

Quality control tools specifications

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I. Introduction

In the user requirements document, we have reviewed *document quality features* and then analyzed and discussed their amenability to calculation, especially in the context of TIPS information resources.

The evaluation of the quality of documents by users will be made along a number of *chosen quality features*, using an *evaluation form*. This form will be configurable. The *configuration of the evaluation form* will require a specific tool, in order for users to manage the configurations of their evaluation forms.

Evaluations will be submitted to an *evaluation database*, to make everyone's judgements available to the community for searching. Submission of evaluations implies *identification and privacy features* to identify users when they assess documents for the system to control evaluations; on the other hand, these features must guarantee users privacy. These elements will be accounted for in the database model, and in the principles for the description of evaluation processes.

The *quality-related searching criteria* brought by the newly available quality features, will be integrated in the standard search tool of the PORTAL.

II. Evaluation form

The evaluation tool will be used along the following steps:

1. Evaluation form download

When a user downloads a document, he/she can download an evaluation form together with the document. The user opens the document with his/her usual document viewer, and also launches the evaluation form.

2. Evaluation form fill up

The form opens in a separate window, in which known bibliographic fields are already filled up. Evaluation fields are filled by the user.

3. Evaluation form submission

When the user is done with it, he/she can submit the form to the server (make this evaluation available to other users).

4. Contribution acknowledgement

Then, the user is acknowledged for his/her contribution.

The evaluation form will be easily extended with new functionalities, and we only give here the general design principles of this form, the basic version of the form, and the directions for possible evolutions of it.

A. General design principles

An evaluation form needs to be *easily and highly configurable*, for three reasons:

1. the first fundamental reason is that the evaluation of a document is time-consuming, and for users to be willing to make the effort, the form must be easily adapted to (a) the state of mind of the user, and (b) to the time the user wants to spend for evaluation;
2. the second fundamental reason is that the tool will be used in various contexts depending on the activity of the user (review article, write article, etc.), and the relevant quality features shall not be the same, nor the time the user can spend on evaluation;
3. the third reason relates to the experimental character of the tool: in the first version of the PORTAL, the set of features used has to be validated; this implies that we will need to easily make up variants of the evaluation form.

As a consequence, an evaluation form is a set of *subforms*, themselves being a set of *mini-forms*. Each mini-form is dedicated to a particular quality feature. Subforms are there to reflect the fact that some features are more or less closely connected, and as such, need to be simultaneously presented to, and filled up by users.

Each subform will have a subscore which summarizes the scores of the existing mini-forms; this subscore can be directly edited by the user if he/she does not have time to go into the subform's details, or it can be calculated by the system if the mini-forms have been filled up.

Particular attention has to be paid to the possibility for users to give partial evaluations, and to complete or revise their evaluations later. This raises the question of how to revise the evaluation database, in case a revised or completed evaluation is submitted by a user on a document for which he/she has already submitted an evaluation (see specific discussion to follow in section Evaluation Database).

B. Basic version

The basic version will involve a small set of features among the most simple and relevant ones. Alternate versions will be defined as feedback arrives from users.

Figure 1 gives a first preview of the evaluation form's user interface.

The figure shows a user interface for an evaluation form, organized into three main sections:

- Bibliographic area:** Contains a 'Done' button, and input fields for 'Title:', 'Document #123', 'Author:', 'Bibliographic reference:', and 'Commentary:'. Below the 'Commentary' field are 'Save', 'Revert', and 'Clear' buttons.
- Evaluation area:** Contains an 'Overall score:' field, a 'Last modified on:' field, and a 'Save all' button. Below these is an 'Iconify/Expand all' button.
- subform with 3 mini-forms:** This section contains four criteria, each with its own mini-form:
 - Criterion 1:** Includes a description field, a 'Note...' button, and a score range from 'no' to 'yes' with five radio buttons. Below the range are 'Save', 'Revert', and 'Clear' buttons.
 - Group of criteria 1:** Includes a description field, a 'Note...' button, a 'Sub score:' field, and a 'Save all' button. Below these is an 'Iconify/Expand all' button.
 - Criterion 2:** Includes a description field, a 'Note...' button, and a score range from 'no' to 'yes' with five radio buttons. Below the range are 'Save', 'Revert', and 'Clear' buttons.
 - Criterion 3:** Includes a description field, a 'Note...' button, and a score range from 'no' to 'yes' with five radio buttons. Below the range are 'Save', 'Revert', and 'Clear' buttons.
 - Criterion 4:** Includes a description field, a 'Note...' button, and a score range from 'no' to 'yes' with five radio buttons. Below the range are 'Save', 'Revert', and 'Clear' buttons.

