Assignment 2 - Soft Systems Methodology (SSM)

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Problem Definition

University professors presently carry out grading of assignments, group projects and, mid-term examinations either by themselves and/or with the aid of multiple teaching assistants.

Such forms of assessment are usually received in soft-copy form, through the online moodle platform or in hard-copy form for hand-written assignments and tests. The professor will then split the tasking of grading these submissions either between multiple teaching assistants who have been given instructions on how to carry out the task, or between himself and multiple teaching assistants to expedite grading. Upon completion of grading, the results are either entered into the moodle platform to be viewed by students or returned to students for assessments types like written tests and assignments.

The problem to be addressed is that the task of grading of such assessments is almost entirely, carried out manually. Thus one of the purposes of Enhanced Academic Learning and Analysis System (EALAS) being developed is to receive submissions like the ones discussed and automate certain tasks of grading in order to expedite the process and delivery of results.

Root Definition with CATWOE Analysis

System Definition of:
A system to enable efficient and methodical grading of assignments and tests

Root Definition:
A Hong Kong Baptist University-owned educational grading system which, under the environment constraints of the performance of professors and teaching assistants, transforms student's submissions to fulfil assessment requirements into systematically graded and accurate results and directly affect the student's academic standing, in order to save time for university teaching staff who require the grading process to be carried out more efficiently and accurate with considerably less effort.

Client:
Students who need to receive accurate results sooner.

Actor:
The teaching staff in University

Transformation:
Student's assessment submissions ➡ graded results information

Worldview:
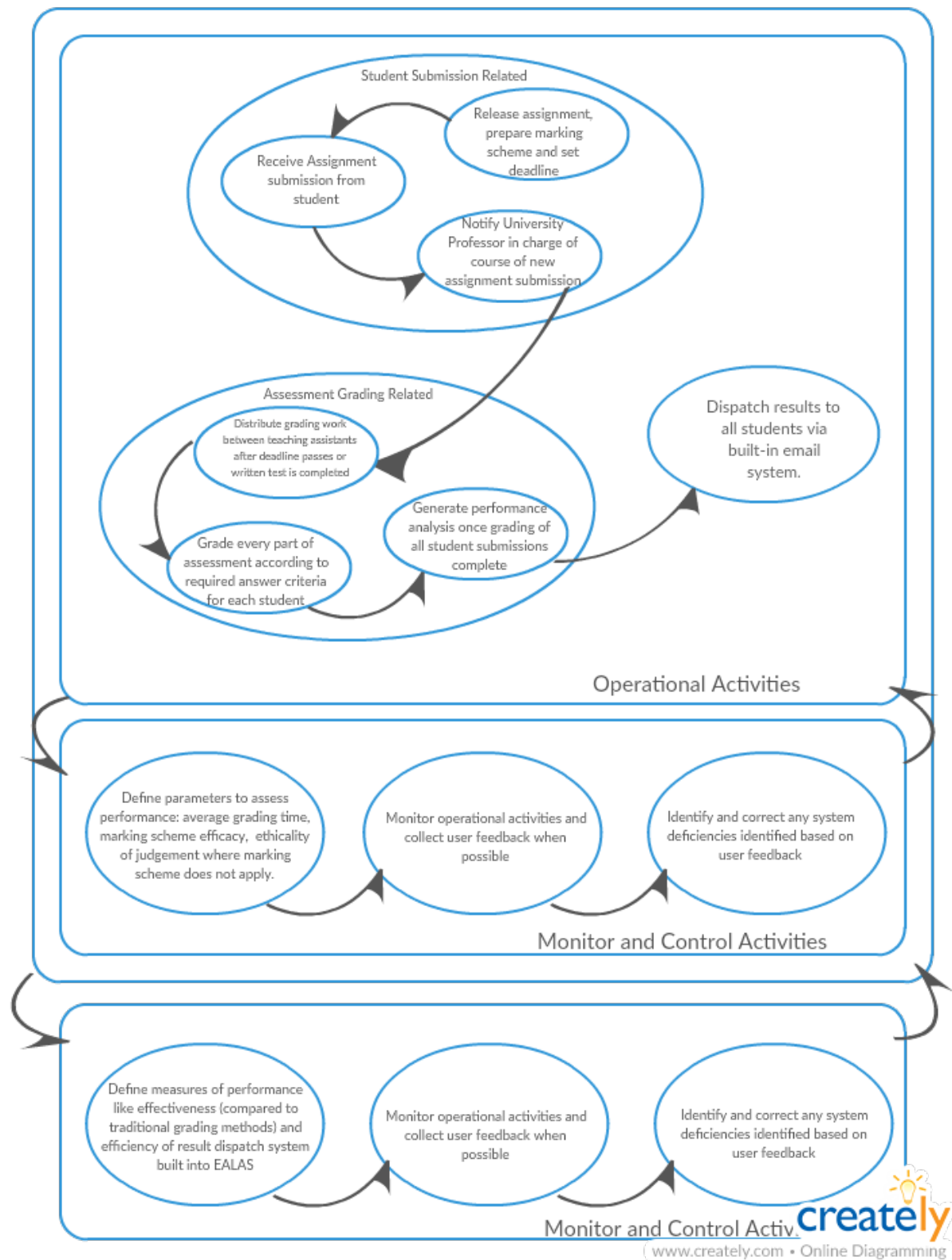From the perspective of university professors who need consistent and accurate results information

Owner:
The University developing and implementing the system.

