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ORIGINAL RESEARCH ARTICLE

Big Data Application in Providing an Effective Model of in-Serving Training Knowledge Workers of the Municipality

Sadegh Tayebi[1], Alaedin Etemad Ahari[2,*], Fariba Hanifi[3]

[1] *PhD student in Educational Management, Faculty of Educational Sciences and Counseling, Islamic Azad University, Roudhan Branch, Tehran, Iran. sadeghtayebi90@gmail.com, 0000-0002-7690-0852*
[2] *Assistant Professor, Curriculum Planning Department, Islamic Azad University, Roudhan Branch, Tehran, Iran (Corresponding Author), ala.etemad@gmail.com, 0000-0002-3206-8849*
[3] *Assistant Professor, Department of Educational Sciences, Islamic Azad University, Roudhan Branch, Tehran, Iran. f.hanifi95@gmail.com, 0000-0002-7449-5152*

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ABSTRACT

The research aims to apply big data to develop an effective education model for serving the knowledge workers of the municipality. The research method used was a mixed approach, incorporating both quantitative and qualitative methods. The components and dimensions of the subject were examined through documentary studies and interviews, and identified in educational content using thematic analysis techniques. To analyze the qualitative data, the theme analysis method was used with ATLAS.ti software, while genetic algorithm and meta-heuristic methods were employed in MINITAB software. The research tool used for data collection was a qualitative semi-structured interview conducted with 12 elites, experts, and qualified specialists from Karaj municipality. The sampling method in the qualitative part was non-probability and non-homogeneous purposeful, dependent on the criterion. In the quantitative part, it was simply random. Finally, the proposed model for in-service training for employees has been designed and validated. Six comprehensive themes (planning (comprehensive implementation), learner, teachers, content, educational environment, and infrastructure) were identified in the form of a paradigm model. The results showed that the VIS algorithm had the best performance. Algorithms CNSGA-II and MISA are both ranked second and have demonstrated nearly identical performances. The NSGA-II algorithm is ranked next. The NNIA algorithm ranks next in terms of performance, while the NRGA algorithm is assigned the worst performance. Organizational innovation, based on big data and organizational training, enhances the performance of knowledge workers and fosters creativity.

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1. Introduction

The increase in knowledge and the rapid transformations in technology have caused organizations to place training and improvement of human resources as the axis of development at the top of their plans (Yulianto et al., 2022). Measuring educational effectiveness for organizations seems problematic and controversial, but analysis of organizational big data has optimized this procedure (Vladescu et al., 2023). In most of today's organizations, there is a new necessity to evaluate the ability and educational capabilities of employees; Therefore, the purpose of educational evaluation is whether the training given to knowledge workers is compatible with their needs; and accordingly, if these pieces of training give organizations the necessary abilities to adapt to today's very changing conditions (Kater, 2013). In the process of big data analysis of educational evaluation, it is determined how much the recorded data related to the training of employees has increased their ability. The process of big data analysis determines the accuracy and transparency of organizational knowledge (Kelich-Lee, 2018). Mezirow (2003) states that successful education includes activities and results beyond the mere transfer of content and skills; Because the ultimate goal of a useful education is to create independence in learning, self-management, and self-motivation of learners in such a way that they can criticize and manage their activities (Faizi, 2016). The success of a training procedure is also done by analyzing the recorded data (Alipour et al., 2019).

Human Management Development Association and educational managers use education as a comprehensive and vital component in organizational and individual development (Alipour et al., 2018).

Naturally, the purpose of holding these training courses is to improve the knowledge and skills of the employees and finally to receive their feedback at work, which can be evaluated correctly by analyzing the real feedback by analyzing the database (Gautam & Wagner, 2016). Managers should pay attention to using the term organizational processes and creating a suitable performance evaluation system based on data-based decision-making, to spread effectiveness in all layers of the organization and among knowledge workers to ultimately have a successful and knowledge-oriented organization (Douglas et al. al., 2021.

