INFORMATION-BASED EVALUATION OF THE QUALITY OF DOCTORAL THESES

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A method of information-based evaluation of the quality of doctoral theses has been worked out. It is based on a multidimensional classification system which includes: a list of attributes to characterize the given theses and their authors; singling out the most significant attributes; calculating a complex criterion showing the quality of a thesis on the basis of a series of significant attributes; ranging the theses according to this criterion. This method was used to evaluate 36 doctoral theses in chemistry according to 41 attributes considered. Four main attributes were singled out. Based on them a complex quality criterion which we termed the originality index was calculated. The values of the originality index of these theses differed by an order of magnitude. Two attributes affecting the index of originality were singled out: the place where the thesis was prepared, and the fact whether the author had any papers published in non-Academy journals (journals not published by the USSR Academy of Sciences).

Introduction

The process of taking one's degree by preparing and defending in public a thesis has been used for a long time. However, the problems of evaluating the quality of theses in the USSR have been subject to discussions for two decades only. Back in the middle of the 19th century in Russia's universities they demanded that the thesis for a Doctor's degree* should be typed and presented to a faculty of a university. The thesis was commented on by several professors. Approval received made it possible to defend the thesis in public. The exact date of this event was reported beforehand. The faculty dean presided over the meeting. Two official opponents read their comments on the thesis. As a rule, if the dissertator was allowed access to this stage, he got the degree he sought for.

* The question of correct comparison of yesterday's and today's dissertations should be considered independently.
The process of defending the thesis in public has basically remained unchanged by now. However, the problem of evaluating the quality of theses has arisen. What is the reason for this? Apparently, the dissertator's abilities to work his way through the problems of science, his knowledge of the literature and so on – i.e. his erudition – was appreciated above all in the past. Defending the thesis in public – with official and unofficial opponents – met these requirements. Theoretical and experimental results obtained mattered less.¹²

Today's demands made of a thesis are quite different. It should prove to be a real and efficient contribution made to science. To find such proofs is far more difficult than to evaluate the dissertator's erudition. The existing multi-stage expertise does not stave off errors when tackling this task.³

In the USSR there are two scientific degrees: Candidate of Science and Doctor of Science. The former one is awarded to people with a college or university education who have passed Candidate exams and defended a thesis at a scientific council. The doctoral degree is awarded to Candidates of Sciences who defended a doctoral thesis at a scientific council.

A thesis presented for the doctoral degree is a typed manuscript up to 300 pages. It is presented to a specialized council of a research organization where it will be defended. The scientific council comprises 11-25 Doctors of Science. 100 copies of an autoreview of the thesis up to 40-50 pages are published and distributed. It includes: main ideas and conclusions, the author's contribution to the development of the problem, the degree of novelty and significance of the results, reasons concerning the structure of the work, the list of author's publications on the given topic. These autoreviews of the theses are sent to scientific-research organizations in order to obtain opinions on the dissertation's quality.

A doctoral thesis must be an independent research contribution which either formulates and grounds scientific statements whose aggregate comprises a new scientific direction, or it must solve a major scientific problem. The basic results of the thesis must be published in scientific publications issued by central publishing houses. A doctoral thesis should be formally discussed by three opponents, who are Doctors of Science. They evaluate the quality of the thesis, i.e. whether it meets necessary requirements for doctoral thesis. The thesis should also be reviewed by a research organization, well-known for its achievements in the respective science field.

If specialized council decided to award the doctoral degree, the thesis is sent to the respective commission of experts of the Supreme Certifying Commission of the