Environment:
Performance of professors in the university

Activity Model

Student Submission Related

- Release assignment, prepare marking scheme and set deadline
- Receive Assignment submission from student
- Notify University Professor in charge of course of new assignment submission

Assessment Grading Related

- Distribute grading work between teaching assistants after deadline passes or written test is completed
- Grade every part of assessment according to required answer criteria for each student
- Generate performance analysis once grading of all student submissions complete

Dispatch results to all students via built-in email system.

Operational Activities

- Define parameters to assess performance: average grading time, marking scheme efficacy, ethicality of judgement where marking scheme does not apply.
- Monitor operational activities and collect user feedback when possible
- Identify and correct any system deficiencies identified based on user feedback

Monitor and Control Activities

- Define measures of performance like effectiveness (compared to traditional grading methods) and efficiency of result dispatch system built into EALAS
- Monitor operational activities and collect user feedback when possible
- Identify and correct any system deficiencies identified based on user feedback

Monitor and Control Activ.

Initial List of Cognitive Categories

ID	Cognitive Category	D	S	N	Des	Ref
From Root Definition from CATWOE Analysis						
R1	Hong Kong Baptist University				X	-
R2	HKBU-Owned System				X	-
R3	Student-Submissions					-
R4	Professor-and-teaching-assistants					-
R5	Graded-Results					-
R6	Assessment-Requirements					-
From the Operational activities of activity model						
O1	Received-Assignment-Submission	X				R3
O2	University-Professor	X				R4
O3	Teaching-Assistants	X				R4
O4	Marking Scheme		X			R6
O5	Part-Of-Assessment			X		R3
O6	Dispatch-Results					-
O7	Parameters-To-Assess-Performance					-
O8	Average-Grading-Time					-
O9	Marking-Scheme-Efficacy			X		O7
O10	Effectiveness					-
O11	Ethicality-Of-Judgement					-
O12	Operational-Activities					-
O13	System-Deficiency					-

(Ref: Reference to a particular category; D: Duplicates; S: Synonyms; N: Names of attributes of another category; Des: Description of the system)

Refinement of initial list of cognitive categories

1. Student-Submissions
2. Professor-and-teaching-assistants
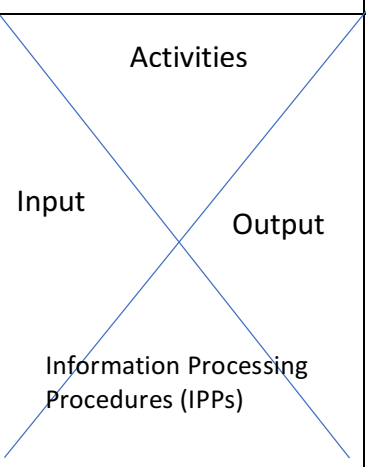3. Marking-Scheme
4. Graded-Results
5. Dispatch-Results