Numerous studies and researches show that in recent years, organizations have paid more attention to in-service training of employees than in the past, and in line with the growth of the number of employees studying in the country's higher education system, in-service training, especially in the long-term spectrum of growth has been significant and has been welcomed by the academic staff of the organization. However, some issues such as the quality of in-service training for academic staff; lack of systematic writing regarding the design, implementation, and evaluation of in-service training programs; inconsistency between types of in-service training; The discontinuity of in-service training and the non-standard training of non-attendance training is a problem for knowledge workers in organizations, which needs to be dissected in the light of future research, and necessary measures should be taken to resolve them and, as a result, improve the quality of staff training. This important thing is achieved by changing the process of analyzing information related to employees based on big data. Therefore, this research seeks answers to the following questions:

What are the components of the effective model of in-service training for municipal knowledge workers?

Does the effective model of in-service education of municipal knowledge workers have the necessary validity?

How is the use of big data in providing an effective model of education while serving the knowledge employees of the municipality?

2. Literature Review

In-service training is one of the requirements for developing workforce skills and providing quality services (Armstrong, 2015) in developing countries where the lack of human resources is one of their constant

problems; The existence of a knowledge workforce can help the productivity and resilience of the organization (Ryan et al., 2022) and turn the organization into a learning organization (Chopani et al., 2023). The purpose of such training, which is planned at the organization's location, is to increase the general level of knowledge and educate knowledge workers (Magen-Nagar et al., 2019). This training can be done collectively or individually (Askarian, 2018). In today's era, training and development of knowledge human resources is the most important tool for the development of the learning organization (Pfoser et al, 2020; Chia, 2017). It can be said that the effectiveness of training is determined by examining the internal and external efficiency of the organizational training system (Shet et al., 2019). That is, if we can improve the internal and external efficiency of the organization's training system, the effectiveness of training is almost guaranteed (UMAR et al, 2020). Therefore, the integration of these pieces of training with professional and work changes is one of the future requirements of the workplace in organizations. It will be educational and research, these pieces of training will facilitate the acquisition of new knowledge and sciences (Akhtar et al., 2018; Deconinck, 2017). It is the skills and abilities that are needed to improve the performance of employees. Effectiveness means the extent to which the organization's goals are achieved with the effective use of resources based on big data, which has been very important for the organization's management (Arnett et al., 2018). In today's situation, organizational innovation based on knowledge is very important for the success and survival of companies in the competition, and one of the challenges of managers in today's organizations is the insufficient use of human knowledge resources, mental power, and potential capacities of existing knowledge human resources. Acquiring and disseminating knowledge through organizational training is a remarkably useful process for generating new ideas (Fernandez-Mesa & Alegre, 2015; Imran, 2013) considering the importance of identifying effective factors in the process of in-service training of employees. Researchers have tried to investigate this issue from different aspects, some of these research are listed in Table (1) as follows:

Table 1. *Summary of Literature Reviews*

Row	Scholars	approach	Methodology	Research Result
1	Yalpanian (2020)	Mixed	Analysis of the theme and method of structural equations	Three dimensions are organizational dimension, behavioral dimension, educational dimension and eight (8) components which include; The nature and content of the course, the course instructor, the atmosphere and environment of the course, the approach and style of the course, organizational factors, optimal analysis, attitude and motivation, follow-up actions, are effective and have a role in the training of human resources of Azad University.
2	Shakri Khalilabadi et al. (2020)	A quantitative correlational approach	Regression analysis	The implementation of in-service training courses for employees has been effective in increasing the performance of employees, their skills and abilities.
3	Mishkoh & Rezaei (2020)	A quantitative correlational approach	Regression analysis	In-service training needs of elementary teachers in the 2nd education region of Tehran at three general levels; Professional and organizational were identified.
4	Bazgir and Afshar (2019)	Qualitative approach	Theme analysis	Among the components of in-service training, order and cooperation had the greatest effect on the sense of competence, creativity, decision-making and skill in independence, cooperation, decision-making and skill in being effective, and creativity and order in the meaningfulness of managers' jobs.
5	Attaran & Rezaiezadeh (2019)	Qualitative approach	Theme analysis	The author realized the importance of the impact of improving the provision of in-service training courses with rich content, the use of expert instructors and the regular holding of training courses.
6	Hashemi Porpetkoi	Qualitative approach	Theme analysis	Dimensions such as learner, content, teacher preparation, evaluation practice, environment, executive requirements, evaluation of results and organization and management influenced the in-service training of managers.
7	(2019)	A quantitative correlational approach	Regression analysis	Validation of the proposed model (there is a logical relationship between the four components of the model, which include: employee training principles, employee training process, learning organization principles, human resource development).
8	Yulianto et al. (2022)	A quantitative	Regression analysis	The employee qualification variable has a significant effect on the work commitment of education and training, a significant effect on the performance

