

eLearning Support for Formative Assessment

Eva Heinrich

IIST, Massey University

Topics

Formative assessment

Onscreen marking of assignments using MarkTool

Management of the marking process

Learning support around formative assessment

Research team

Eva Heinrich

Jia-Yi Lu, Jun Zhang, Alex Lawn, (Diogenes Wang)

More Information, downloads

<http://www-ist.massey.ac.nz/MarkTool/>

Formative assessment

Main focus is on learning (but reality is that we need to give marks as well)

Students need to

- Develop own thoughts

- Construct own answers

The marker helps students to

- Identify gaps between actual and target level of knowledge

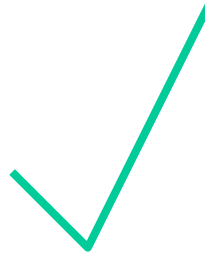
- Develop plans for closing the gaps

Feedback provided needs to be worded carefully

Formative assessment

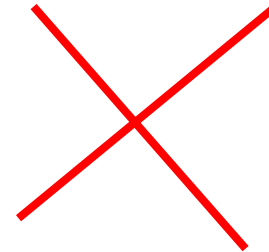
Linked to

Open-ended questions
Essay-type submissions
Human markers



Unsuitable

Multiple-choice style testing
Automated marking
Automated generation of feedback



Principles of our project

Rely on human input

- To understand the work submitted by the students

- To construct feedback conducive to learning

Use the strengths of computer systems for

- Sharing, displaying, storing, searching, retrieving, ...

Process

- Students submit assignments in electronic form

- Human marker annotates assignments electronically

- Students receive marked assignments in electronic form

Our tool supporting the marker is called [MarkTool](#)

MarkTool

Mirror the way many people mark on paper

- Highlight areas

- Write comments close to reference point

- Use a marking scheme for transparency

Work with assignments in PDF format

- Student either submit PDF or we convert their files

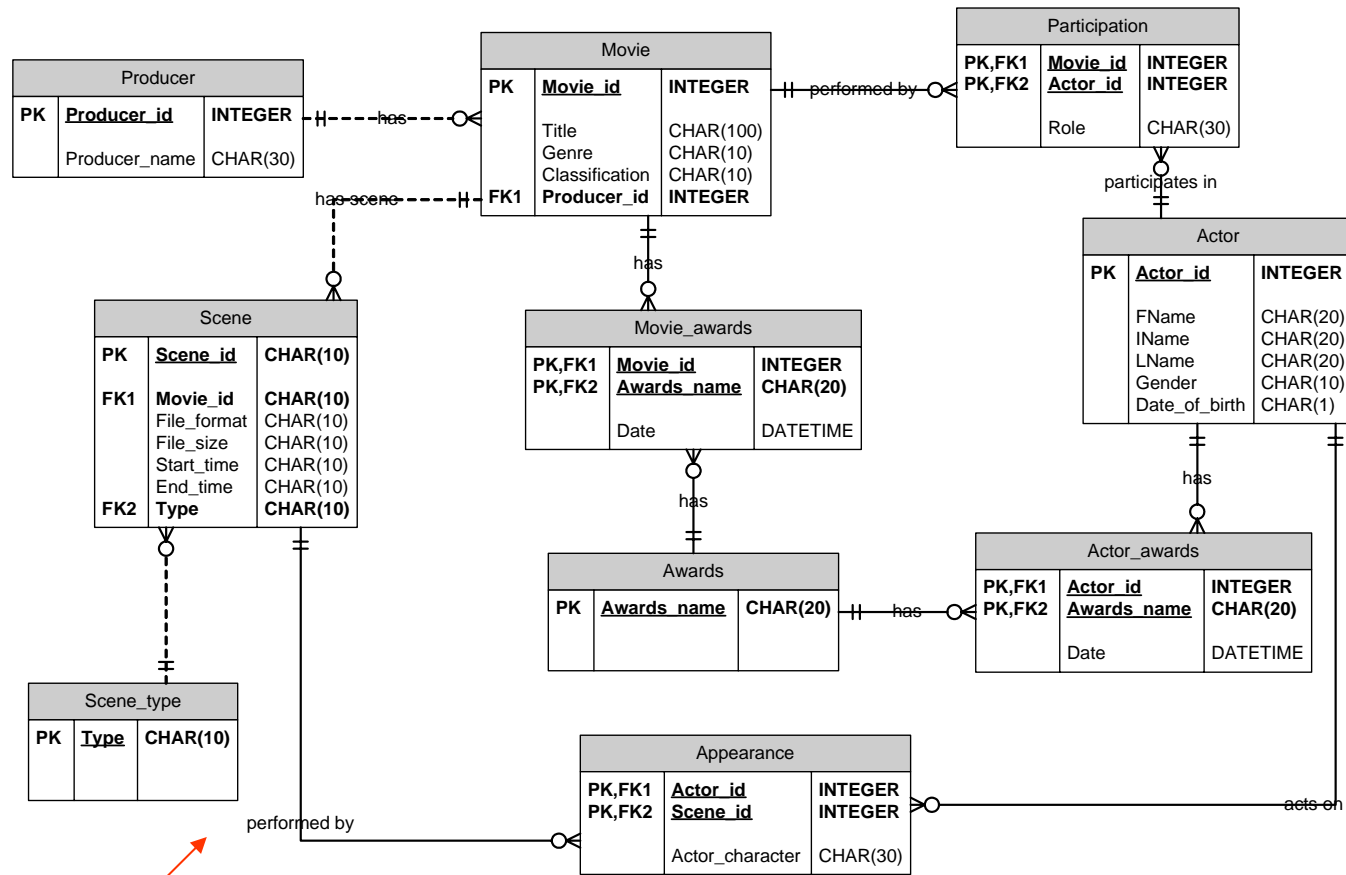
- Focus on single but universal file format