Information requirement

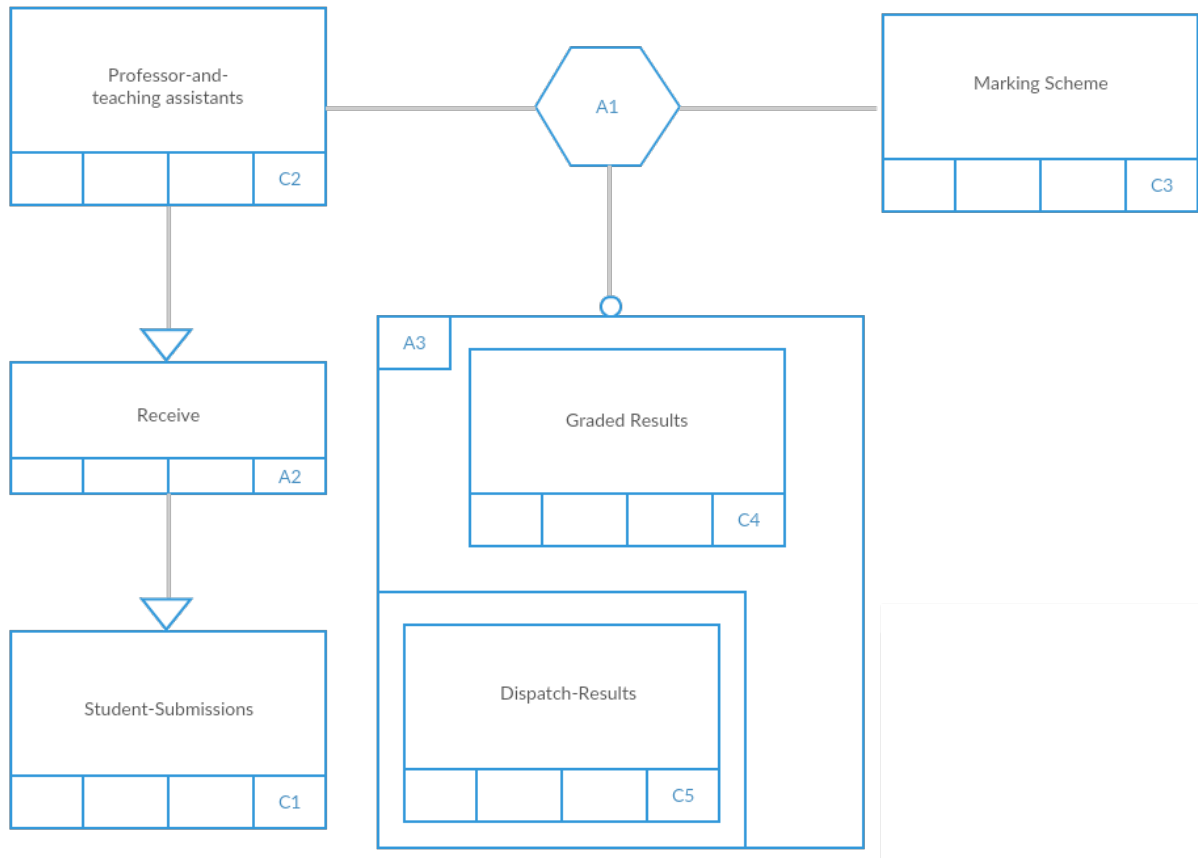| Information	Activity					
	Create a marking scheme for Assignment	Log assignment submission received from student	Notify University professor on receiving new submission	Distribution of grading work among teaching assistants	Grade parts of assessment according to grading criteria	Dispatch Results to all students.
Input	-Define Assessment Criteria -University Professor	-Assignment submission -Submission information	-Assignment submission -Submission Notification	-Assignment Submission -Teaching Assistants	-Assignment Submission -Teaching Assistants	-Graded Assignments
Output	-Marking Scheme for assessment	-Assignment Submission	-Assignment Submission	-Grading tasks and assignments allotted	-Assignments graded according to pre-defined criteria	- Personalized Results information email sent to Students
Measures of Performance	-Efficacy of marking scheme	-Submission received on time	-Response time after submission is received	-Average Grading time	-Average Grading time -Ethicality of Judgement	- average delay between dispatching results and students receiving them.

Refined List of Cognitive Categories

ID	C1	C2	C3	C4	C5
NAME	Student-Submissions	Professor-and-teaching-assistants	Marking-Scheme	Graded-Results	Dispatch-Results

Maltese Cross

5) Dispatch Results to students.	4) Grade assignments/assessment	3) Notify university professors	2) Assignment submission	1) Define Assessment Criteria	Activities / Input / Output / Information Processing Procedures (IPPs)	1) Define Assessment Criteria	2) Assignment submission	3) Notify university professors	4) Grade assignments/assessment	5) Dispatch Results to students.
				X	1) Create a marking scheme for Assignment					
			X		2) Log assignment submission received from student		X	X		
			X		3) Notify University professor on receiving new submission					
					4) Distribution of grading work among teaching assistants				X	
	X				5) Grade parts of assessment according to grading criteria					
		X			6) Distribution of grading work among teaching assistants					X
X					7) Dispatch Results to all students.					
		X	X	X	1) Assignment Handling	X	X			
		X		X	2) Distribution of Student submission among Teaching assistants	X				
					3) Dispatching results information to students					

Association between categories

Categories				Association		
ID	Name	ID	Name	ID	Type	Name
C2	Professor-and-Teaching Assistants	C1	Student-Submissions	A2	Action	Receive
C4	Graded-Results	C3	Marking-Scheme	A1	Dependency	Depends
C4	Graded-Results	C2	Professor-and-Teaching Assistants	A1	Dependency	Depends
C5	Dispatch-Results	C4	Graded-Results	A3	Composition	Is referred to

Data dictionary

Definition	TypeOf	Aliases	Agreed Meaning (Description)	Associations in which this category participates	Attributes of The category currently known
C1: Student-Submissions	Cognitive Categories	-	Assignment or test submission received	Association (A2) through Potential for Action (C5)	-
C2: Professor-and-teaching-assistants		University Teaching Staff	Student-submission received by Professor-and-Teaching-Assistants	Association (A2) through Potential for Action (C1) Association (A1) arising from dependency of meaning (C2&C4)	-
C3: Marking-Scheme		Assessment Criteria	Pre-defined criteria for carrying out grading	Association (A1) arising from dependency of meaning (C3&C4)	-
C4: Graded-Results		-	Results produced after grading of assessment is complete	Association (A1) arising from dependency of meaning (C2&C4) Association (A3) through composition (C5)	-
C5: Dispatch-Results		-	Results dispatched to students via email	Association (A3) through composition (C4)	-