		correlational approach		of employees and training, a significant effect on the performance of employee training.
9	Kobriya & Benisi (2021)	Mixed	Analysis of the theme and method of structural equations	The main dimensions of the model are organizational factors, managerial factors, individual factors and structural factors, and 74 sub-components and the results of the research model show that the model used in the current study is appropriate.
10	Junejo et al. (2018)	Qualitative approach	Theme analysis	It showed the positive effect of educational programs in serving teachers.
11	Wang et al. (2015)	Qualitative approach	Theme analysis	Evaluating the performance and behaviors resulting from trainees' learning should be effective and discover latent knowledge to improve trainees' learning results.

3. Methodology

From the point of view of the purpose of this study, it is fundamental research that has been done with the aim of using big data to provide an effective model of education while serving the knowledge workers of the municipality. Based on the method of data collection, it is considered a cross-sectional survey. Based on the type of data, it is exploratory research that was done with qualitative-quantitative approaches. Based on the qualitative findings, a proposed model is presented. To show the effectiveness of the model based on the simulation in the software, the model has been tested and tested.The statistical population of this research includes theoretical experts (university professors) and experimental experts (managers and employees of Karaj municipality) in the qualitative part and presentation of the model, and in the data mining part, municipal databases. Using the purposeful sampling method, 12 people participated in this study. The main tool for collecting research data is the interview and information sheets. The interview was conducted in a semi-structured way and thematic analysis was used to identify the underlying categories of the research. After doing the coding process of 55 codes for basic themes; 29 organizing codes and finally 6 inclusive codes were extracted. Then meta-heuristic and genetic algorithms were used to analyze the model. The analysis of data in the qualitative phase has been done using ATLAS TI8 software, and then the analysis of educational data of the municipal organization has been done with a data mining technique. In this research on solving this multi-objective problem, several meta-heuristic multi-objective algorithms were considered in order to measure the reaction of these algorithms in dealing with such problems and to see what results these algorithms achieve in different conditions.

We selected three algorithms NSGA-II, CNSGA-II, and NRGA from the field of genetic algorithm and MISA, VIS, and NNIA algorithms from the field of productivity algorithm for this work.

Table 2. *Demographic characteristics of participants*

Row	Education	Field of Study	Work experience	Position
1	P.H.D	Education Management	24	University professor
2	P.H.D	Governmental Management	28	University professor
3	P.H.D	Education Management	26	University professor
4	MA	Human Resources Management	13	Education Headquarters of Karaj Municipality
5	MA	Governmental Management	19	Education Headquarters of Karaj Municipality
6	P.H.D	Governmental Management	24	University professor
7	P.H.D	Human resources Management	28	University professor
8	MA	Education Management	15	Education Headquarters of Karaj Municipality
9	MA	Education Management	14	Education Headquarters of Karaj Municipality
10	MA	Management	15	Education Headquarters of Karaj Municipality
11	MA	Education Management	16	Education Headquarters of Karaj Municipality
12	MA	Management	25	Education Headquarters of Karaj Municipality

4. Findings

In order for the researcher to get to know the depth and scope of the content of the data, repeated re-reading of the data and active reading of the data (searching for meanings and patterns) have been done. The results of the interviews were analyzed by thematic analysis method. The text of the interviews was entered into the software as a text file; It was studied many times and their key points were extracted from ATLAS TI8 software in the form of code. For this purpose, the text of the interviews was read and reviewed several times. The criterion for achieving theoretical saturation has been achieving repetition in extracted codes. In the stage of coding the basic themes, 55 codes were identified. Finally, through the classification of codes, we found 29 organizing themes and 6 overarching themes. The themes of the effective factors of in-service training, extracted from the interviews using the theme analysis method, are presented in Table (3):

