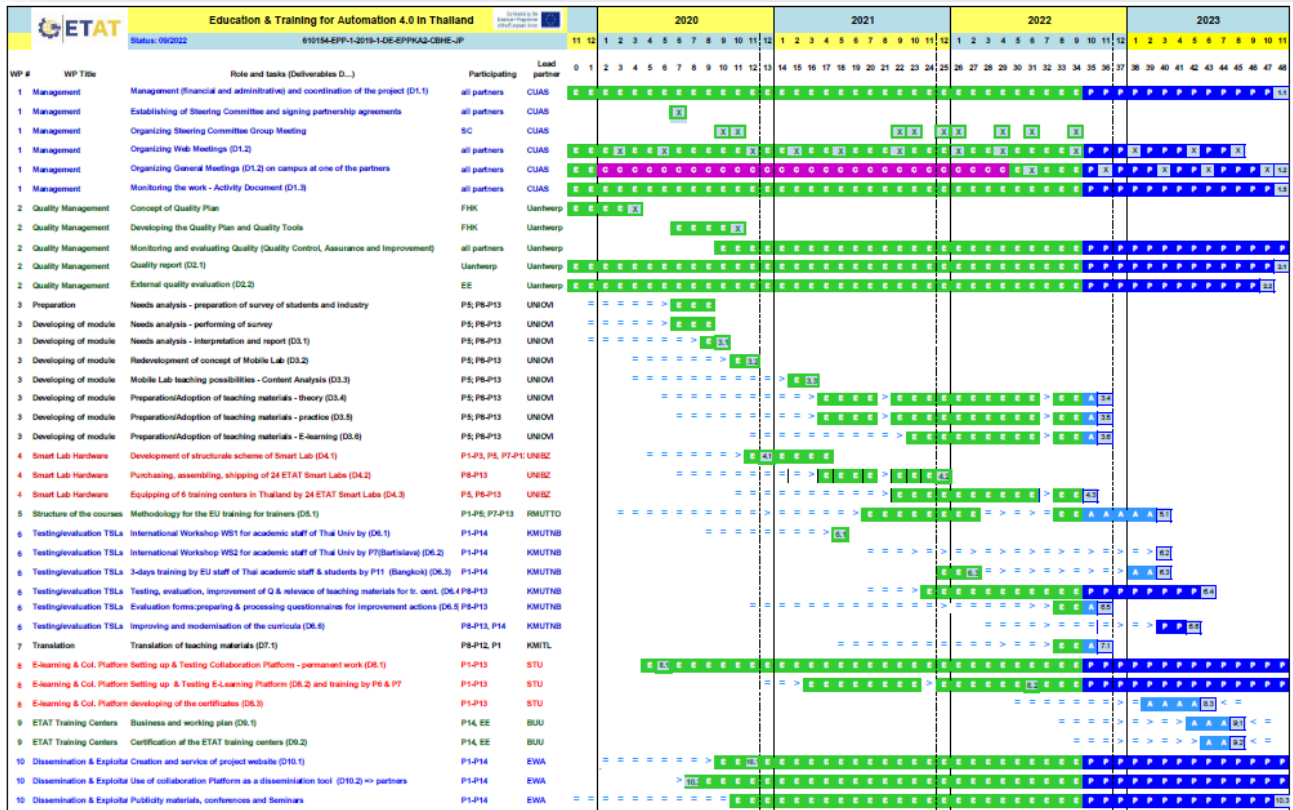
Attachment 1: Overview Activity Document (first period)

 Co-funded by the Erasmus+ Programme of the European Union				Status: 18/05/2021 Overview Activity Documents						
Partner				01-12/2020			01-06/2021			
				Activities, results, outcomes	Problems, issues, ..	Quality of outcome deliverable	Activities, results, outcomes	Problems, issues, ..	Quality of outcome deliverable	
			P1	1	OK	none	D1.2 ; D10.2			
			P2	1	OK	time-sheets: solved	D2.1			
			P3	1	OK	time-writing: solved	D3.1 ; D4.1			
			P4	1	OK	lab tours in WP5: OK	x			
			P5	1	OK	x	D3.1			
			P6	1	OK	delays procurement process, website, ...	x			
			P7	1	OK	reporting activities: solved	D8.1 ; D8.2			
			P8	1	OK	activities online: OK	D3.1			
			P9	1	OK	x	x			
			P10							
			P11	1	OK	x	D1.3 ; D3.1			
			P12	1	OK	selecting industry: OK; distance working: NOK; documents flow	D3.1 ; ..			
			P13	1	OK	deep knowledge PLC next technology	D4.1			
			P14							

(Names of partners are hidden for privacy reasons.)

Attachment 2: Gantt Chart (Example: 09/2022)











(global impression)





Legend:

- Planned** (Blue bar)
- Adapted planning** (Light blue bar)
- Executed as planned** (Green bar)
- Delayed** (Red bar)
- X** Milestone (not deliverable) **X** Milestone reached / not reached
- 4.2** Deliverable **4.2** Deliverable finished / not finished
- GM** General Meeting **Im** Impossible due to corona
- 3.2 = > 3.2** Changes in planning