The marking gets stored separate from the assignments

- The PDF file remains unchanged

- The marking is saved as an XML file

An example of a student assignment

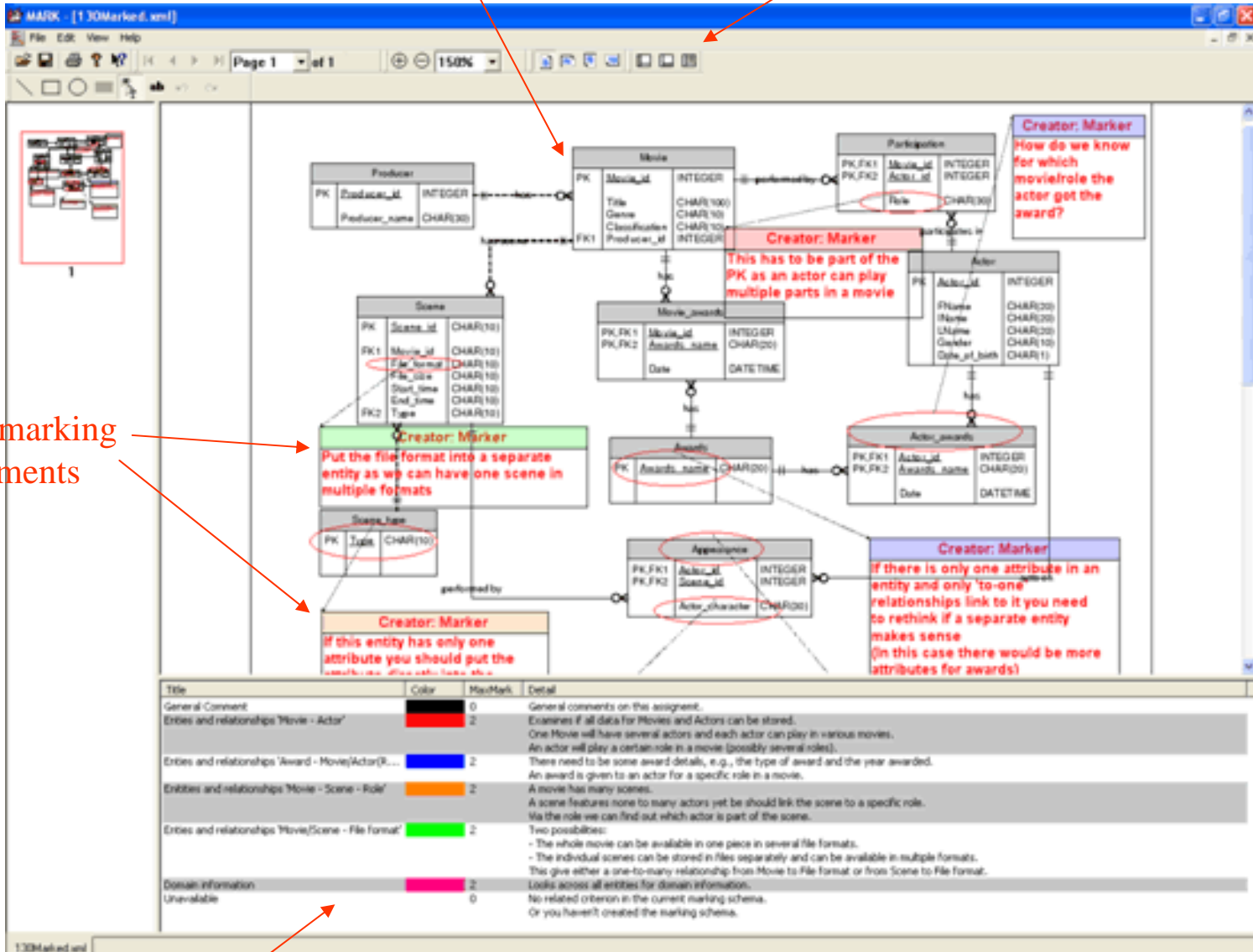


This is from a course on data modelling yet it could be any content or format that can be converted into a PDF document

The original assignment (in black)

Toggle to summary view

MarkTool, Version 1.0



The marking comments

EHeinrich, eFest 2004

The marking scheme, defined by the marker

MarkTool, Version 1.0

All comments for the assignment

The screenshot shows the MarkTool interface for a file named '130Marked.xml'. The main window is divided into several sections:

- Criteria Table:** A table listing evaluation criteria with columns for Criteria, Creator, and Detail.
- All Available Comments:** A large text area containing comments for each criterion.
- Final Mark:** A section with a checkbox for 'Update total mark automatically' and a table showing the maximum and final marks for each criterion.
- Summary:** A text area for overall summary notes, currently showing 'N/A'.
- Detail View:** A table at the bottom showing a detailed view of a specific criterion, including its title, color, maximum mark, and a detailed comment.

Annotations in red text point to specific parts of the interface:

- An arrow points from the text 'All comments for the assignment' to the 'All Available Comments' section.
- An arrow points from the text 'Marks for the individual criteria' to the 'Final Mark' table.

Criteria	Creator	Detail
Entities and relationships 'Movie - Actor'	Marker	This has to be part of the PK as an actor can play multiple parts in a movie
Entities and relationships 'Award - Movie/Actor(R...'	Marker	If there is only one attribute in an entity and only 'to-one' relationships link to it you need to rethink...
Entities and relationships 'Award - Movie/Actor(R...'	Marker	How do we know for which movie/role the actor got the award?
Entities and relationships 'Movie - Scene - Role'	Marker	If this entity has only one attribute you should put the attribute directly into the 'Scene' as, accordi...
Entities and relationships 'Movie - Scene - Role'	Marker	Where does this attribute come from?
Entities and relationships 'Movie - Scene - Role'	Marker	Link to 'Participation' - we want to know which character/role has appeared; that character is alrea...
Entities and relationships 'Movie/Scene - File format'	Marker	Put the file format into a separate entity as we can have one scene in multiple formats