Table 3. *Effectiveness of in-service training based on content analysis*

Basic themes	Organizing themes	Overarching themes
Training courses are designed according to job needs	Compliance with occupational and professional needs	Planning (comprehensive implementation)
Training courses are designed according to the specialized needs of employees		
Designing training courses based on the mission of the organization	Design based on the goals of the organization	
Designing training courses based on the mission of the organization		
Notification based on the topic	Notification method	
Notification based on location		
Notification based on time		
Effective measures to provide quality training courses	Effective measures	
The results of training courses are used in decisions	Use the results	
The results of training courses are used in planning		
Passing training courses is essential in the career advancement of employees	The effect of training courses on the career advancement of employees	learner
In training courses, the level of motivation plays an effective role in the quality of employees' learning	Training history of employees	
In training courses, the level of prior motivation of learners plays an effective role in the quality of employees' learning.		
In training courses, the students' previous knowledge plays an effective role in the quality of employees' learning.		
In training courses, the previous skills of learners play an effective role in the quality of employees' learning.		
Participation in training courses is effective and useful in the way employees work.	Performance and empowerment of employees	
Participation in employee empowerment training courses is effective and useful.		
In training courses, employees are separated in order to provide training according to the type of job.	Individual training	
In training courses, employees are separated in order to provide training according to the job description.		
Successful completion of training courses is effective in salary promotion.	Successful completion of employee training courses Promotion of employee salaries and benefits	
Successful completion of training courses is effective in the amount of employee benefits.		
Mastery in teaching	mastery	Teachers
Dominating the class		
Suitability of the evaluation method with the course content		
The suitability of the social behavior of the lecturer with the capacity of the learners in terms of gender		

Basic themes	Organizing themes	Overarching themes
The suitability of the social behavior of the teacher with the capacity of the learners in terms of age	Suitability of the evaluation method with the course content Proportion of social behavior	
The suitability of the social behavior of the teacher with the capacity of the learners in terms of education		
Motivating learners through participation in discussions		
Optimum use of new equipment	Collaborative teaching Use new tools	
Optimal use of technology		
To be able to use its contents in performing tasks	Usability	content
Adequate standards should be considered for the training course		
The novelty of the educational chapters	Quality New and up-to-date content	
Newness of educational materials		
Up-to-date course materials		
Being up-to-date on the educational chapter		
Suitability of educational space with educational issues		
Use of Internet technology and combining virtual training with face-to-face	Attention to the educational environment	
Providing the conditions to check the results in the same environment	Mixed and virtual content	Learning environment
In terms of light and brightness	Applying educational findings in the educational environment Quality of place	
Proper ventilation		
Good sound		
Attention to the type of characteristics of people in sitting	How to deploy participants	
How to place participants in training courses according to gender		
How to place participants in training courses according to age		
How to place participants in training courses, according to the job position		
Attractive		
to suite		
Teaching methods are suitable for providing optimal training to employees	The atmosphere of the educational environment	Overarching themes Planning (comprehensive implementation)
The administrative administrative structure of the organization has sufficient potential in support for providing trainings		
Appropriate social structure	Administrative structure Management structure Cultural structure	
Appropriate value structure		
To what extent does the culture of employees support learning?		
The economic structure of the organization is optimal for financial support in providing training to employees.		
Appropriate software and hardware (teaching and learning systems) are used in providing training.		

The initial model of the effectiveness of in-service training is shown in Figure 1.

Considering that the criteria considered for comparing algorithms are 6 components of planning (comprehensive implementation), learner, teachers, content, educational environment, infrastructure and the calculations made to compare them are very large, for example, only the full description of a criterion It is enough to mention only the final results of the remaining criteria. Here, the criterion of the number of non-defeated answers was considered. First, we must prove the hypothesis of the equality of the average number of non-defeated solutions by algorithms, which is expressed as follows:

$$\begin{cases} H_0 : \mu_{NSGA-II} = \mu_{CNSGA-II} = \mu_{NRGA} = \mu_{MISA} = \mu_{VIS} = \mu_{NNIA} \\ H_1 : \text{At least one of the algorithms has a different average from the rest of the algorithms.} \end{cases}$$

In this hypothesis, it states that the average obtained from the algorithms are not significantly different from each other, but it states that at least one of the algorithms has a different average from the rest of the algorithms.