Figure 1 Preview of the evaluation form's user interface

The basic version of a mini-form is described with its visual attributes. Two views exist: the full one, and the summary one.

The full view of the mini-form is as follows:

- name of the feature
- short description of the feature
- "More..." button for detailed description of the feature, with examples
- radio buttons for values (users tick the box corresponding to the right value; possible values are set on a linear scale with 3 to 5 values)
- apply button
- revert button
- clear button
- iconify button (turns the mini-form into the summary view)

The summary view is as follows:

- name of the feature
- chosen value
- expand button (turns the mini-form into the full view)

A subform is a group of mini-forms with a heading.

The subform heading contains:

- name of the subform (i.e. a name reflecting the nature of the feature covered in the mini-forms)
- subscore value (calculated as soon as mini-forms are complete, but also directly editable by users)
- description of the scale for the subscore value (between min and max)
- show/hide mini-forms button
- filling status icon (to reflect whether all mini-forms have been completed or not)

The complete form has two areas: the *bibliographic area*, and the *evaluation area*.

The bibliographic area contains:

- an identifier of the paper
- the bibliographic information of the paper to evaluate (title, author, etc. just like in bibtex entries)
- a commentary area for users to write some free comment of their own with the following elements associated
 - save button
 - revert button
 - clear button
- close button (asks for savings the commentary area if necessary)

The evaluation area contains a heading, followed by a set of subforms.

The heading of the evaluation area contains:

1. the overall score
2. the date of last modification of the evaluation part of the form
3. iconify/expand all button (to toggle all the mini-forms into the summary/full view)
4. save all button

We shall keep in mind the possibility of adding more heading information later on, as it appears to be useful (for instance, showing an overall score as a result of the combination of the various values, showing only the mini-forms that are still not assessed, showing only those mini-forms already assessed, saving the template of mini-forms that were assessed, etc.).

C. Directions for possible evolutions of the form

Evaluation forms can evolve along the following directions:

- which mini-forms (depending on which features are easily assessed and reused for searching)
- which subforms (depending on the perception of users concerning the inter-relationships between features)
- evaluation scale (a simple linear scale may not be appropriate for some features)
- evaluation interactive object (from ticking a radio button to choosing among a predefined list of values)

D. Configuration of the form

1. Referee evaluation form configuration

If the user evaluates a document for the purpose of a *reviewing activity*, he/she will require an elaborate evaluation form. Typically, quality features that the referee will have to assess are:

- Scientific quality
- Readability
- Intended audience

Generally, journal or conferences provide referees with an indication of the standards for publication of the journal or conference, as well as a summary evaluation form to return to the editor. The electronic evaluation form can be configured to fit the evaluation form of the journal or conference, possibly allowing for more details than the summary evaluation actually required by the editor.

2. Simple reader evaluation form configuration

If the user evaluates a document in the context of a *reading activity*, he/she will decide how much time to spend in making explicit evaluations of the quality of the paper, and which features are easily evaluated by him/her. This decision will also depend on the benefits that the user can expect from this evaluation.

As opposed to a referee, a simple reader has no obligation to go into a detailed evaluation of scientific quality, readability and intended audience. Moreover he/she shall not be qualified to do it. But he/she may be interested in assigning his/her own overall scores, for his/her own use, in order to feed his/her personal bibliographic collection. Typically, if the form is submitted by the user, these scores should not contribute to the same level as those coming from a referee.

The quality of identification feature is important to simple readers, for the constitution of a coherent and usable personal bibliographic collection. As such they may be willing to contribute to the citability feature in completing or correcting the bibliographic reference, the history, or the publication status. To control the correction of these updates, they should be first submitted to the author of the document, for him/her to acknowledge the proposed

changes. In case no answer is provided by author, an alternate control processes can be set up involving a person employed as a database manager to check the correction of the updates submitted by simple readers.

The same remarks hold for simple readers and recency required features (writing date, publication date).

3. Author evaluation form configuration

When an author uploads a paper to an electronic database, he/she may fill up an important number of fields relating to the bibliographic reference of the paper, to the authors and affiliation of authors, to the publication status of the paper, its history, the formats of full text, and so on.

These information are not so much of an evaluative nature, but they will allow for automatic estimation of other quality features. Moreover, it is important that the author of a document does not provide certain quality judgment on it, as it will certainly be strongly biased!