Criteria	Max Mark	Final Mark
General Comment	0	0
Entities and relationships 'Movie - Actor'	2	0
Entities and relationships 'Award - Movie/Actor(Role)'	2	0
Entities and relationships 'Movie - Scene - Role'	2	0
Entities and relationships 'Movie/Scene - File format'	2	0
Domain information	2	0
Unavailable	0	0
Total Mark	10	7.5

Title	Color	MaxMark	Detail
General Comment		0	General comments on this assignment.
Entities and relationships 'Movie - Actor'		2	Examines if all data for Movies and Actors can be stored. One Movie will have several actors and each actor can play in various movies. An actor will play a certain role in a movie (possibly several roles).

Onscreen marking of assignments using MarkTool

Some key points

Encouragement to use a detailed marking scheme

Formative feedback positioned at its reference points

Separation of summative and formative feedback

Summary sheet with all comments

Students view marked assignment with MarkTool (*alternative is export into a new PDF document that combines assignment and marking*)

Extensions in planning

Selective viewing of comments by categories

List of frequently used comments

Sequential release of formative/summative feedback

...

Management of the marking process

Minimal steps required

Assignment submission

- Mechanism for submission

- Keeping record of who submitted what and when

- Secure storage of submitted assignments

Marking

- Keeping track of which assignments have been marked

- Being able to switch between assignments

Recording of marks

- Extracting all marks in a list for upload into a spreadsheet or result processing system

Returning marked assignments

- Returning feedback and marks to students

- Preserve confidentiality

Management of the marking process

Our approach

Assignment submission

Students use Assignment tool in WebCT to submit

Marker downloads assignments for whole class from WebCT

Marking

Use MarkTool

Recoding of marks

From MarkTool export list of marks into CSV file for upload into RPS

Returning marked assignments

From MarkTool upload feedback/marks into WebCT

Automatically generate personal WebCT email to students with
feedback/mark as attachment