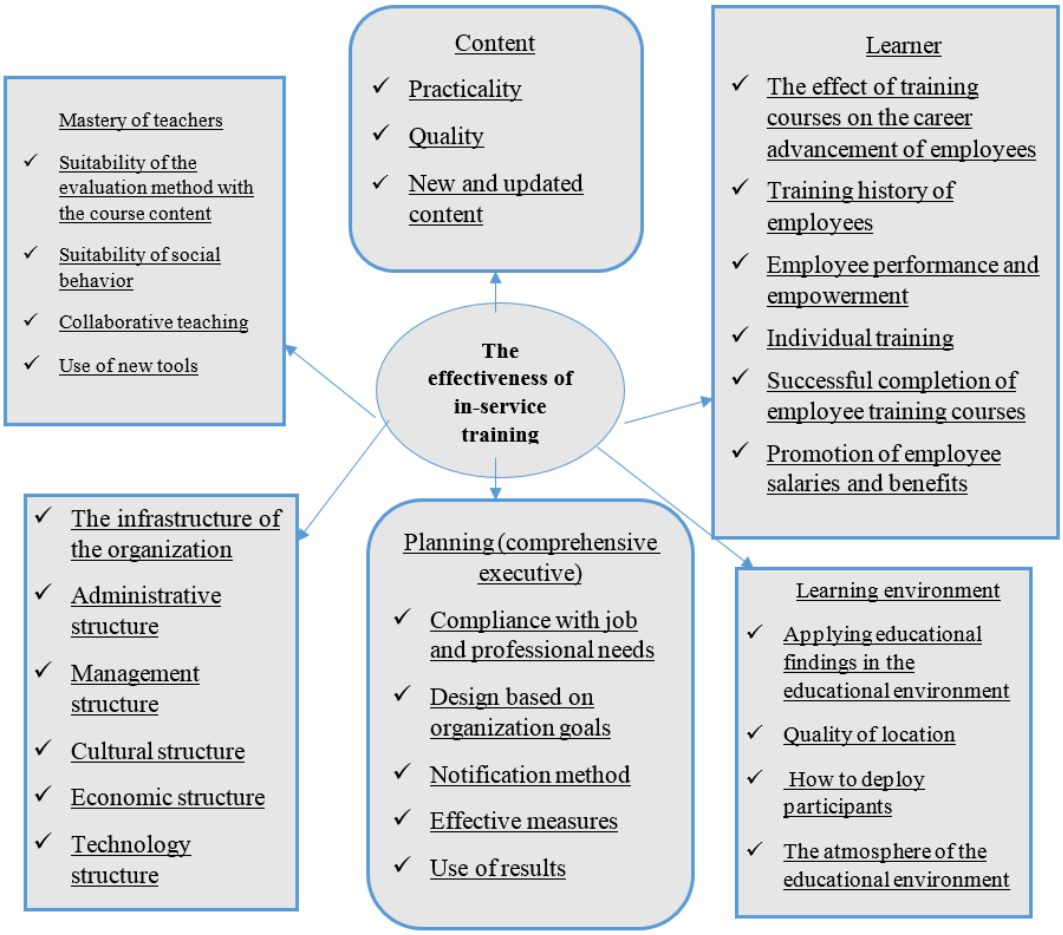

Figure 1. *Effective model of in-service training*

To test this hypothesis, one-way analysis of variance (ANOVA) was used and the results obtained by Minitab software are shown in Figure (2). As it is clear, at the 95% confidence level, the hypothesis is rejected and the hypothesis is confirmed. This means that there is a significant difference between the algorithms in terms of the number of non-defeated solutions.

One-way ANOVA: Number(Number of Pareto Archive) versus Algorithm

```
Source      DF      SS     MS      F      P
Algorithm    5  159684  31937  34.93  0.000
Error      174  159071    914
Total      179  318755

S = 30.24   R-Sq = 50.10%   R-Sq(adj) = 48.66%

Level                N    Mean  StDev
MISA                30   99.91   0.41
NNIA                30   94.78   8.72
NRGA                30   70.03  15.04
NSGAII              30  105.51  30.57
CNSGAII             30  123.55  36.49
VIS                 30  166.46  54.01
                    Individual 95% CIs For Mean Based on
                    Pooled StDev
Level                +---------+---------+---------+---------
MISA                           (--*---)
NNIA                         (---*--)
NRGA                 (--*---)
NSGAII                           (--*---)
CNSGAII                                (--*---)
VIS                                                (--*---)
```

Figure 2. *The result obtained from the analysis of variance for the measure of the number of non-dominant answers*

Now that it is clear that there is a significant difference between the algorithms, the algorithms should be evaluated in comparison with each other and it should be determined which algorithms have this significant difference and to what extent this difference is. Algorithms should also be ranked in terms of effectiveness. Tukey's test, by grouping the algorithms in a binary way, compares the algorithms with each other in terms of the significant difference and its amount. Figure 3 shows the results obtained from Tukey's test in terms of the number of non-defeated answers.