Hence for an author, although he/she can evaluate as many features as he/she likes for personal use, at submission time, the features that are very likely to be biased will be simply ignored.

III. Evaluation database

The server saves the evaluations of the various users into a database, with the following principles:

- Combination of evaluations

These evaluations are combined to give an overall value for each document and each feature.

- Storage of individual evaluations

Nonetheless, all the individual information is stored in order to allow for later evolution of the tool involving social aspects in searching (such as searching for documents that have been assessed by someone).

- Tracking history of evaluation for a user

As a user may submit successive evaluations of the same paper (completed or revised evaluations), the database must be able to identify when this phenomenon occurs to account for it in the calculation of scores. In addition, this tracking will be used to provide a user with an uptodate evaluation form when he/she downloads a document that he has already assessed (two options to discuss: centralized vs. local personal evaluation database, and maybe a third one being a combination of these two).

A. Database model

The idea is to build a database which uses records found in various electronic databases, and to add quality information on top of usual document records fields. We give here a sketch of a set of relational database tables to clear up ideas, although the actual DB technology can be adapted to conform to the consortium choices. We do not go into the details of rules for updates, they will be deduced from the descriptions of the evaluation processes (see sections **Erreur ! Source du renvoi introuvable.** and III.B).

1. Document tables

It contains traditional fields of document records and additional document quality features (scientific quality, readability and intended audience), as well as complementary bibliographic information like history, anticipated future, organization of author.

Document(document id., title, abstract, accession date, anticipated future, publication status, downloads, <scientific quality features>, <readability features>, <intended audience features>)

For authors:

WrittenBy(document id., person id.)

For files:

File(file id., format, size)

ContainsTheFullTextOf(file id., document id.)

For history:

IsALaterVersionOf(document id., document id.)

For citation index:

Cites(document id., document id.)

For publications:

WasPublishedIn(document id., journal or conference id., publisher id., editor id., publication date)

2. Community tables

These are the tables that concern persons and entities of the community such as organizations, publishers, journals and conferences.

Organization(organization id., organization name, organization reputation)

Person(person id., first name, second name, last name, person reputation)

IsOrWasAffiliatedTo(person id., organization id., date)

Journals or conferences table: identification and reputations

Journal(journal or conference id., journal or conference name, journal or conference reputation)

Publisher(publisher id., publisher name, publisher reputation)

IsPublishedBy(journal or conference id., date, publisher id.)

IsEditedBy(journal or conference id., date, person id.)

(there may be several editors)

3. Activity tables

These are the tables concerning registered users and their activities.

When a user registers, he/she must check that he/she is not already existing as a person in the database (if he/she is also an author, an editor, etc.).

A registered user associates his/her registration not only with a person identity, but also with an activity, that will provide special rights.

Activity(activity id., activity type, journal or conference id.)

For instance, (#123, reading, NULL) ; (#124, reviewing, #3)

Registration(person id., activity id., date, expiry date)

B. Description of the feeding of the evaluation database

We describe here the principles for the description of the processes through which the evaluation database will be fed (see **Erreur ! Source du renvoi introuvable.**). Then we give an example of it.

1. Principle of description

For each quality feature, one or several evaluation processes are listed. Each evaluation process implies a calculation mode, that ranges from direct calculation to human evaluation. Each process takes place in a particular context related to a particular activity (or no activity).

For each evaluation process, the required features are listed. Required features can be other quality features (but not top-level), document features (existing in standard bibliographic records), users (types of users are distinguished), collection features (features that relate to properties of the whole collection of documents in the field of high energy physics).

When required features are not available, the evaluation process cannot be made, which means that an alternate process has to be tried. The various evaluation processes can be taken in parallel. In this case, conflicts can be either solved with preferences on processes (which processes provide the more reliable evaluation), or all information kept.