Returning marked assignments

WebCT

Facility to send individual emails and attach files

Yet marker must do this individually for each student

Our tool WebCT Access

Retrieve class list from WebCT

Specify location of marked assignments on local computer

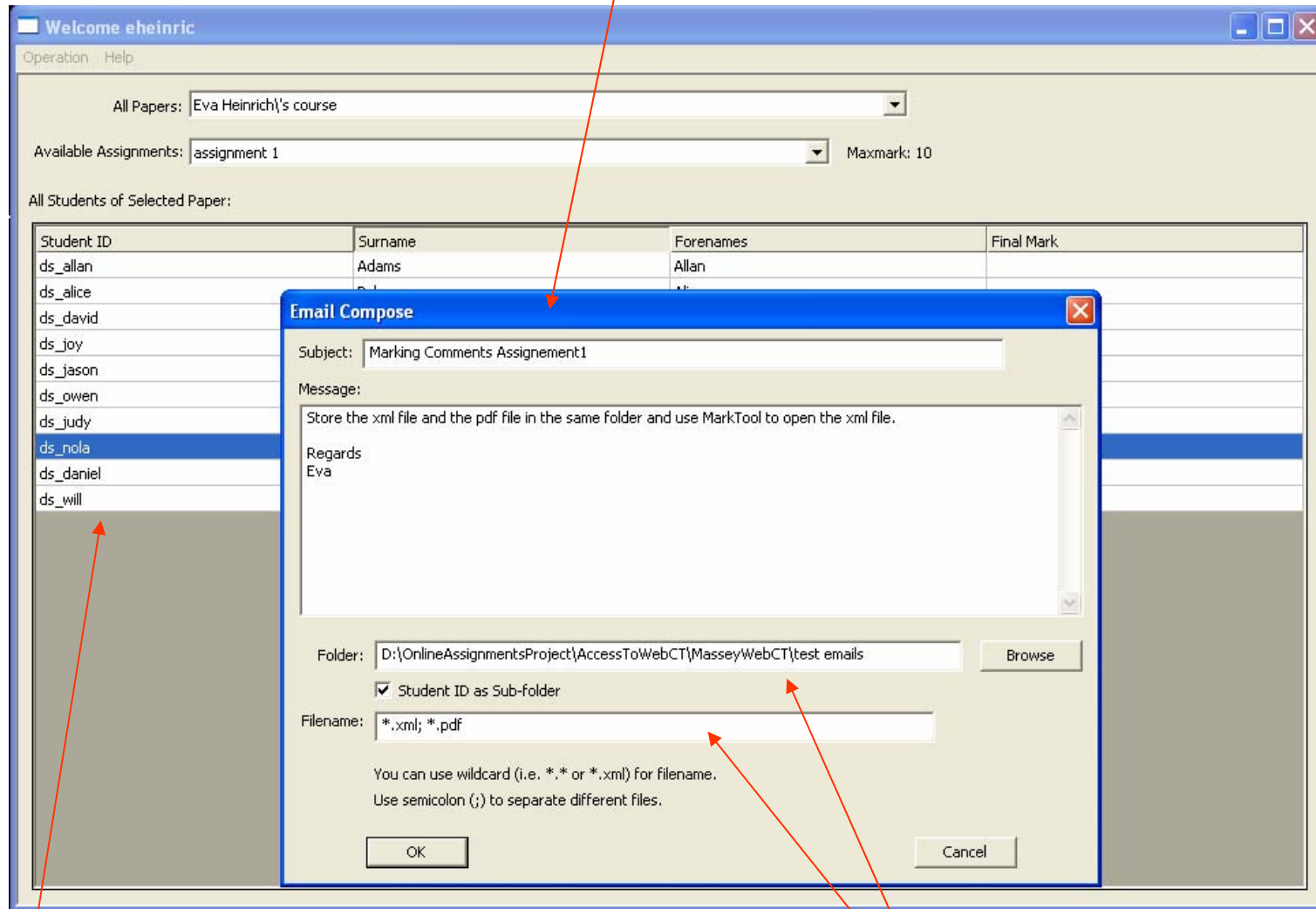
Formulate one email text to be sent to all students

Automatically send correct files to individual students

Students use standard WebCT functionality to access their marked assignments

WebCT Access

Marker composes message to be sent to students via WebCT mail mechanism



Class list downloaded from WebCT

Marker specifies which files are to be sent to students

WebCT Access

Operation Help

All Papers: Eva Heinrich's course

Available Assignments: assignment 1 Maxmark: 10

All Students of Selected

Send Email

Subject: Marking Comments Assignment1

Message:

Store the xml file and the pdf file in the same folder and use MarkTool to open the xml file.