As shown in figure (3), Tukey's test compares algorithms in five stages and two by two, and it does it in such a way that it first compares the first algorithm with the second to the last algorithm. Then it compares the second algorithm with the third algorithm until the end and so on. In this way, all algorithms are compared with each other. In any comparison, it can be said that passing any distance from the zero-point means that that algorithm does not have a significant difference with the compared algorithm at that level of confidence. The grouping table shows that group A includes the VIS algorithm. Also, group B includes CNSGA-II and NSGA-II algorithms. While group C includes NSGA-II, MISA and NNIA algorithms. And finally, the NRGA algorithm belongs to group D. As a result, it can be said that at the 95% confidence level, the performance of the algorithms from the point of view of the number of non-defeated solutions is shown in Table (4). Of course, schematically, this comparison is shown more prominently in Figure 4. Based on the regression assumptions, the model has been implemented, so it is confirmed in terms of validity.

```
Grouping Information Using Tukey Method

Algorithm            N    Mean  Grouping
VIS                 30  166.46  A
CNSGAII             30  123.55    B
NSGAII              30  105.51    B C
MISA                30   99.91      C
NNIA                30   94.78      C
NRGA                30   70.03        D

Means that do not share a letter are significantly different.


Tukey 95% Simultaneous Confidence Intervals
All Pairwise Comparisons among Levels of Algorithm

Individual confidence level = 99.56%


Algorithm = MISA subtracted from:

Algorithm            Lower  Center  Upper
NNIA                -27.66   -5.13  17.39
NRGA                -52.41  -29.89  -7.36
NSGAII              -16.92    5.60  28.12
CNSGAII               1.12   23.64  46.16
VIS                  44.02   66.55  89.07

Algorithm              +---------+---------+---------+---------
NNIA                                  (---*---)
NRGA                             (---*---)
NSGAII                                (---*---)
CNSGAII                                  (---*---)
VIS                                           (---*---)
                       +---------+---------+---------+---------
                     -120       -60         0        60


Algorithm = NNIA subtracted from:

Algorithm            Lower  Center  Upper
NRGA                -47.28  -24.75  -2.23
NSGAII              -11.79   10.73  33.26
CNSGAII               6.25   28.77  51.30
VIS                  49.16   71.68  94.20

Algorithm              +---------+---------+---------+---------
NRGA                             (---*---)
NSGAII                                (---*---)
CNSGAII                                  (---*---)
VIS                                           (---*---)
                       +---------+---------+---------+---------
                     -120       -60         0        60


Algorithm = NRGA subtracted from:

Algorithm           Lower  Center   Upper
NSGAII              12.96   35.49   58.01
CNSGAII             31.00   53.53   76.05
VIS                 73.91   96.43  118.96

Algorithm              +---------+---------+---------+---------
NSGAII                                (---*---)
CNSGAII                                  (---*---)
VIS                                                (---*---)
                       +---------+---------+---------+---------
                     -120       -60         0        60


Algorithm = NSGAII subtracted from:

Algorithm           Lower  Center  Upper
CNSGAII             -4.48   18.04  40.56
VIS                 38.42   60.95  83.47

Algorithm              +---------+---------+---------+---------
CNSGAII                               (---*---)
VIS                                        (---*---)
                       +---------+---------+---------+---------
                     -120       -60         0        60


Algorithm = NSGAII-Constrained subtracted from:

Algorithm  Lower  Center  Upper     +---------+---------+---------+----
-----
VIS        20.38   42.91  65.43                              (---*---)
                                    +---------+---------+---------+----
-----
```

Figure 3. *The result obtained from Tukey's test for the criterion of the number of non-defeated answers*

Table 4. *Algorithms grouping based on the criterion of the number of non-defeated solutions*

Algorithm	Algorithm Rank
VIS	1
CNSGA-II	2
NSGA-II	3
MISA NNIA	4
NRGA	5

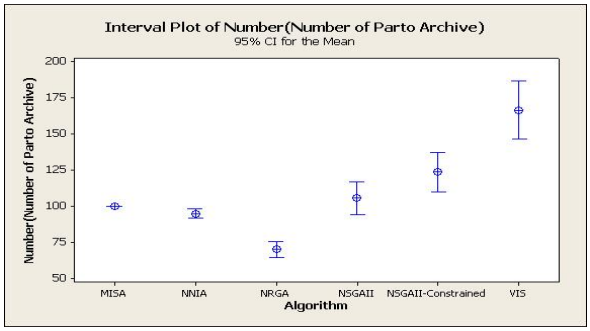

Figure 4. *The result obtained from the analysis of variance for the number of non-dominant answers*