Attachment 3: Project Dashboard (Example: 06/2021)

project dashboard			Co-funded by the Erasmus+ Programme of the European Union			
Education & Training for Automation 4.0 in Thailand						
610154-EPP-1-2019-1-DE-EPPKA2-CBHE-JP						
KI 1	understanding of goals		KI 8	deliverables completed	7	
KI 2	organization is clear		KI 9	delayed deliverables	7	
KI 3	meetings are "in time"		(total number of deliverables: = 29)			
KI 4	no considerable delays		KI 10	general meetings to go	3	
KI 5	respecting of the budget		(total number of general meetings = 6 ..)			
KI 6	balance work/budget		KI 11	months to go	17	
KI 7	problems "in control"		Date: June 2021			
Legend:						
OK, in control, as planned			potential problem			NOK, delayed, problem
Remarks:						
<ul style="list-style-type: none"> • KI 3: on campus general meetings were not possible due to the Corona crisis; we had 5 web meetings (March, June and November 2020, February 2021 and May 2021) • KI 4 & KI 7: still huge delays in several of the project activities • KI 8: needs analysis report is available (D3.1), concept of Mobile Lab is developed (D3.2), the structural scheme of Smart Labs is also available (D4.1), the collaboration platform is launched and tested (D8.1), the project website is launched (D10.1), the content analysis is available (D 3.3), we had a first international (online) workshop (14 & 21/05/2021 – D6.1). • KI 10: normally 6 general meetings on location at one of the partners were planned, as long as traveling is impossible web meetings are organized. We will have more than 6 general (web) meetings. The next (web) meeting is planned at the beginning of October. We hope that the first meeting "on location" can be organized in January 2022. 						

Attachment 4: Poster (June 2021)

 												Overview of Problems / Improvements and their Status												Situation on : 30 June 2021			
No.	Project Description & Owner	January March 2020	April June 2020	July September 2020	October December 2020	January March 2021	April June 2021	July September 2021	October December 2021	January March 2022	April June 2022	July September 2022	October December 2022														
1	Reduce as much as possible the delays in the project, project coordinator (P1)					P	D	D	D	D	D	D	C														
WP: 1 Key Activity: project management Comment: A lot of activities and deliverables have a delay due to corona. The goal is to extend the project to be able to finalize it as planned.																											
2	Minimize as much as possible the effect of the delay in the procurement process, project coordinator (P1)						P	D	C	A																	
WP: 1 Key Activity: project management Comment: Due to Corona there are delays in the procurement process (> 9 months).																											
3	Stimulate all partners to give input for the website and publications, (P6)						P	D	D	D	D	D	C														
WP: 10 Key Activity: dissemination Comment: Due to Corona there are delays in the project website and other publication activities (> 6 months).																											
4	Provide partners with easy access to knowledge about PLC next technology,						P	D	C/A																		
WP: 6 Key Activity: preparation Comment: "Need of deep knowledge about PLC next technology." => an overview of useful sources will be put on the collaboration platform (see ToDo list GMS)																											
5																											
WP: Key Activity: Comment:																											
6																											
WP: Key Activity: Comment:																											
7																											
WP: Key Activity: Comment:																											
8																											
WP: Key Activity: Comment:																											
Example:																											
"	The Key Activities are not known by partners, Erwin S.	P	D	D	C	A																					
WP: 2 Key Activity: monitoring of quality Comment: an overview document of Key Activities and Planned Actions will be developed (Gantt Chart)																											
Milestones: P = Problem defined, analysed and planned D = Actions executed C = Actions checked A = Problem is solved																											
Status: <input type="checkbox"/> Planned <input type="checkbox"/> Executed <input type="checkbox"/> Delayed																											

Attachment 5: List of Project Indicators

 <small>Co-funded by the Erasmus+ Programme of the European Union</small> 	
Indicator?	
N ₁	number of students in academic year 2020-2021/2021-2022/2022-2023 in faculty x in university x
L ₁	changes/improvements in teaching process (qualitative indicator that describes in a descriptive way the situation, e.g. "no changes in the curriculum done at this moment" or "module M1 integrated in course xx" or "ESL partially integrated in course ..." or ...)
N ₂	number of Thai academic staff of university x trained by EU partners
N ₃	number of trained specialists from Thai enterprises
N ₄	number (of hours) of developed teaching materials
N ₅	number (of hours) of E-learning courses
N ₆	number of new courses
N ₇	number of updated courses
N ₈	number of study programs
L ₂	quality of the new courses (qualitative indicator based on the results of evaluation forms, questionnaires, ...)
L ₃	quality of the updated courses (qualitative indicator based on the results of evaluation forms, questionnaires, ...)
N ₉	number of "face-to-face" General Meetings
N ₁₀	number of web meetings (General Meetings)
N ₁₁	number of meetings steering committee
N ₁₂	number of activities in Collaboration Platform
N ₁₃	number of activities in E-learning Platform
N ₁₄	number of enterprises in the National Resonance Groups
N ₁₅	number enrolled users in Collaboration platform
N ₁₆	number enrolled users in E-Learning Platform
L ₄	quality of the training materials (qualitative indicator based on the results of evaluation forms, questionnaires, ...)
L ₅	quality of the training schemes (qualitative indicator based on the results of evaluation forms, questionnaires, ...)
N ₁₇	number of published articles
N ₁₈	number of participations in conferences
N ₁₉	number of newsletters
N ₂₀	number of distributed flyers
N ₂₁	number of distributed (posted) posters
N ₂₂	number of certificates gained by ...
N ₂₃	number of postings in social networks
N ₂₄	number of face-to-face meetings with different stakeholders
N ₂₅	number of promoted workshops
N ₂₆	number of website visitors
N ₂₇	number of views of Youtube videos
N ₂₈	number of subscriptions of Facebook fan page
N ₂₉	number of glossary visitors

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by Erwin Smet

