Influence of Action Research on Meta-Cognitive Knowledge of Primary School Teachers in the Province of Alborz

Forouhar Kavousi
MS, Educational Management

Abstract

This research was performed with the purpose of evaluating the influence of action research on enhancement of meta-cognitive knowledge in teachers of education and development districts of the province of Alborz. This research was descriptive-applied in kind and its method was retrospective and statistical population constituted of all teachers occupied in primary schools in the eight districts of education and development of the province of Alborz in the 2015-2016 academic year. By referral to the general office of education and development of the province of Alborz, the number of teachers occupied in primary schools in this province was found to be 7659 individuals active in 797 schools. From this number, 2645 individuals were identified as researchers. For sampling, the Morgan sample size formula was used based upon which, the sample size for researcher and non researcher teachers was calculated at 185 and 405, respectively. Research instrument was a researcher formulated questionnaire used for data collection. In this research, we sought to evaluate the level of growth of meta-cognitive knowledge in the domains of expressive, contextual and procedural knowledge among researcher and non researcher teachers. Considering the nature and goals of the research, for data analysis, single factor and multivariable analysis of variance were used. Results of the research shows that meta-cognitive knowledge of researcher and non researcher teachers is different and in all three domains of meta-cognitive knowledge namely expressive, contextual and procedural, researcher teachers performed better than non researcher teachers. Therefore, considering the studies related to meta-cognition and its processes, a new area of research has been created named growth of cognitive skills or method of increasing cognitive processes particularly in the matter of teaching-learning. Based on the results of this research, it can be suggested to superintendents of education and development to pay more serious attention towards action research in schools.

Keywords: Action Research, Meta-Cognition, Teacher, Education and Development.
Introduction

The same way that the environment and society change, the education and development sector is also a dynamic organization undergoing change and evolution and in the education and development system, to be responsive to this evolution, we need to participate in research. If we accept that the main axis of advancement of education and development is human resources, we will have no choice but to develop and train teachers that are capable of performing this important task. The reason is that the quality of every educational system is dependent on the quality of the work of its teachers. Therefore, it is necessary that teachers across the country while performing their pedagogical duties are researchers as well. Researching teachers with recording and reporting action research in the format of research work participate in the program for researcher teachers and in this way while sharing their experiences with other instructors are also involved with a kind of investigational competition. Persistent research and criticism by teachers leads to improvement in their skills and abilities and enriches education. Such teachers instead of being dominated and subdued, ask questions about knowledge, make theories and own knowledge. The self-actuated knowledge in this case is very valuable. By such knowledge, we mean that the person has internalized the ideas and possessed them. This action empowers and enables him or her (Ghasemipouya, 2013, 56). Apparently, persistence of research orientation in teachers goes along with growth of their system of thinking and cognition. When a teacher also becomes a researcher, questioning is promoted in the curriculum and class environment. Research in addition to leading to blossoming of teachers helps their reasoning system and beliefs to be more logical (Ghasemipouya, 2013). Growth of meta-cognitive skills can be the consequences of such solid actions by the teachers. In fact, meta-cognition is inclusive of awareness about cognitive processes and achievements. Cognitive skills are applied for facilitation of learning. Meta-cognitive knowledge refers to knowledge gained regarding cognitive-knowledge based processes that can be used for control of cognitive processes. Meta-cognitive knowledge is expressible and relatively constant such that it provides the possibility to think about cognitive processes and discussion with others. Yet, it can be error prone, unreal or based on simplistic models (Brown, 1987, cited in Niazzari, 2003). Research in its professional form with thinking and becoming equipped with special skill, discovery and design of problem and logical questions can provide the context for meta-cognitive knowledge. Research by teachers helps solving problems afflicting the classroom and improvement of teaching and learning. A researcher teacher endeavors by way of research in the classroom and taking advantage of various teaching methods that are appropriate for each student to provide conditions that students can reach maximum blossoming of their talents (Ghasemipouya, 2013, 9). The purpose of the researcher teacher is creation of a knowledge that undoubtedly is applicable in teaching and learning. Certainly, such knowledge due to breadth of educational objectives will be broad. Research by teachers obliterates the distance between theory and action which is persistently criticized by most experts and specialists. A connection is formed between scientific and teaching institute theories with classroom activities. The teacher him or herself matures, grows and self-belief is enhanced in him or her. Local and regional topics and problems will gain sufficient attention and the sense of belonging and participation is strengthened in them. The credibility of their work increases and their creativity expands (Hopkins, 2000, cited in Ghasemipouya, 2013).
Regarding the necessity to consider the importance of meta-cognition and teaching of meta-cognitive skills to students, developmental psychologists in the matter of multiple decades have confirmed teaching special learning strategies to students. The most important topic of cognitive psychology in developmental psychology is emphasis on learning «how to learn» (learning learning) as one of the main goals of the process of learning and teaching. The more intended material is familiar with the mind and related to the life and previous information a person has gained, processing of information becomes simpler (Kadivar, 2004). The main purpose of this research was evaluation of the effect of action research (research in action) on meta-cognitive knowledge of primary school teachers in the Alborz Province. For realization of this objective, the following hypotheses were formulated.