Similarly, the same analysis was done for all criteria and also these criteria were calculated for all modes of hard problems, simple problems, small problems and big problems, thus the performance of algorithms in different criteria is determined in general. It is up to the decision maker which criteria is more important to him and to use an algorithm that has performed well in that criteria. But if all the criteria are equally important for the decision maker, the average of all the criteria can be considered for the algorithms and the rank of that algorithm can be obtained according to all the criteria, the result of which can be seen in Table 5.

Table 5. *Average criteria of algorithms and ranking of algorithms based on it*

Final rank	Algorithm rank according to average criteria					Average of criteria					Algorithm
	big	Little	hard	simple	Total	big	Little		simple	Total	
3.4	3	4	4	3	3	1.625	2.125	3.4	2.25	2.125	NSGAII
2.4	2	3	3	2	2	1.375	1.75	2.4	2	1.625	CNSGAII
5	5	5	5	5	5	2.25	2.625	5	3.25	2.625	NRGA
4	4	4	4	4	4	1.875	2.125	4	2.75	2.25	NNIA
1	1	1	1	1	1	1.125	1.25	1	1.625	1.25	VIS
2.4	3	2	2	3	2	1.625	1.5	2.4	2.25	1.625	MISA

As can be seen in Table 5, the VIS algorithm performed best. Algorithms CNSGA-II and MISA are almost ranked second and have shown almost similar performances. NSGA-II algorithm is ranked next. The NNIA algorithm is in the next position in terms of performance, and the worst performance is assigned to the NRGA algorithm.

5. Discussion

Based on the relationships between the concepts, 6 comprehensive themes include codes: planning (comprehensive implementation), learner, teachers, content, educational environment, infrastructure. Of course, it can be said that at this stage, articles have been used as a new input that helps to better categorize the codes, and the issues that could be placed in the same categories in terms of theory and definition have been placed in a more relevant category based on the article, and the codes that have a similar meaning in the format A code has been expressed, and finally the following classification is provided through the Atlas software. The theme of planning (comprehensive implementation) includes five subcategories (codes) of compliance with job and professional needs, design based on goals, organization's mission, information method, effective measures and use of evaluation results, which are based on the researches of Wang et al. (2015) and Fernández-Mesa et al. (2015) is the same.

An educational program is a plan that contains policies, goals, strategies, and an action plan related to the development of a system or an educational institution in a certain period of time, in which the methods of implementation and evaluation, as well as the resources needed to realize the policies and goals, are predicted.

The teachers' conditions include 5 subcategories (codes) of mastery, appropriateness of evaluation method with course content, appropriateness of social behavior, cooperative teaching, use of new tools. With his skills in teaching content and class management, the teacher can influence

people's innovation and creativity. Jain et al. (2021) obtained congruent results. The theme of the training content also includes 5 subcategories (codes) of practicality, quality and attention to the educational environment, mixed and virtual content, new and up-to-date content.

The results obtained are in line with Junejo et al. (2018)'s study. In explaining this issue, it can be said that the happier and more pleasant the environment is, the more active the mind is and the more creativity it increases. The educational environment with the subcategory (organizing topics) of the venue, the quality of the place, the way of settling the participants, the application of educational findings in the educational environment, the atmosphere of the educational environment.

The quality of the place, the placement of the participants, the application of educational findings in the educational environment and the atmosphere of the educational environment affect innovation and creativity.

The infrastructure of the organization, which includes 5 organizational themes of administrative structure, management structure, cultural structure, economic structure, information technology infrastructure, and the last comprehensive theme of service innovation, which includes 5 subgroups of learning approaches and methods, dynamic learning, structure appropriate to creativity, New and up-to-date teaching materials, creative methods and dynamic management administrative structure. The results obtained by Mohanty et al. (2019) are consistent.