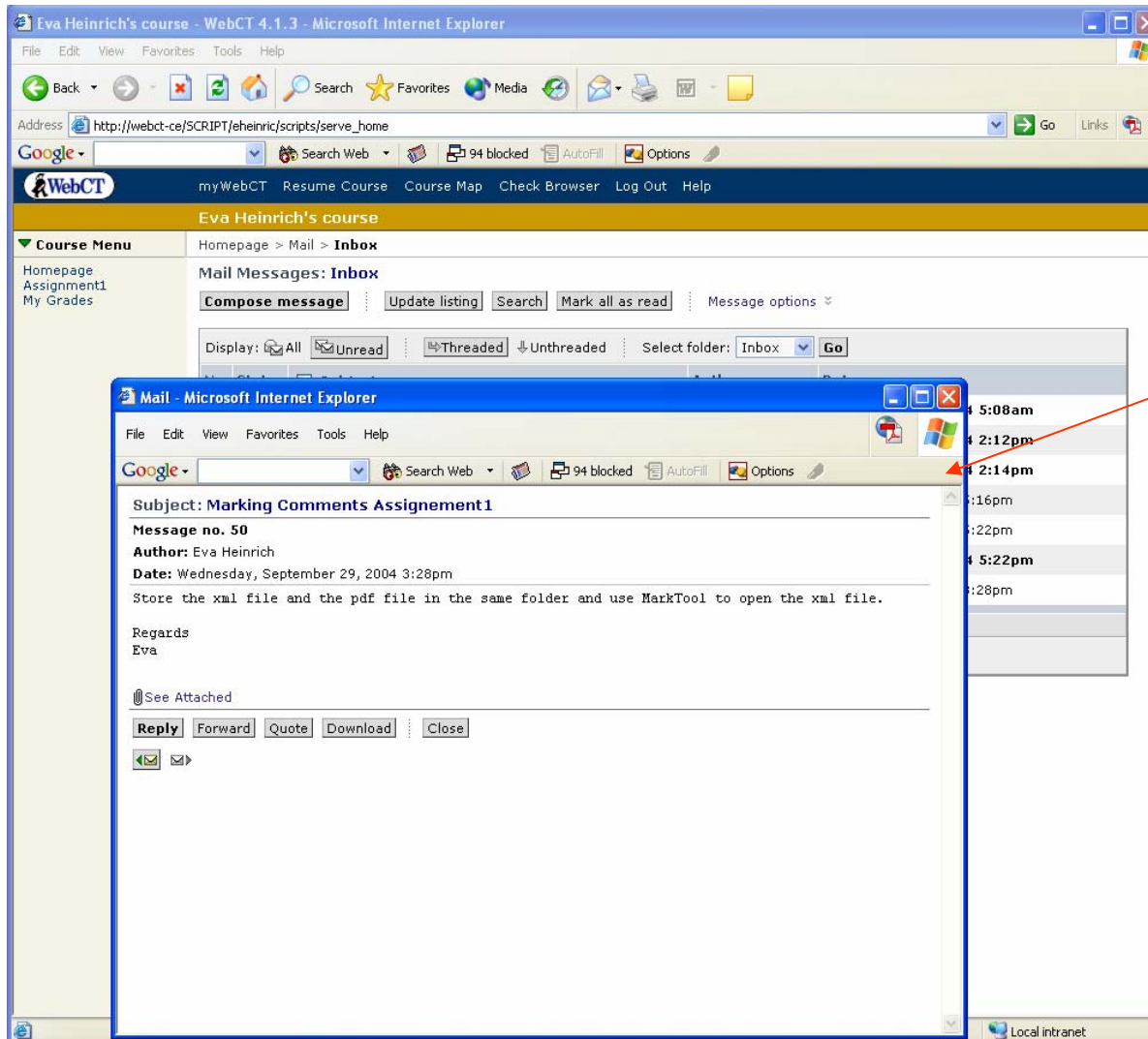
Regards
Eva

Attachments:

Student ID	Surname	Forenames	File attachment	File attachment	Email Status
ds_alice	Baker	Alice	D:\OnlineAssignmentsProject\AccessToWebCT\...	D:\OnlineAssignmentsProject\AccessToWebCT\Massey...	OK
ds_allan	Adams	Allan	D:\OnlineAssignmentsProject\AccessToWebCT\...	D:\OnlineAssignmentsProject\AccessToWebCT\Massey...	OK
ds_daniel	Weir	Daniel	D:\OnlineAssignmentsProject\AccessToWebCT\...	D:\OnlineAssignmentsProject\AccessToWebCT\Massey...	OK
ds_david	Crick	David	D:\OnlineAssignmentsProject\AccessToWebCT\...	D:\OnlineAssignmentsProject\AccessToWebCT\Massey...	OK
ds_jason	Norton	Jason	D:\OnlineAssignmentsProject\AccessToWebCT\...	D:\OnlineAssignmentsProject\AccessToWebCT\Massey...	OK
ds_joy	Lu	Joy	D:\OnlineAssignmentsProject\AccessToWebCT\...	D:\OnlineAssignmentsProject\AccessToWebCT\Massey...	OK
ds_judy	Pike	Judy	D:\OnlineAssignmentsProject\AccessToWebCT\...	D:\OnlineAssignmentsProject\AccessToWebCT\Massey...	OK
ds_nola	Quin	Nola	D:\OnlineAssignmentsProject\AccessToWebCT\...	D:\OnlineAssignmentsProject\AccessToWebCT\Massey...	OK
ds_owen	Perters	Owen	D:\OnlineAssignmentsProject\AccessToWebCT\...	D:\OnlineAssignmentsProject\AccessToWebCT\Massey...	OK
ds_will	York	Will	D:\OnlineAssignmentsProject\AccessToWebCT\...	D:\OnlineAssignmentsProject\AccessToWebCT\Massey...	OK