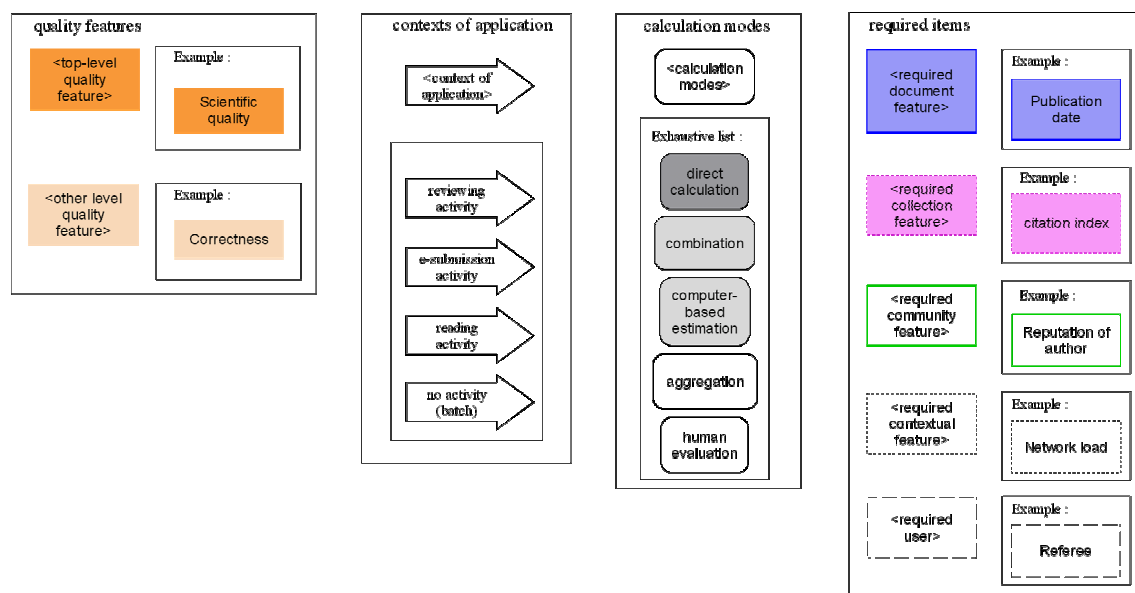
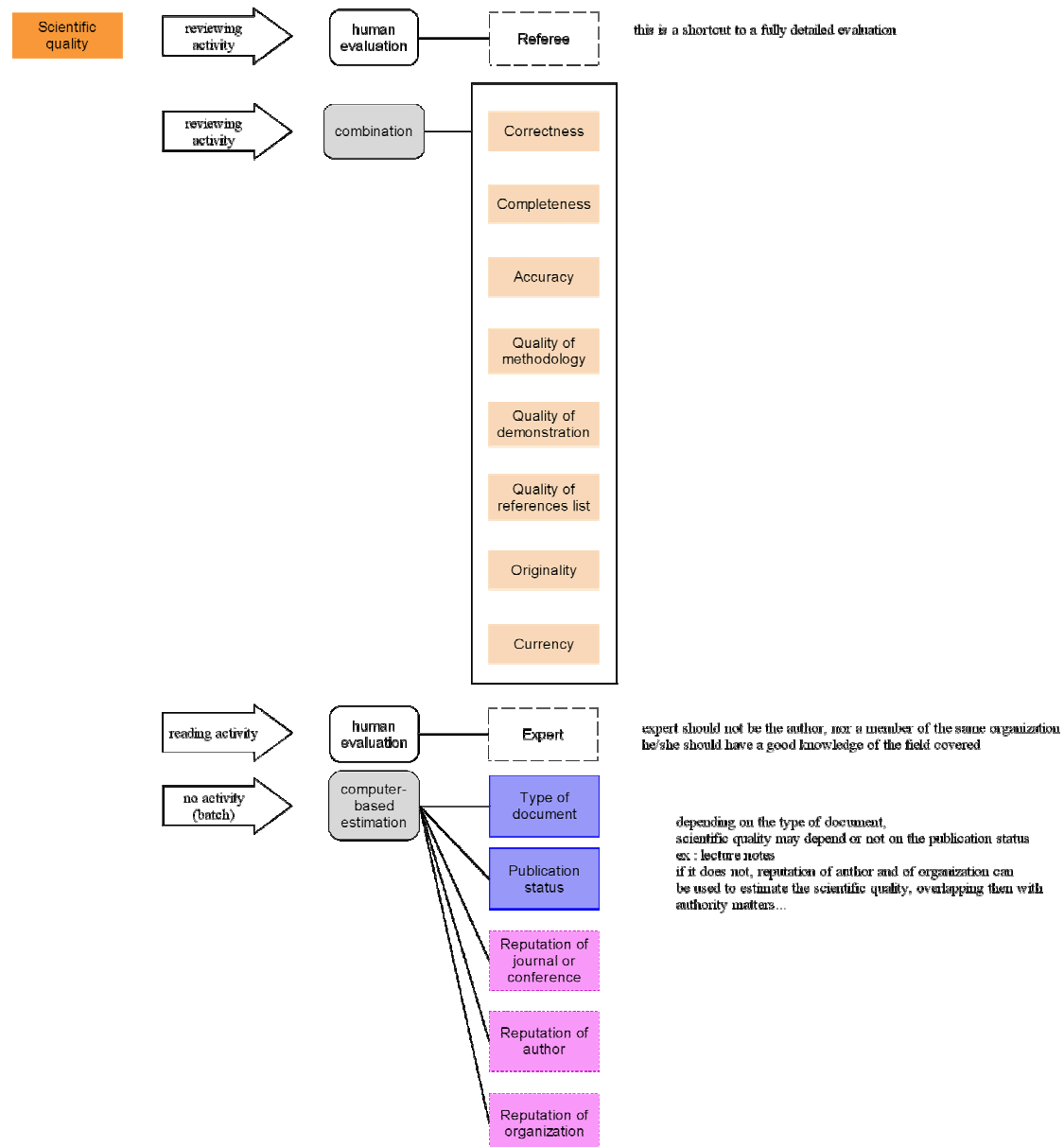
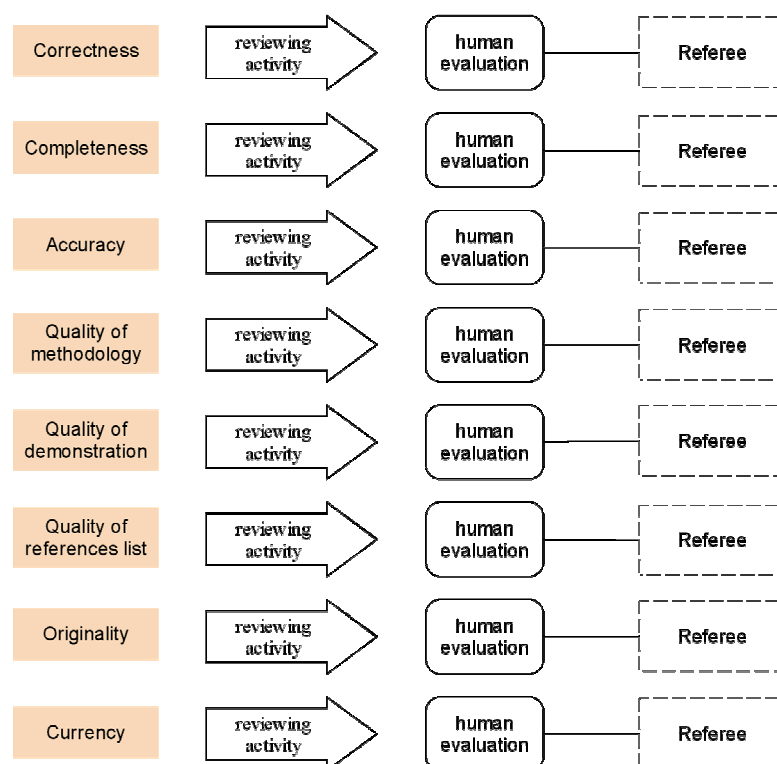


