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Assessment of Professional Competencies: A Regional Model

Daria V. Cousina, Yulia A. Cherkasova,
Eugenia G. Grigoreva and Larisa A. Novopashina*
Siberian Federal University
Krasnoyarsk, Russian Federation

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Abstract. The article deals with the problem of assessing the professional competencies of personnel. A theoretical model is proposed, which is based on the assessment of subjective conditions of professional deficits and its empirical verification. As a result of the factor analysis of the data obtained during the survey of 3375 teaching staff in 61 municipalities of the Krasnoyarsk Territory, the structure and content of the model were clarified. The analysis of professional deficits revealed the gender and age specifics of the model in the conditions of regional development. It is proposed to consider value orientations, the use of online communications, professional well-being, attitude to the profession, grounds for professional choice, motivation for professional development, involvement in the educational process and organization of work with professional deficits in the organization as the subject of assessment of professional deficits of teaching staff in the refined model.

The study was carried out within the framework of the project «Comprehensive study of professional deficits of teachers of the Krasnoyarsk Territory», with the support of the Krasnoyarsk Regional Foundation for the Support of Scientific and Scientific-Technical Activities.

The obtained results contribute to the development of tools for assessing professional competencies, make it possible to become the basis for the development of professional development programs and the work of professional development centers.

Keywords: professional competencies, professional deficits, subjective conditions, regional model, factor analysis.

Research area: economics.

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Региональная модель оценки профессиональных компетентностей

Д.В. Кузина, Ю.А. Черкасова,
Е.Г. Григорьева, Л.А. Новопашина

*Сибирский федеральный университет
Российская Федерация, Красноярск*

Аннотация. В статье рассматривается проблема оценки профессиональных компетентностей работников. Предлагается теоретическая модель, в основу которой положена оценка субъективных условий профессиональных дефицитов и ее эмпирическая проверка. В результате проведенного факторного анализа данных, полученных в ходе опроса 3375 педагогических работников в 61 муниципальном образовании Красноярского края, уточнена структура и содержание модели. Анализ профессиональных дефицитов педагогических работников в условиях развития региона показал, что профессиональные дефициты имеют свою половозрастную специфику. В качестве предмета оценки профессиональных дефицитов педагогических работников в уточненной модели предлагается рассматривать ценностные ориентации, использование онлайн-коммуникаций, профессиональное самочувствие, отношение к профессии, основания профессионального выбора, мотивацию для повышения квалификации, включенность в образовательный процесс и организацию работ с профессиональными дефицитами в организации. Исследование выполнено в рамках проекта «Комплексное исследование профессиональных дефицитов учителей Красноярского края», при поддержке КГАУ «Красноярский краевой фонд поддержки научной и научно-технической деятельности».

Полученные результаты вносят вклад в разработку инструментария оценки профессиональных компетентностей, позволяют стать основой разработки программ повышения квалификации и работы центров повышения квалификации.

Ключевые слова: профессиональные компетентности, профессиональные дефициты, субъективные условия, региональная модель, факторный анализ.

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Introduction

The competence approach is recognized as effective in achieving the strategic objectives of organizations through increasing the competitiveness of personnel. The model of personnel competencies in this approach becomes an operational tool for their assessment, training and development, recruitment of new employees, etc. (Sharipova, 2020).

What competencies should employees have? This question remains open. There are currently nine main models (Milyokhina, 2021). The list of types of competencies is ex-

panding both through research of situations in individual labor markets (Perevozova, 2021), and through the development of HR technologies by leading Russian and foreign companies (Sharipova, 2020). Models of supra-professional competencies are presented in a wide range in the scientific literature – from value attitudes (Sharipova, 2020) to digital and media competencies (Perevozova, 2021). The definition of «deficits of professional competencies» is not used in economic research.

The competence approach used in pedagogy and psychology finds its place in mod-

ern economic research. However, the variety of approaches to professional quality models leads to the number of research tools.¹ (Bidys, Grigoreva, Kuzina, Novopashina, 2020). With these tools, researchers identify difficulties and build professional development systems based on them. In general, they are reduced either to a questionnaire or to self-assessment with subsequent processing and interpretation of data.

Regional practices for assessing professional difficulties have shown that models for assessing professional deficits are practically not used in dealing with professional difficulties. These are mainly empirical studies using sociological and psychological tools, borrowed foreign methods tools are also widely used. In addition, the personnel certification system is a tool for assessing the professional skills and competencies of teachers. However, an integrated approach requires solving the problem of assessing professional deficits and using methods that exist in other fields of knowledge. This solution overcomes the mosaic and fragmentary nature of the procedures used.