Send Cancel

WebCT Access



Student receives message with attachments in WebCT

Management of the marking process

Some key points

Use WebCT if it provides a functionality we need already

Leave responsibility for data security and storage with WebCT server

No need to setup/maintain own server

Communicate feedback/marks to students via mechanism already established for a course, that is WebCT

No need to obtain correct email addresses

During the marking marker is independent of WebCT

No need for web access

Freedom from limited WebCT functionalities

Learning support around formative assessment

A wide range of possibilities

Quality control when working with multiple markers

Marked assignments as study material

Peer-assessment for exam preparation

Communication between marker and student

Self-assessment after access to marking schemes or solution attempts by others

...

Quality control when working with multiple markers

... or just for oneself

Looking for a convenient, efficient way to look across all marking comments

Be able to go from an individual comment back to the relevant assignment

Be able to go from an individual comment back to the marker

Analyzer

A list of formative feedback from all assignments which can be sorted in various ways

Selecting a comment leads back to the assignment

Filenames containing student ids hidden to protect privacy

The screenshot shows the 'Analyzer - Untitled' application window. The main window contains a table with columns: XML File, Criteria, Creator, and Detail. The table lists various feedback items, such as 'Access Right & Status' and 'Assessment Components'. A second window at the bottom shows a detailed view of a comment, with columns for Title, MaxMark, and Detail. The detailed view shows the title 'Access Right & Status' with a MaxMark of 2, and the 'Assessment Components' title with a MaxMark of 4. The 'Detail' column contains the text of the feedback comments.

XML File	Criteria	Creator	Detail
	Access Right & Status	Marker	user access rights are missing
	Assessment Components	Marker	This if fine - just should be linked to the Student entity you don't have
	General	Marker	these two attributes together don't give a unique combination
	General	Marker	What about historic information?
	Grades & Conversion	Marker	This entity is fine
	Grades & Conversion	Marker	Grade should be an associative entity between Paper Offering and student; You have mixed up the process of determining a grade with the data to be stored
	Student Enrolment	Marker	Class Member should be an associative entity linking Paper Offering and Student; the Student name attribute violates 2NF
	Access Right & Status	Marker	The details would be managed outside RPS
	Access Right & Status	Marker	The cardinalities connecting this associative entity are wrong; this resolves a many-to-many relationship between Paper Offering and Staff
	Assessment Components	Marker	This entity violates 2NF; you are mixing up an entity with the generic assessment component characteristics
	Assessment Components	Marker	Where do you store a mark given to a student?
	Assessment Components	Marker	The way you have linked that one could store that one assessment component was stored by multiple staff
	General	Marker	Not suitable as PK as a paper with the same number might, e.g., be offered both internally and extramurally
	General	Marker	Create a Paper_Id attribute as PK
	General	Marker	Why do you have this attribute here?
	General	Marker	Split name into parts
	Grades & Conversion	Marker	How can all mappings of marks to grades fit into one attribute?
	Grades & Conversion	Marker	How can a paper offering have one grade?
	Grades & Conversion	Marker	Many students take one paper offering and each one of them gets a grade
	Grades & Conversion	Marker	The final grade needs to be linked to the student
	Grades & Conversion	Marker	Important is not the activity but the result?
	Student Enrolment	Marker	Where do you store the grade assigned?
	Access Right & Status	Marker	This information would be stored and maintained in the SMS
	Access Right & Status	Marker	The relationships are the wrong way round
	Access Right & Status	Marker	Need an attribute for the level of staff access
	Assessment Components	Marker	That entity is ok but it should be linked to Paper directly, with a 1-to-many relationship from Paper to Assess
	Assessment Components	Marker	Why do you have this entity?
	Assessment Components	Marker	Why this entity? How can one 'assessment check' belong to multiple students?
	General	Marker	Is this the same as AssessmentName in the other entities? Should it be a key then?
	General	Marker	That would not be unique; lots of papers have the same grades
	General	Marker	Split up
	General	Marker	Make that a Text or Memo type
	Grades & Conversion	Marker	That entity is fine (besides the PK)
	Grades & Conversion	Marker	How do we know for which paper the grade is?
	Others	Marker	This shouldn't be linked to Assessment Marks in the data model but to Student and Paper.
	Student Enrolment	Marker	This doesn't seem to make sense
	Access Right & Status	Marker	Enrolment should be the associative entity between Paper and Student. The cardinalities on both relationship
	Assessment Components	Marker	You can't have a many-to-many relationship; your attributes/keys could be right if you make it a 1-to-many f
	Assessment Components	Marker	This entity needs to be linked to a paper. How can you store marks together with the definition of the asses
			How do we find out which student not which mark?

