Relationships Among Scientific and Methodological Skills in Teachers' Performance

Nazmi Xhomara

MA Ed., Teaching Methodologies Specialist at Institute of Educational Development
Lecturer at Social Sciences Faculty of Tirana University, Albania
E-mail: nxhomara@yahoo.com

Abstract *The relationships between teachers' scientific and methodological skills in their performance has intrigued the author of this research recently. Results of data analyzed show that the relationship between teachers' scientific and methodological skills is a significant and important one. Teachers that show high results on scientific skills may show high results on methodological skills as well. Influence of scientific skills independent variable on the variance of methodological skills dependent variable is fewer than the median, but the correlation between two variables is linear positive.*

1. Introduction

Scientific and methodological skills' command or demonstration in the teachers' work reflects directly on the quality of learning. Teachers in general show the same of the different performance on command and demonstration of these skills. Thus there are teachers that show high performance on scientific and methodological skills, as well as there are teachers that show high performance on scientific skills and low performance on methodological ones, or vice versa.

Formal teachers' professional development is mainly focused on methodological skills development, meanwhile scientific skills development is made at teachers' faculties. Managerial educational institutions include: (1) programmes for methods and techniques of teaching, (2) programmes for command of specific competences such as ICT, (3) programmes for command of new competences related to curriculum changes or educational managerial or teaching structures changes in their teachers' professional development programmes.

Teachers' scientific skills development that consider directly obligation of university teachers' faculties, generally support by schools only in the staff training forms, or by personal initiatives of teachers themselves that may involve in the process of self- training or self- updating of knowledge. Teachers' achievements in scientific and methodological skills is verified or measured at teachers' professional qualification examinations that manage by regional and central educational institutions that are responsible for teachers'profesional qualification management.

In our practice of teachers' professional development, command of scientific and methodological skills by them, reflect directly in qualification grade achievements acquirement, because these two skills are two main parts of final assessment for teachers' professional qualification grades acquirement.

Aim of research was to find out the relationship among scientific and methodological skills in teachers' performance. Main research's question is to find out if there is any relationship among two main variables: (1) scientific skills, (2) methodological skills, as well as if there is any influence by scientific skills on methodological ones, or the other variables in the relationship: (1) portfolio and bonuses, (2) documentation, (3) programme.

Research focus was to find out the relationship among two main variables, as well as to find out the influence of the other ones. Alternative hypothesis of the research was: The level of scientific skills' command influences on the level of methodological skills' command, meanwhile the null hypothesis denies this assumption.

The main variables analyzed in the research for the relationship among them, as well as for the influence, level of association, and the direction of relationship are structured as below: (1) methodological skills was dependent variable, and (2) scientific skills was independent variable.

Research on relationships among scientific and methodological skills as two main variables in teachers' professional configuration is a precious contribution for the institutions that manage teachers' professional development, starting from school level, regional educational departments, and that finish to central level with Ministry of Education and Science, as well as Institute of Education Development. Research' conclusions are also precious for university teachers' faculties that may use the conclusions to examine the balance among scientific and methodological skills to reflect them in the report between scientific and methodological curriculums.

2. Methodology of Research

Methods used in the research on relationships among scientific and methodological skills on teachers' performance are mainly quantitative that mean all of statistical analysis as cross tabulation, correlation, regression, compared means, but involved also qualitative method that was used to generate alternative findings, as well as to contrast generated findings from quantitative analysis to them generated by qualitative analysis.

Qualitative analysis was concentrated on two well known instruments for qualitative method: (1) interviews applied with regional educational departments respondents that are responsible in local level for teachers' professional development, (2) focus group with stratify respondents starting from kindergarten teachers, primary school teachers, low secondary education, and high secondary education, National Inspectorate, Institute of Educational Development, Ministry of Education and Science. Findings from interviews and from focus group was contrasted to findings generated by quantitative analysis that was used to verify research hypothesis.

