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Information Systems 01PDWOV

31 January 2014

Books, notes are not allowed. Write only on these sheets.

Lesson log

A university is organized in Schools. Each School offers a number of courses. Each School is run by a Dean. A teacher is responsible of one or more courses. Each course has a code, a name (such as 01PDWOV), a number of credits, and is offered once per academic year. Each course is delivered in a series of lessons. Each lesson is delivered by the teacher responsible, or by another teacher. At the end of the course the teacher responsible of the course must produce a log of the lessons given. The log contains: for each lesson: date, start and end time, name of teacher doing it, arguments, signature (remark that the signature must be the signature of the person who delivered the lesson); summary of hours delivered, and by what teacher.

Within 15 days by the end of the term, the teacher must deliver the log to the School secretary. The secretary checks the log (each lesson has a signature, the teachers who delivered the course were authorized to do so, the teacher responsible delivered at least 50% of the hours, the sum of delivered hours must be equal or exceed the credits of the course –- with one credit = 10 hours). If all checks are passed, the Dean of the School signs the log too, and the Secretary sends to the teacher a letter communicating that the log has been accepted.

At the end of the academic year the secretary does other checks: each teacher has delivered at least 12 credits of lessons (in any course). If all checks regarding a teacher have been passed, then the secretary communicates to the accounting office the amount to be paid to that teacher. The amount is X euro per hour, only for the excess of 120 hours.

In the AS IS situation the log is a piece of paper, typically produced by the teacher using a Word template file. The logs, signed by the Dean, are official records and must be kept for at least 10 years.

The TO BE situation removes the paper log. The log is managed by all parties using a web service and a web browser. Signatures are replaced by digital signatures. The log is still an official record, but storage is electronic only.

In the following, analyze and model in detail the TO BE situation.

1 IT Model / Technological model: describe the hardware architecture of the system

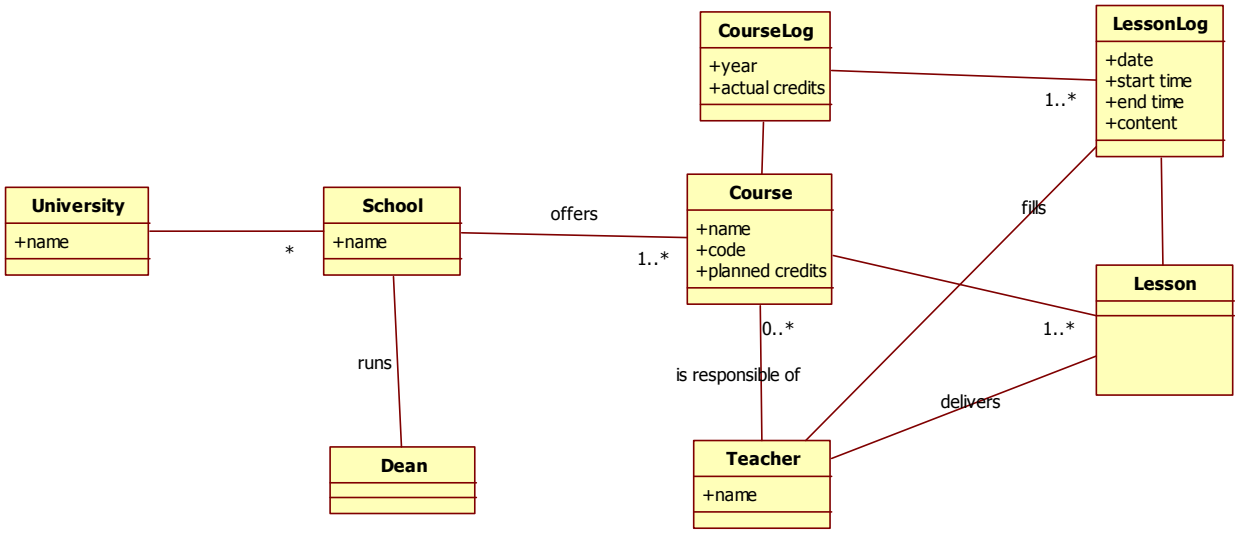
Client server model. Client: PC or smartphone for teacher, secretary
Server: web service, data storage, access management

