

CRITERIA TO ESTIMATE REVIEWERS' OBJECTIVITY

A quantitative assessment of the objectivity of a reviewer

The designations used:

$R_k^{(j)}$ – my averaged estimate of content after reviewing

R^{read} – averaged content rating provided by end users/readers of content

R^{rev} – my reviewer's rating based on the end-users/readers' ratings of content I reviewed

k_i – weight coefficient of content's estimate by end users/readers from different categories, $i = 1, 2, 3$:

$k_1 = 0,25$ – if the end user/reader is a scientist but is not registered at the InGraph Platform as a reviewer

$k_1 = 0,5$ – if the end user/reader is not a scientist, but is a practitioner buying content for own professional activities

$k_3 = 1$ – if the end user/reader is a scientist who is registered at the InGraph Platform as a reviewer, or is a practitioner who is registered at the InGraph Platform as a reviewer

\overline{R}_i – averaged estimate by end users/readers from different categories, $i = 1, 2, 3$:

\overline{R}_1 – averaged estimate by end users/readers who are scientists but are not registered at the InGraph Platform as reviewers

\overline{R}_2 – averaged estimate by end users/readers who are not scientists but are practitioners who buy content for their professional activities

$\overline{R}_3 - \overline{R}_3$ – averaged estimate by end users/readers who are scientists and are registered at the InGraph Platform as reviewers or are practitioners registered at the InGraph Platform as reviewers

m_i – number of end users/readers from different categories who rate this content, $i = 1, 2, 3$:

m_1 – number of end users/readers who rate this content and are scientists but are not registered at the InGraph Platform as reviewers

m_2 – number of end users/readers who rate this content and are not scientists but are practitioners who buy content for their professional activities

m_3 – number of end users/readers who rate this content and are scientists registered at the InGraph Platform as reviewers or are practitioners registered at the InGraph Platform as reviewers

Formulae for calculating my objectivity as a reviewer:

$$R^{rev} = \frac{R_k^{(j)}}{R^{read}},$$

$$R^{read} = \frac{\sum_{i=1}^3 k_i \bar{R}_i}{\sum_{i=1}^3 k_i} = \frac{(k_1 \bar{R}_1 + k_2 \bar{R}_2 + k_3 \bar{R}_3)}{(k_1 + k_2 + k_3)}$$

$$\bar{R}_1 = \frac{1}{m_1} \sum_{l=1}^{m_1} R_1^l, l = 1, \dots, \infty$$

$$\bar{R}_2 = \frac{1}{m_2} \sum_{l=1}^{m_2} R_2^l, l = 1, \dots, \infty$$

$$\bar{R}_3 = \frac{1}{m_3} \sum_{l=1}^{m_3} R_3^l, l = 1, \dots, \infty$$

Qualitative assessment of the objectivity of a reviewer

$R^{rev} < 1$ – the reviewer is very principled or shows excessive caution in the assessment (knowingly does not want to risk his/her reputation if the assessment of the end user/ reader happens to be much lower)

$R^{rev} = 1$ – the reviewer is fully objective in assessing content in terms of meeting end user/reader requests

$R^{rev} > 1$ – the reviewer is either very supportive in evaluating the content according to his/her internal beliefs (always ready to help the author in the desire to support him/her and stimulate the authors' interest in the creation of scientific works), or he/she saw big potential in the peer-reviewed content that others have not revealed or is interested in creating the most attractive picture for end user due to personal motives

An example of assessing the objectivity of a reviewer

Following the reviewing, the paper received such results from reviewers:

My estimate: $R_k^{(j)} = 0,55$

Other reviewers estimated this paper as follows:

Reviewer 2: $R_k^{(j)} = 0,35$

Reviewer 3: $R_k^{(j)} = 0,75$

The paper was rated by 100 end users/readers, of which:

Scientists who are not registered at the Platform as reviewers – 66 people ($m_1 = 66$)

Practitioners who bought this paper for their professional activities – 16 people ($m_2 = 16$)

Scientists who are registered at the Platform as reviewers – 18 people ($m_3 = 18$)

End-users assessed as follows (Table)

Estimates from end users/readers who are not registered at the Platform as reviewers	
Number of users who rated content	Numerical value
10	0,66
34	0,36
22	0,4
Total	$\bar{R}_1 = \frac{1}{66}(10 \times 0,66 + 34 \times 0,36 + 22 \times 0,4) = 0,419$
Estimates from end users/readers who are practitioners who bought this paper for their professional activities	
Number of users who rated content	Numerical value
10	0,35
6	0,5
Total	$\bar{R}_2 = \frac{1}{16}(10 \times 0,35 + 6 \times 0,5) = 0,406$
Ratings from end users/readers who are registered at the Platform as reviewers	
Number of users who rated content	Numerical value
5	0,8
5	0,7
5	0,45
3	0,2
Total	$\bar{R}_3 = \frac{1}{18}(5 \times 0,8 + 5 \times 0,7 + 5 \times 0,45 + 3 \times 0,2) = 0,575$

$$R^{read} = \frac{\sum_{i=1}^3 k_i \bar{R}_i}{\sum_{i=1}^3 k_i} = \frac{(k_1 \bar{R}_1 + k_2 \bar{R}_2 + k_3 \bar{R}_3)}{(k_1 + k_2 + k_3)} = \frac{1}{1,75}(0,25 \times 0,419 + 0,5 \times 0,406 + 1 \times 0,575) = 0,504$$

Calculating my objectivity as a reviewer

$$R^{rev} = \frac{R_k^{(j)}}{R^{read}} = \frac{0,55}{0,504} = 1,09 \approx 1$$

Calculating the objectivity of reviewer No. 2

$$R^{rev} = \frac{R_k^{(j)}}{R^{read}} = \frac{0,35}{0,504} = 0,69 < 1$$

Calculating the objectivity of reviewer No.3

$$R^{rev} = \frac{R_k^{(j)}}{R^{read}} = \frac{0,75}{0,504} = 1,49 > 1$$

Summary:

1. As a reviewer, I am objective
2. Reviewer No. 2 is very principled or overly cautious in assessing
3. Reviewer No. 3 is very supportive, either he/she saw big potential in the peer-reviewed content, which others did not reveal, or is interested in creating the most attractive picture for end user due to personal motives