There were two kinds of instruments on the research. Main instrument used to verify research hypothesis was 2010 teachers' qualification database. The data derived from database was used to apply statistical analysis. The second instruments used in the research was interviews and focus group. Generated data was based on the same dimensions applied on quantitative instrument, as well as on qualitative ones.

Respondents for quantitative analysis was selected by teachers' population that were part of 2010 qualification, that was a stratify and probability sample, and a lot of representatives for some reasons: (1) The sample is compounded by all of the teachers' profile, starting from kindergarten teachers, primary school teachers, low secondary education, high secondary education, (2) the sample was compounded by teachers with different professional experiences that varied from 5, 10, 20 teaching' years experience, respectively 3rd grade, 2nd grade, 1st grade, (3) teachers selected in the sample came from all of the counties of Albania.

We selected respondents for qualitative analysis the most updated specialists from regional educational departments. Meanwhile focus group respondents were selected by experienced teachers that represent kindergarten, primary school, low secondary school, high secondary school, National Inspectorate specialists, Institute of Educational Development specialists, Ministry of Education and Science specialists.

Research based on hypothesis level of scientific skills command influences on level of methodological skills of teachers' performance, did not design to research teachers' professional development in all in all. Teachers' professional development is a broad and complex structure, and is compounded by a lot of variables that influence on each other, as result from literature review, but the research study two variables only: scientific skills and methodological skills and the relationships among them. Research to measure the relationships among scientific skills and methodological skills variables, was not designed to measure the influence of other variables that are not included in the study.

Research did not analyze the influence of teachers' initial training at university faculties on the relationships of variables in the study. Research did not analyze the influence of other variables that are not part of this study on methodological skills that was selected to be dependent variable in conventional way.

3. Findings

Comparing generated data of variables' value frequencies, result that : (1) number of teachers that achieve low level in scientific skills is 1.7% fewer than the number of teachers that achieve low level in methodological skills; (2) number of teachers that achieve medium level in scientific skills is 5.2% greater than the number of teachers that achieve medium level in methodological skills; (3) number of teachers that achieve high level in scientific skills is 3.5% fewer than the number of teachers that achieve high level in methodological skills.

In other words the sample of teachers in the study in low and in medium level has a more positive tendency in scientific skills, and has a light descent of this tendency in the high level. Although we must say that there are relatively closely differences and varies from 1.7% up to 5.2%.

Table 18 : Summaries of variables values

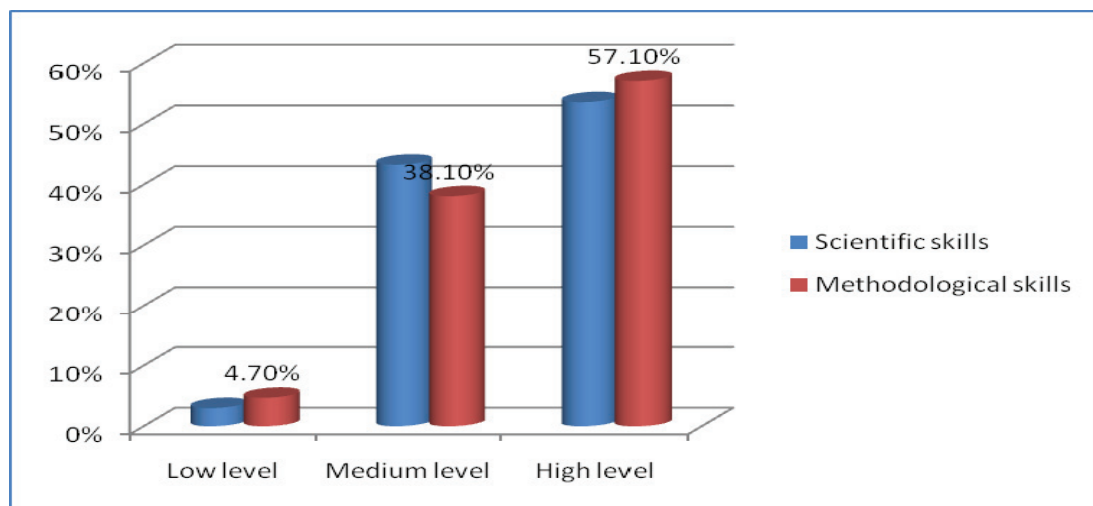| Variable	Low level	Medium level	High level
Scientific skills	3%	43.30%	53.60%
Methodological skills	4.7%	38.10%	57.10%