Theoretical framework

Objective economic, socio-cultural, technological conditions affect the success of the formation and development of human resources. These conceptual representations are the most common. This study examines the subjective conditions that determine the reality of professional behavior and the success of the professional activities of the teachers' corps and the governing structures themselves. The idea of subjective conditions served as the conceptual basis of the study (Novopashina, Khasan, 2015). Subjective conditions determine the reality of professional behavior and the success of the professional activity of the teachers' corps and the actual management structures. Subjective conditions do not ignore the contextual conditions of professional activity. This made it possible to identify the difficulties of teachers in the context of professional development.

¹ Bidys I.A., Grigoreva E.G., Kuzina D.V., Novopashina L.A. (2020) Metodicheskie rekomendatsii po otsenke professional'nykh defitsitov uchiteleiie [Methodological recommendations for assessing teachers' professional deficits].

In this sense, the study and assessment of professional difficulties is a methodology for assessing competencies in pedagogical activity in the Krasnoyarsk Territory. This approach becomes a key tool for designing and implementing changes in the teacher training system. In general, this answers the request of the entire education system of the Russian Federation.

Statement of the problem

The assessment of professional competencies is still the subject of heated discussions. In various sectors of the economy, the assessment of personnel competencies has a pronounced industry specificity. However, addressing the assessment through the identification of professional deficits as a condition for development is one of the problems of this approach. On the one hand, the assessment of teachers' professional deficits in education is not new (Archer, 2010, Dudareva, Unegova, 2015; Bershadskaia, Bershadskii, 2017), on the other hand, it requires understanding and clarifying the subject every time (Margolis et al., 2015; Mitrofanov, Loginov, 2015; Sobkin, Adamchuk, 2017, Fedorov, 2018).

Theoretical analysis allowed us to give the following definition. Professional deficits are a lack (limitation) in professional competence that prevents the effective implementation of professional actions, that became the basis of the theoretical model.

The purpose of this article is to test the model of professional deficits on empirical material.

Methods

This study was carried out within the framework of the project «Comprehensive study of professional deficits of teachers of the Krasnoyarsk Territory», with the support of the Krasnoyarsk Regional Foundation for the Support of Scientific and Scientific-Technical Activities.

Professional positioning, professional competencies, professional communications, and professionally significant personal qualities of teachers were included in the structure of the model for assessing the professional deficit of teachers.

A special questionnaire was developed² based on a model for a comprehensive assessment of teachers' professional deficits. Multiple – choice questions were formulated for each block of the model structure. The sample is calculated taking into account the gender and age structure in 61 municipalities of the region. 3,375 teachers of the Krasnoyarsk Territory were interviewed. The survey of teachers was conducted in offline and online formats. Further, the responses were processed using factor analysis.

The data matrix has been specially designed for analysis. The answer options made up the rows of the matrix. The rows of the matrix contained 108 definite answers. The columns of the matrix were determined by splitting the data array of teachers' responses by gender and age. The groups consisted of the following years 25–29; 30–34; 35–39; 40–44; 45–49; 50–54; 55–59; 60–64; 65 65 and older. Gender data was considered in each age group.

Thus, the size of the matrix was 108 rows*18 columns. The percentage of responses was calculated depending on gender and age. Then the proportion of responses at the intersection of the corresponding rows and columns was entered. Then the matrix was processed using factor analysis by the principal component method, followed by rotation in accordance with the Kaiser criterion «varimax».

Discussion

The empirical analysis revealed internal substantial latent stable connections of the studied structure of the model for assessing professional deficits. Professional positioning, professional competencies, professional communications, and professionally significant personal qualities of a teacher were studied using factor analysis.

As a result, it was found that professionally significant personal qualities are described by the selected factors presented in Table 1.

² Novopashina L.A., Grigorieva E.G., Kuzina D.V., Cherkasova J.A. (2021) Teacher deficits in the Krasnoyarsk Territory: a pre-project study. In *Development practices: educational paradigms and practices in a situation of technological change. Materials of the XXVII scientific and practical conference. Krasnoyarsk*, p. 84.

The data in Figure 1 shows how teachers of different age groups and gender are positioned relative to the second and third factors.

The following patterns have been established. Young teachers see their mission in the need to «transfer knowledge». It is important for them to have a «detailed work process» and the need to «shift the difficult into a language that the student understands.» This characterizes both men and women. In addition, the prospect of professional growth is a professional value guide for them.

Mature teachers, starting from about 40 years old, see their purpose in actualizing the student's need to learn. They are focused on the formation of a common culture and relationships with students.

Substantiation of one's point of view on the subject, a high level of thinking and disclosure of the mechanism that allows to show the causes of the phenomenon, as well as actualization of the student's need to learn are characteristic of male teachers over 60 years old. It is established that young male teachers at the beginning of their professional career are focused on substantiating their point of view on the subject, a high level of thinking and disclosure of the mechanism that allows to show the causes of the phenomenon.