**Main Hypothesis**

Action research is effective on enhancement of meta-cognitive knowledge of teachers.

**Minor Hypotheses**

1. Action research is effective on contextual knowledge of teachers.
2. Action research is effective on procedural knowledge of teachers.
3. Action research is effective on expressive knowledge of teachers.

**Method of Research**

Considering nature and objectives, this research was of the descriptive-applied type and its method was retrospective such that two groups of teachers were selected: a group that had undergone necessary action research training and had performed research (researcher teacher) which constituted the study group and a group of teachers that had not participated in action research training programs and did not perform research which constituted the comparison group. Trainings and research had been performed in the past. Therefore, the study was retrospective (comparative). Since causal-comparative research seeks to evaluate causal relationships without intervention in the independent variable, in this research we can name the predicting variable or cause as action research and meta-cognitive knowledge can be classified as the criteria variable or effect. Sampling was performed by multi-step cluster sampling. Instrument of data collection was a researcher formulated questionnaire with five degree Likert scale. To obtain a valid research questionnaire, it was designed considering the theoretical background of the research found in the literature and to evaluate what the researcher had in mind. Subsequently, in design of the questionnaire and determination of the questions, open discussion sessions with guiding and counseling professors and experts and informed specialists in the matter of issues related to the research and its standard format were held and the validity was confirmed. Internal consistency of the scale was also evaluated using the Cronbach’s alpha method. Considering the coefficient obtained (0/748), it can be concluded that the internal consistency between the questionnaire items was at an acceptable level. Thus, the final form of the questionnaire was organized and prepared for administration to the research sample group.
Statistical population consisted of all teachers occupied in primary schools of the province of Alborz in the 2015-2016 academic years. Therefore, sampling was performed from 797 schools with 7659 teachers. From among this number, 2645 individuals were researcher teachers and 5014 were non researcher teachers as recorded in the list of the department of education and development of the Alborz Province.

For determination of sample size, the Morgan sample size estimation table was used cited in Cohen and colleagues (2002). Therefore, the sample size was estimated at 590 individuals where based on the sample ratio, 185 and 405 individuals were selected as researcher and non researcher teachers, respectively. To test research hypotheses, in the section of comparison of researcher and non researcher teachers, analysis of variance for comparison of means of two independent groups was used. It should be noted that for simplicity and precision in the data analysis, social sciences statistical software SPSS-15 was used.

**Data Analysis**

In the following for data analysis, minor hypotheses were tested.

Hypothesis 1: Action research is effective on contextual knowledge of teachers.

Hypothesis 2: Action research is effective on procedural knowledge of teachers.

Hypothesis 3: Action research is effective on expressive knowledge of teachers.