Chart : Summaries of variables values in %

Derived results from cross tabulations, indicate that significance statistical value generated by analysis made for "Pearson Chi Square" and for "Phi and Cramer's V" is .000. This means that there are 100% of possibilities that the relationships among scientific and methodological skills are statistically significant, and there are 0% of possibilities that the relationships among scientific and methodological skills come by chance.

Based on data generated by cross tabulations among scientific and methodological skills variables result that1302 teachers, or 55.2% of them has achieved the same assessment level on two variables, meanwhile 1056 teachers or 44.8% of them has achieved different assessment. As a conclusion we may say that the relationship between two variables is strong; teachers that achieve an assessment level on one variable keep the same level on other variable as well.

Table 2 : Data summaries of crosstabulation

		Scientific			Total
		1.00	2.00	3.00	
Methodological	1.00	11	74	27	112
		9.8%	66.1%	24.1%	100.0%
	2.00	45	453	401	899
		5.0%	50.4%	44.6%	100.0%
	3.00	13	496	838	1347
		1.0%	36.8%	62.2%	100.0%
Total		69	1023	1266	2358
		2.9%	43.4%	53.7%	100.0%

Pearson correlation value for scientific and methodological skills .237 generated from correlation analysis, indicates that there is an under medium level correlation among scientific and methodological skills variables. Direction of correlation is linear positive that means that increasing of values of one variable influences on increasing of values of the other variable.

Thus, if the teachers show or demonstrate high level of scientific skills show or demonstrate high level of methodological skills and vice versa. But the indication mass is not considerable, even is under medium level. This means that although main tendency of linear positive correlation, teachers that achieve high level on scientific skills may not achieve high level on methodological, and vice versa.

Generated results from bivariate regressive analysis among scientific skills and methodological skills variables indicates that statistical significance value is .000. This means again that that there are 100% of possibilities to be a statistical significant relationship among two variables or that the relationships among them do not come by chance.

"R Square" generated value .056, indicates that around 5.6% of variance on methodological skills dependent variable is caused by scientific skills independent variable; the other variance is caused by hidden or unknown variables that are not part of this study.

Through multivariate analysis was confirming the same value of statistical significance as in all of the other statistical analysis. In this analysis we included except scientific and methodological skills variables the other variables in the configuration as portfolio and bonuses, documentation, programme, to find out their influence on the variance of methodological skills dependent variable.

"R Square" generated value .103, indicates that around 10.3% of variance on methodological skills dependent variable is caused by scientific skills independent variable + the other variables added in the analysis portfolio and bonuses, documentation, programme; meanwhile 89.7% of variance is caused by hidden or unknown variables that are not part of this study.

At the end compared means analysis confirm that statistical significance value is .000, that is unchanged in all of statistical analysis, as well as positive linearity of the relationship among two variables in the study.

About 90% of interviews and focus group respondents answered that scientific skills are primary compared to methodological ones. In other word teachers that show or demonstrate high scientific level may show or demonstrate high methodological level, but not in all of the cases because there are teachers that show or demonstrate high scientific level and low methodological level. Adding achievements by quantitative analysis, result that scientific skills are primary on teachers' professional formation, methodological skills is been influenced in a certain mass by scientific skills, but they develop in a great mass independently.

About 100% of respondents reported that a teacher that show or demonstrate low scientific level is not possible to show or demonstrate high methodological skills. Teachers that do not show or demonstrate scientific skills of the subject do not show or demonstrate interactive methods or techniques in teaching. They talk themselves only, they do not allow discussion or alternative opinions by pupils, they characterized by a conducted pedagogy and at the end they apply a teaching with teacher in the center.