The age dynamics of the professional trajectories of male and female teachers are completely different. It's should be considered in the construction of a teacher training system.

In the communicative part of the model of professional shortage of teachers, significant, hidden connections were revealed only in relation to the use of social networks in the educational process, the data are presented in Table 2.

The highlighted latent connections show that the use of online communications significantly depends on the purpose of communication.

The data presented in Table 3 shows the placement of teachers in the space of factors by gender and age. In the first factor, it is established that social networks are used only for communication that is not related to work. This is typical for male teachers from 35 years and older, as well as female teachers over 60 years

Table 1. Professionally significant personality traits

Content of factors	weight values
The first factor F1 – bipolar, «Value orientations»	24,9 %
«Methodical excellence» is a quality necessary for a teacher	,91
values of continuous self-improvement	,91
continuation of family traditions	,76
«To enable the student to believe in himself» is a task in the educational process	,76
the ability to influence the behavior of other people and guide them	-,79
knowledge of the subject is a value	-,78
The second factor F2 – bipolar, «Professionally positioning»	21,1 %
«Knowledge transfer» is the main task of the teacher	,92
a «detailed labor process» is a value orientation	,86
«To shift the difficult into a language understandable to the student» is the task of the teacher	,84
«Having the prospect of professional growth» is a value	,73
«Actualization of the student’s need to learn» is the teacher’s task	-,79
The third factor F3 – bipolar, «Professional guide»	18,8 %
substantiating your point of view on the subject	,87
«High level of thinking» is the main quality of a teacher	,78
disclosure of the mechanism, the need to show the causes of the phenomenon is a priority task	,75
the value of the teacher-student relationship	-,84
General culture	-,82

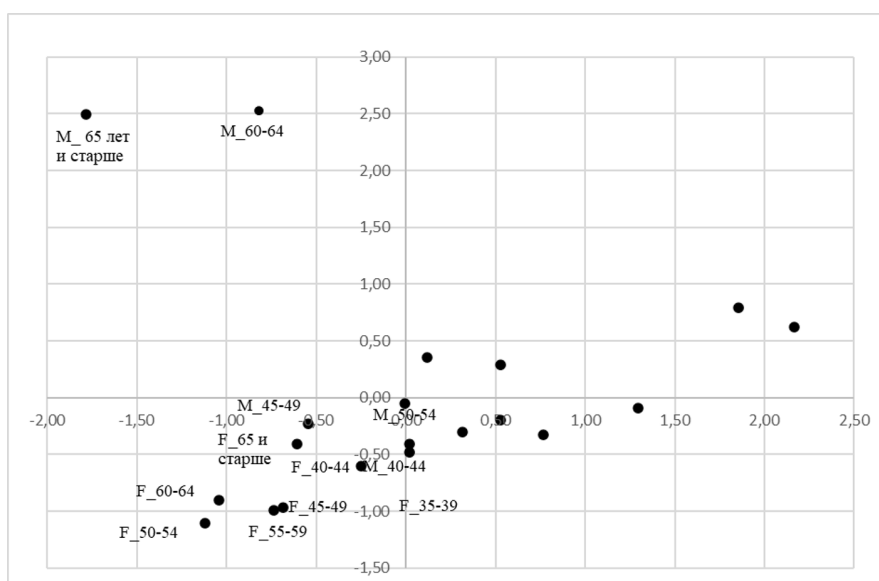


Fig. 1. Placement in the space of factors F2 (professional purpose) and F3 (professional guidelines) of teachers of different genders and ages.

Source: [Compiled by the authors]

Table 2. The use of social networks in the educational process

Content of factors	weight values
The first factor F1 – bipolar, «Communication»	37 %
communication with colleagues	,89
inappropriate use of social networks	,85
only communication not related to work	-,82
The second factor F2 – unipolar, «Support of the educational process»	20,4 %
I use social networks to communicate with students	,92
The third factor F3 – unipolar, «Maintaining contacts»	17,8 %
«Communication with former students (graduates)»	,77
«I don't use social media because there is no way»	,70

Table 3. Gender and age placement of teachers in the space of factors

Gender and age	F 1	F 2	F 3
F до 25	1,60	1,23	1,14
F 25–29	1,15	-0,01	0,70
F 30–34	1,02	-0,29	0,17
F 35–39	1,03	-0,34	0,10
F 40–44	0,47	0,59	0,16
F 45–49	0,34	0,66	-0,17
F 50–54	0,12	0,77	0,46
F 55–59	0,06	0,31	0,14
F 60–65	-0,36	0,07	-0,22
F 65 и более	-0,86	-0,45	0,07
M до 25	0,71	0,64	0,31
M 25–29	1,19	-1,13	-0,65
M 30–34	0,10	-0,66	-1,66
M 35–39	-0,27	-3,08	0,32
M 40–44	-0,73	0,35	0,04
M 45–49	0,06	0,29	-0,34
M 50–54	-0,94	-0,59	0,65
M 55–59	-0,76	0,75	-3,26
M 60–64	-1,89	-0,68	1,33
M 65 и более	-2,06	1,56	0,73

old. Social networks are used for communication with colleagues by young men and all age categories of women under 60.