Title	MaxMark	Detail
Access Right & Status	2	We need an entity AccessRight that captures who can access a paper offering at what level. Users are identified by a userId. The user details are administered outside RPS. RPS only needs to store what a specific user can do for a specific paper offering. What is implied by an access level (paper coordinator, departmental controller, ...).
Assessment Components	4	Each paper offering has to have assessment components (assignments, tests, exams, ...) defined. A student has to be given a mark for each assessment component belonging to the paper offering. We get a 1-to-many relationship between PaperOffering and AssessmentComponent. We need an associative entity between AssessmentComponent and Student. This is not about the entity of staff entering a mark. It is about who received which mark for what

The marking scheme used for the assignment

Marked assignments as study material

Marked assignments as examples – used this semester in 159.254

Material available

Last years assignment task and marking scheme

Nine marked example solutions from last year (anonymous)

Procedure suggested to students

1. Attempt task yourself
2. Study example solutions and try to mark these yourself
3. Look at lecturer's marking and compare to your own
4. Reflect on your own solution

Parameters

Participation voluntarily

No marks/credit given

Marked assignments as study material

Has this approach been successful?

We have conducted a survey to establish level of participation and students' perception

Analysis underway

Indication that students appreciate opportunity

Ethics approval has been granted

Approval to ask students for their informed consent

Application available on request

Marked assignments as study material

What was missing/needs to be considered?

Opportunity for students to get feedback on their own work

On their own solution attempts

On their own marking attempts

Incentive for students to participate/invest time

A few marks for participation?

Issues around student identification for peer-assessment

Participation under their real name?

Complete anonymity using pseudo ids?

A 'mixed' model

Lecturer knows real identities

Student work gets distributed under pseudo ids

Peer-assessment for exam preparation

Considerations

Students prepare for exams only after lectures/class time has finished

Trying to answer 'old' exam questions is useful learning experience

Students should get feedback on their solution attempts

The lecturer will not have the time to provide this feedback for each individual

Approach

Make old exams available via WebCT

Allow students to submit their solution attempts

Make these solution attempts available anonymously to whole class

Encourage students to peer-assess these solution attempts

Make the peer-assessments available to the whole class

Summary

Onscreen marking of assignments using MarkTool

Makes it feasible to do formative marking on electronic assignments

MarkTool available for download and ready to use

<http://www-ist.massey.ac.nz/MarkTool/>

Management of the marking process

Complementing WebCT with our own tools

Trial version available from Eva Heinrich or soon from website

Learning support around formative assessment

Simple approaches possible right now

Supporting tools under development