**Table 1: Results of multivariable analysis of variance (MANOVA) for scores of expressive, contextual and procedural knowledge of researcher and non researcher teachers**

<table>
<thead>
<tr>
<th>Tests</th>
<th>Value</th>
<th>F</th>
<th>DF hypothesis</th>
<th>DF error</th>
<th>Significance level (p)</th>
<th>Test value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pillai trace</td>
<td>0.209</td>
<td>44.278</td>
<td>3</td>
<td>586</td>
<td>0.01</td>
<td>0.209</td>
</tr>
<tr>
<td>Wilks' lambda</td>
<td>0.791</td>
<td>44.278</td>
<td>3</td>
<td>586</td>
<td>0.01</td>
<td>0.209</td>
</tr>
<tr>
<td>Hotelling's trace</td>
<td>0.265</td>
<td>44.278</td>
<td>3</td>
<td>586</td>
<td>0.01</td>
<td>0.209</td>
</tr>
<tr>
<td>Roy's largest root</td>
<td>0.265</td>
<td>44.278</td>
<td>3</td>
<td>586</td>
<td>0.01</td>
<td>0.209</td>
</tr>
</tbody>
</table>

As shown in Table 1, the significance level of all tests show that meaningful difference exists between researcher and non researcher teachers at least with regards to one of the dependent variables (expressive, contextual and procedural knowledge) (p=0/010, F=44/278). For seeing the difference, the results of single variable analysis of variance in the context of MANOVA has been shown in Table 2.
Table 2: Results of single variable analysis of variance in the context of MANOVA for scores of expressive, contextual and procedural knowledge of researcher and non researcher teachers

<table>
<thead>
<tr>
<th>Variables</th>
<th>Sum of squares</th>
<th>Degrees of freedom</th>
<th>Mean squares</th>
<th>F</th>
<th>Significance level</th>
<th>Effect size</th>
<th>Test power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expressive knowledge</td>
<td>4560.002</td>
<td>1</td>
<td>4560.002</td>
<td>110.663</td>
<td>0.01</td>
<td>0.180</td>
<td>1</td>
</tr>
<tr>
<td>Contextual knowledge</td>
<td>1530.435</td>
<td>1</td>
<td>1530.435</td>
<td>94.179</td>
<td>0.01</td>
<td>0.157</td>
<td>1</td>
</tr>
<tr>
<td>Procedural knowledge</td>
<td>580.561</td>
<td>1</td>
<td>580.561</td>
<td>53.531</td>
<td>0.01</td>
<td>0.096</td>
<td>53.531</td>
</tr>
</tbody>
</table>

As evident in Table 2, significant difference exists between researcher and non researcher teachers with regards to expressive knowledge (p=0.001, F=11.066). Therefore, the first hypothesis is confirmed. In other words, considering the means of the two groups, researcher teachers have higher expressive knowledge compared to non researcher teachers.

Significant difference exists between researcher and non researcher teachers with regards to contextual knowledge (p=0.001, F=94.179). Therefore, the second hypothesis is confirmed. In other words, considering the means of the two groups, researcher teachers have higher contextual knowledge compared to non researcher teachers.

Significant difference exists between researcher and non researcher teachers with regards to procedural knowledge (p=0.001, F=53.531). Therefore, the third hypothesis is confirmed. In other words, considering the means of the two groups, researcher teachers have higher procedural knowledge compared to non researcher teachers.

Test of the main hypothesis: Action research is effective on enhancement of meta-cognitive knowledge of teachers.

Table 3: Results of analysis of covariance for effect of group membership on level of overall meta-cognitive scores

<table>
<thead>
<tr>
<th>Source of changes</th>
<th>Sum of squares</th>
<th>Degrees of freedom</th>
<th>Mean squares</th>
<th>F</th>
<th>Significance level</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>65477.344</td>
<td>1</td>
<td>65477.344</td>
<td>6037.323</td>
<td>0.001</td>
<td>0.923</td>
</tr>
<tr>
<td>Group membership</td>
<td>580.561</td>
<td>1</td>
<td>580.561</td>
<td>53.531</td>
<td>0.001</td>
<td>0.096</td>
</tr>
</tbody>
</table>
In continuation, the results of analysis of covariance with moderation of the effect of the pretest (Table 3) show that the effect of the group is completely meaningful (Sig=0.001, F=53.531). Considering the value for Eta squared, it can be stated that close to 10 percent of the scores of the respondents in the total meta-cognitive knowledge is explainable and interpretable based on the group. Therefore, we can confirm the effect of action research on meta-cognitive knowledge and estimate it at a relatively appropriate level.