Placement data on the F2 factor show that support for communication with students has

little to do with the age and gender differences of teachers. Support of contacts with graduates through online networks is most pronounced among female teachers. It can be seen in the factor F3.

The study of the structural part of the «Professional positioning» model of professional deficits allowed us to identify the following three factors, which are presented in Table 4.

Professional positioning is highlighted as a separate part of the structure in the theoretical model. Factor analysis showed significant characteristics of the three identified factors in which well-being in the profession, its choice and attitude to it are significant characteristics.

The component of the «professional competencies» structure consists of four factors that describe 68.4 % of the total variance, the data are presented in Table 5.

The area of professional competence is associated with a professional deficit by registering a request to the professional development system. So, the first factor is bipolar. This factor shows that career attitudes determine the positive pole, and formal attitudes determine the negative pole. This factor can be called «Motivation for professional development».

Involvement in the organization of the educational process or alienation from it constitute the revealed content of the F2 factor. Building relationships with other parties and participants, for example with parents, has become the content of the F3 factor. This content shows the deficit and the need for advanced

training. It is established that the orientation towards the formation of students' competencies and discussion of the results of advanced training with the administration has become the main content of factor F4.

Thus, the theoretical model has been refined based on empirical material.

Conclusion

The analysis of the data made it possible to clarify the theoretical model and highlight the subject of assessment of professional deficits of teaching staff. The identification of professional deficits is the basis for the assessment of professional competencies. The subject of the assessment of professional competencies of teaching staff are value orientations, the goals of using online communications, professional well-being, attitude to the profession and the grounds for professional choice, motivation for professional development, involvement in the educational process and work with professional deficits in the organization.

It is established that the model is sensitive to the gender and age structure of the teaching staff and needs further verification in the context of municipalities. Gender and age-related professional dynamics were identified because of the audit and requires to be considered when

Table 4. Professional positioning

Content of factors	weight values
The first factor F1 – bipolar, «Professional well-being».	29,1 %
the possibilities of the profession are limited, but I intend to change them	,93
choosing a profession by purpose	-,75
constant analysis of pedagogical activity	-,70
The second factor F2 – bipolar	17,9 %
passion for finding new forms, methods, and technologies of work	,80
choosing a profession on the recommendation of acquaintances / friends/ relatives	,74
«My profession is not important to me, what I do is important»	-,87
The third factor F3 – bipolar, «Professional choice».	15,2 %
choosing a profession by vocation	,71
choosing a profession in demand in modern society, in the labor market	-,95
I must make a living	-,79
Well-being of the limited possibilities of the profession and the desire to be realized elsewhere	-,85

Table 5. Professional competencies

Content of factors	weight values
The first factor F1 – bipolar, «Career – Formality»	28,2 %
the opportunity to improve the qualification category	,91
get advice on creating your own professional development methodology	,85
expand your horizons	,82
Advanced training allows you to advance in the service	,77
it is better to understand the problems of modernization of school education	,77
preference for full-time professional development	-,81
professional development is one of the job requirements	-,80
The second factor F2 – bipolar, «Alienation-Involvement»	20,2 %
material remuneration as an incentive for professional development	0,89
the opportunity to study and grow, but «I did not realize it»	,82
it is not possible to plan yourself, since plans «come down from above» as a task	,75
«no one in our school is interested in the difficulties of teachers»	,71
understanding professional issues makes sense for professional development	,70
the opportunity to learn and grow has been realized	-,86
«The interests of students» is an incentive for professional development	-,79
The third factor F3 – bipolar, «Public Relations».	12,3 %
«parents' requests» are an incentive for professional development	,75
the assessment of professional deficits is carried out as part of the certification in our school, it's formal.	,75
«Changing the pedagogical image» is an incentive for professional development	-,91
The fourth factor F4	7,8 %
it is important to master the basics of experimental work at advanced training	,82
I discuss the results of advanced training courses with the management and include them in my plans	,72

developing and implementing professional development programs.

In general, the obtained results contribute to the development of tools for assessing professional competencies. These results make it pos-

sible to become the basis for the development of professional development programs and the work of professional development centers with the prospect of justifying a professional development plan on a regional scale.

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