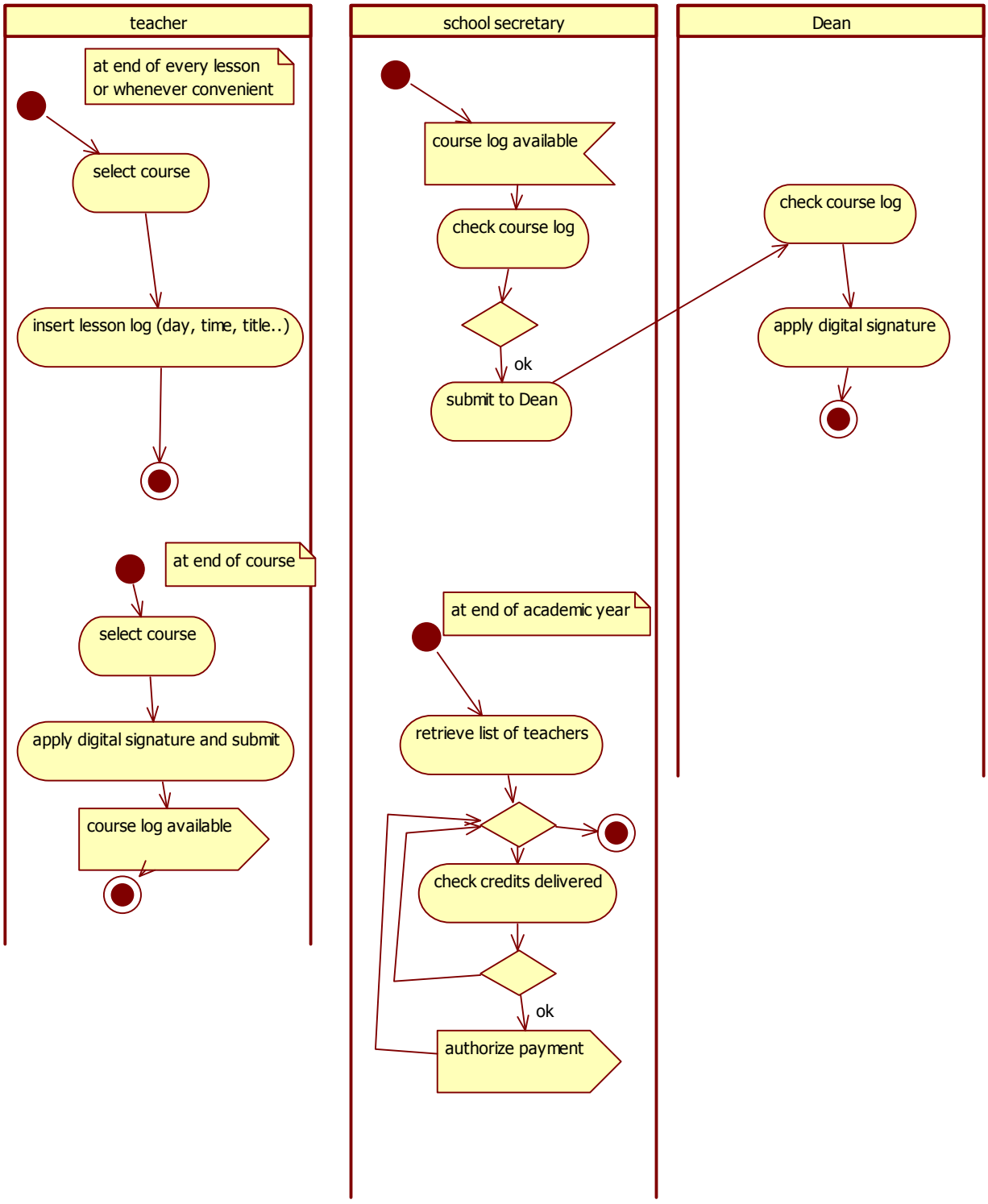
2 Organizational model: list roles or organizational units involved

Teacher, school secretary, Dean, accounting office

3 Functional model: Design and model (using UML activity diagrams with swimlanes + class diagram) the following processes.