**Discussion and Conclusion**

If the purpose of education and development is training learners to be able to take responsibility for their own learning, then it is first necessary that this trait is developed in instructors. Among the important reasons for lack of teaching meta-cognitive knowledge in the classroom and lack of emphasis on meta-cognitive strategies is that teachers have not been trained for these strategies or they have not been mastered by them. Considering the results of this research, based on effect of action research on meta-cognitive knowledge of teachers, superintendents of education and development should with quantitative and qualitative increase in action research training programs and presentation of action research plans, smoothen the context for growth of meta-cognitive knowledge in teachers. This finding agrees with the results of Cooper-Twamley and Wilkerson (2009). Cooper-Twamley and Wilkerson have evaluated the effect of action research on efficacy of teachers. Results of data analysis have shown that action research is influential on teachers’ efficacy and particularly on their method of instruction. The results of this research in the area of action research can have positive effects along with it, the most important of which can be mentioned as: success of any program depends on goals, implementation and evaluation. It cannot be expected that a program without precise objectives, design and implementation to have effective results along with it. Thus, the level of realization of objectives of the program for action research training in the important subject of meta-cognitive knowledge in the process of teaching was shown in this research and the objectives of teaching action research sessions relative to meta-cognitive knowledge in the process of teaching and training of teachers have been realized and this itself can be the source of appropriate planning in the section of teachers’ research. These findings agree with the results of Spates (2008) and Youngworth (2005). Spate performed a research in 2008 titled «Study of teacher encouragement and classroom retention in a general college» . In this research, based on the psychological structure of encouragement of «Alfred Adler», teaching communication strategies effective on retention in the classroom in a general college has been evaluated. Analyses show that two factors exist in accordance with principles of Adler’s theory which are search and confirmation of the student. Findings of this study show that behaviors such as truthfulness, trustworthiness, re-evaluation of progress, support and suggestions for improvement, personal attention, confirmation and verification and respect are considered encouragement for students in general college. Youngworth (2005) in a case study regarding the effects of action research of teachers on student progress showed that the research in addition to action led to growth of academic skills and progress in students. By way of this research the points of strength and weaknesses of challenges in line with objectives of
holding action research training sessions can be identified and evaluated. The result of this research can create evolutionary changes in planning and content of training sessions particularly in action research.

Use of action research as a way to find the solution to problems and a kind of innovation and increasing of knowledge helps individuals involved in research to gain access to skill and knowledge that they had not been familiar with previously. This leads to growth, maturity, change and evolution in the level of insight and thinking and is followed with creative ways.

Therefore, apparently action research with increasing deep perception and understanding and critical thinking skill helps growth of cognition and promotion of the level of information processing and ultimately increased meta-cognition. Meta-cognitive knowledge refers to the knowledge or belief about which factors and variables and which methods are effective on cognitive flow and consequences. In other words, meta-cognitive knowledge refers to that part of human knowledge that is related to cognitive matters. Considering the result of this research which shows significant higher meta-cognitive knowledge in researcher teachers, expanding their number is suggested. The most important suggestions based on the findings of this research for use in the field of education and development is as follows:

1. More research is performed in the context of methods of pedagogy by researcher teachers and the kind of probable meta-cognitive knowledge that they take advantage of most in the process of teaching.

2. Comparative and adaptive study of other educational and research systems is performed in the context of evaluating the situation of meta-cognitive knowledge of researcher teachers.

3. Study of the meta-cognitive situation of students of researcher and non researcher teachers is performed.

4. Organization and development of in service training programs for action research is realized.

5. Analysis of the content of material presented in action research training programs is planned based on meta-cognitive knowledge.

6. Planning is considered for better implementation of action research sessions.

7. Teaching and acculturation for consultation, collaboration and best use of information of researcher teachers is performed.

8. Training of human resources is one of the most fundamental and sustained ways of growth and advancement of a society. Teaching in addition to developing individuals’ talents and improving methods and techniques of work performance leads to acquisition of knowledge and increased skills and prevents expenditure wastage. Therefore, it is suggested that action research trainings for teachers are prioritized as one of the main activities in the plan for expansion of research in education and development.
9. For increasing level of meta-cognitive knowledge of teachers, in the action research plan, the importance of meta-cognition is expressed in a clearer way in the process of teaching and it is focused on the influence of action research on growth and expansion of meta-cognitive knowledge.
References

[In Persian]