This conclusion reinforce the abovementioned idea that scientific skills are primary on teachers' professional development; we cannot say that methodological skills are the function of scientific skills, but they are depended in a certain mass from them. The vice versa option based on quantitative and qualitative data is not possible; methodological skills cannot be primary and cannot influence scientific skills.

Teachers, especially inexperienced ones need to develop professionally on two fields as in scientific skills as well as in methodological ones. Of course, the fields where teachers need more include inexperienced ones are methodological ones, but based on data of last years where new teachers have scientific incompetence's, need to develop scientific skills as well.

About 90% of respondents answered that teachers' professional qualification structure as a part of teachers' professional development is a comprehensive one; need to change some elements saving structural report through current elements.

Credits involve as a possibility to acquire qualification grades would urge teachers to take part in training activities that would indicate in their professional competence development.

4. Conclusions

- The relationship among two skills, as two components that determine structural configuration and contentual of the teachers, is significant. This means that two skills are related, sustain each other, influence each other, and complete each other. We cannot understand a teacher that during his or her performance show or demonstrate in a certain level scientific skills without show or demonstrate at the same level or in closely levels methodological skills as well, and vice versa. Thus, two skills in the study cannot exist without each other that altogether and with other variables complete teachers' professional configuration.

- More than 50% of teachers have professional achievements more than mean. Thus more than half of teachers in primary and secondary schools show or demonstrate scientific and methodological skills on medium level.

- Majority of teachers have achieved relatively more points at high level and relatively fewer ones at low level. Group of teachers that show or demonstrate high level on scientific skills and on methodological ones is bigger than group of teachers that show or demonstrate low level on two skills.

- In the two skills, with a small superiority of methodological skills, about 70% of teachers have achievements from the medium to maximum that indicate that majority of teachers show or demonstrate scientific and

methodological skills between medium and high level.

- In low level teachers' achievements in scientific skills have a small positive difference compared to their achievements in methodological skills.
- In medium level teachers' achievements in scientific skills have a bigger positive difference compared to their achievements in methodological skills, as well as compared to low level of achievements.
- In high level teachers' achievements in methodological skills have a small difference compared to their achievements in scientific skills. In the three levels of showing or demonstrating of scientific and methodological skills, there are very small differences that indicate that relationship among two variables is significant.
- On the majority of teachers the level of showing and demonstrating of scientific skills influence on the level of methodological skills; this indicates that on the majority of teachers is verified research hypothesis.
- Teachers with low level on methodological skills cannot have high level on scientific skills; this verifies again research hypothesis that scientific skills are primary and influence on methodological skills
- Teachers with high achievements on scientific skills may not show the same level on methodological skills.
- Teachers with high achievements on methodological skills may not show the same level on scientific skills
- Variance on methodological skills is influenced on a little mass by scientific skills; the other part is developed independently.
- Portfolio and bonuses, documentation, and programme have a little influence on the variance of methodological skills.
- Methodological skills as an important component of teachers' professional development, since they are related, cannot influence scientific skills
- Teachers' professional development is a structure that means development of teachers in two main directions: scientific and methodological, as well as development of additional competences of professional configuration.

5. Recommendations

- Development of scientific and methodological skills must be applied percepting them as two main components of the same common structure, that represents teachers' professionalism.
- There is a need to develop teachers not only in methodological skills, but in scientific skills as well.
- Managerial educational institutions that are responsible for teachers' professional development, local and central ones, must compile short- term, medium- term, and long- term programmes for teachers' professional development include scientific and methodological skills, as well as based on their needs.
- Central educational institutions must announce primarily new teachers' competences, as part of scientific and methodological skills of their fields or subjects.
- Central educational institutions that manage teachers' professional qualification must include credits in this structure; this would orientate teachers toward participation in different training programmes, a process that would bring a continual teachers' professional development.
- Teachers' university faculties must assess curriculum report of teacher initial training of teachers' scientific and methodological skills to apply a harmonically report between them, that would support increasing of quality on teachers' initial formation.

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