- Fill in of log (teacher)
- Check of log of one course (at end of term)
- Check of all logs (at end of academic year)




teacher
school secretary
Dean
at end of every lesson
or whenever convenient
select course
insert lesson log (day, time, title..)
course log available
check course log
ok
submit to Dean
check course log
apply digital signature
at end of course
select course
apply digital signature and submit
course log available
at end of academic year
retrieve list of teachers
check credits delivered
ok
authorize payment

4 Define the KPI, considering as strategic goal ‘teacher satisfaction’ and ‘reduction of cost to manage the logs’.

Category (General, cost ..)	Name	Description	Unit of measure
General	N_C	Number of courses (= number of logs per year)	
	N_T	Number of teachers	
Cost	Ef_log	Effort to manage one log (fill in, sign, send to secretary)	Person hours
	Ef_v_one	Effort to verify one log	P h
	Ef_v_all	Effort to verify all logs of one teacher	P h
	C_S	Cost of storage infrastructure	Euro
	C_material	Cost of paper, ink	Euro
	C_log	Cost of managing one log EF_log + EF_v_all + (C_S + C_material) / N_C	Euro
Service	L_V	Lead time to verify all logs of all teachers (for secretary, at end of academic year)	T
	L_F	Lead time to fill one log (for teacher)	T
Quality	E_L	Clerical errors in logs (wrong date, hour, lesson duration)	
	E_V	Errors in check (errors in log not found)	
	S_T	Teacher satisfaction	
	S_E	Employee satisfaction	

5 Compare the previous and the current situation, using the KPIs defined above

KPI	AS IS	TO BE
N_C		No changes
N_T		No changes
Ef_log		Little decrease (send by email instead paper)
Ef_v_one	Possibly check is automated, but requires data entry from secretary	Decreased, Automated, data entry from secretary avoided
Ef_v_all	Probably automated. Requires data entry but already made for Ef_v_one	Automated, no change
C_material		zero
L_V		Automated, reduced
L_F		No changes or small decrease
E_L		Could be reduced if web service performs clerical checks
E_V		No change if check was already automated
S_T		Should increase
S_E		Avoids data entry, should increase

6 Define the TCO (time span: 4 years) for the TO BE situation

Phase	Cost factor	Cost estimate (500 teachers, 1000 courses per year)
Construction	Analysis, design implementation and test of web service	
Deployment	Deployment (only on one server) Training on use of service Training on use of digital signature	
Operation	Hosting of web service Maintenance of web service	

7 List pros and cons when switching to the TO BE situation. Discuss quantitative (especially cost) and qualitative pros and cons

Pro	**Con**
Ef_v_one Ef_v_All effort and lead time for the checks decreases meaningfully, data entry of logs is not repeated (by teacher by secretary) C_material reduced to zero Overall C_log should reduce	Investment in web service Investment in digital signature (however this is shared with many other services) Investment in digital storage infrastructure
L_V decreases, for same reason as above (no data entry)	
E_L decreases	

From PRO vs CON analysis is the TO BE situation better? (answer Yes or No): YES

Why?

In the AS IS teachers fill the logs in paper, then the secretary processes them, entering summary data (total of hours per teacher) in an application.

The TOBE avoids **double data entry** (from teacher, from secretary). This impacts effort and cost (EF_V_one), quality and partially lead time. An investment is required, but it returns probably very fast. Considering 6 minutes for data entry on one log, this means 6*1000 minutes per year = 600 hours = 4 person months. Since an employee costs at least 4K Euro month, data entry costs 16K Euro per year. And this does not include cost to fix errors (E_L). So if the web service requires 16K for construction, this investment returns in one year only.

The cost of paper and ink (if 10cent per log, = 100euro) is saved, but is negligible compared to labour.

I do not consider here explicitly the investment in digital signature and digital storage, because they can be shared with all other business processes in the university (typical indirect costs). On the other hand paper storage is indeed expensive (space required) and needs to be kept for old documents, for at least 10 years.
I also assume that in the AS IS the logs are already checked automatically (after data entry by secretary personnel into a dedicated application). Of course the TO BE is even more recommendable if logs are checked manually in the AS IS.

8 (1 point) What are the main processes in the telecom domain?

Network management, service management, workforce management

9 (1 point) Explain the 'activity' dimension in outsourcing (IT infrastructure, application ..) . Provide an example for each case.

Infrastructure (ex disk space), Application (ex email), Business process (ex logistics)

10 (1 point) What characterizes a *divisional* organization ?

Each division focused on a product, replicates some functions

11 (1 point) The strategic goal of a service company is 'customer satisfaction'. Because of budget restrictions on IT, whenever a customer accesses the web site of the company to obtain a service, he or she has to wait too much. This is a symptom of what?

No Alignment. The customer has to wait (because of poor IT) and 'customer satisfaction' goal is missed.