Figure 2 Principle of description of evaluation processes

2. Example of evaluation processes in context

The formal description of all processes described in section **Erreur ! Source du renvoi introuvable.** is not given as it would be very lengthy. We simply give here an example: the scientific quality evaluation processes.





the referee will be affiliated to
a different organization
than that of the authors

IV. Integration into PORTAL

A. Validation feedback loop

This document gives a perspective view of what the quality control tools could be, but in a first approach, we are going to implement the evaluation form and the evaluation database.

We will first run all the plain computer-based evaluations on a subset of arXiv and JHEP, to see how much information can be automatically produced. Then we will test evaluation forms configurations on user groups, to collect their feedback upon the usability of the forms. All aspects of control in updates will have to be validated by managers. A first test will be made with both a review process context and a reading process context, if possible real cases.

With this feedback, the tool will be improved for PORTAL-1.0, for wide range use of evaluation forms by all users, that will allow to evaluate further the actual usage of the tool.

B. Search tool

As a second step, thanks to the evaluations provided by users, a quality-aware searching tool can be made, as an extension of the existing search tool (Okapi-based), with the following functionalities:

- Query form

The query form will have the existing Okapi search fields, and additional fields relating to quality criteria (and corresponding quality feature) (when appropriate, see next point).

- Presentation of results

In the search tool, it will be possible to rank results with respect to some of the quality criteria (rather than direct query on it).

- Overview of existing evaluations

As there will be very few documents evaluated at the beginning of the existence of the system, it is important to give an overview of the state of the evaluations, to allow users to know which documents have been assessed. This overview will also be useful later, when the evaluation database is more complete, but it may have different features then.