6. Conclusion

In explaining this result, it can be said that organizational change is defined as the adoption of a new thought or behavior by the organization, but organizational innovation based on big data is the adoption of an idea or behavior that is suitable for the type of organization's situation, the market, and the overall environment of the new organization. and the more organizational conditions in terms of structure or employees are receptive to change and act more flexibly, the more innovative and creative it is. Therefore, it is suggested:

ϖ Increasing the efficiency of employees by creating information and working knowledge

ϖ Formulating the goals of training courses and making them available to all employees

ϖ Increasing the growth of employee efficiency, according to the occupied positions

ϖ Cultivating awareness and alertness towards the country's social, economic and administrative issues and difficulties ϖ Justification of employees at different levels in order to meet behavioral executive needs

ϖ Up-to-date maintenance of employee information along with technological developments

ϖ Creating visionary changes in the organization.

ϖ Expanding the organization and increasing current capital

ϖ Completing management and leadership at different levels of the organization

ϖ Determining goals and setting educational programs with the help of educational experts

ϖ Getting help from human resources of the organization, educational experts and educational administration from experts outside the organization

ϖ Pursuing the implementation of training for human resources who have not completed the training course

ϖ Motivating human resources to effectively participate in in-service courses

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References

Akhtar, C. S., Awan, S. H., Naveed, S., & Ismail, K. (2018). A comparative study of the

application of systems thinking in achieving organizational effectiveness in Malaysian and Pakistani Banks. *International Business Review*, 27(4): 767-776. https://doi.org/10.1016/j.ibusrev.2018.01.001

Alipour, K. Imani Galah Prdsry, M. N., Zolfaghari Zafarani, R. (2019), Provide a model to improve the efficiency of human resource training in Islamic Azad University, New Approaches in Educational Administration, 10 (37), 1-14. [in Persian].

Armstrong, M. (2015). Armstrong's essential human resource management practice. London: Kogan Page.

Arnett, D. B., Sandvik, I. L., & Sandvik, K. (2018). Two paths to organizational effectiveness-Product advantage and life-cycle flexibility. *Journal of Business Research*, 84: 285-292. https://doi.org/10.1016/j.jbusres.2017.11.010

Askarian, M. (2018). *Human Resources Management, Recruitment, Hiring, Maintenance*, Second Edition, Tehran, Publisher: Amir Kabir. [in Persian]

Attaran, A. Rezaizadeh M. (2019). A study of the effect of in-service training on the performance of the employees of Iran Khodro Sapco Design and Engineering and Parts Supply Company. *Scientific Journal of New Research Approaches in Management and Accounting*, 4, 112-114. [in Persian]

Bazgir, T. Afshar, H. (2019). Determining the effectiveness of in-service training courses on empowering principals of elementary schools in Tehran. *New strategies of teacher training*, 6(10), 63-87. [in Persian]

Chia, R. (2017). A process-philosophical understanding of organizational learning as "wayfinding": Process, practices and sensitivity to environmental affordances. *The Learning Organization*. https://doi.org/10.1108/TLO-11-2016-0083

Choopani, A., Vatankhah, S., & Aryankhesal, A. (2023). Health Workforce Development Policies in Iran: A Study of In-service Training Policies. Health Scope, 12(2). https://doi.org/10.5812/jhealthscope-132662

Deconinck J. (2017). The effect of organizational justice, perceived organizational support, and perceived supervisor support on marketing employee's level of trust, Journal of Business Research, 63(2017)1349-1355. https://doi.org/10.1016/j.jbusres.2010.01.003

Douglas, S., Merritt, D. R., Roberts, R., & Watkins, D. (2021). Systemic leadership development: impact on organizational effectiveness. *International Journal of Organizational analysis* https://doi.org/10.1108/IJOA-05-2020-2184

Faizi, F. (2016). transformational learning, transformation in learning. *The growth of educational technology*, 33(4). [in Persian]

Fernández-Mesa, A., & Alegre, J. (2015). Entrepreneurial orientation and export intensity: Examining the interplay of organizational learning and innovation. *International business review*, *24*(1), 148-156. https://doi.org/10.1016/j.ibusrev.2014.07.004

Gautam T Wagner U. (2016). Organizational identification and organizational commitment: Distinct aspects of two related concepts, *Asian Journal of Social Psychology*, 7, 301-3015. https://doi.org/10.1111/j.1467-839X.2004.00150.x

Hashemi Porpetkoi, A., Sohri, A., Mohammad Khani, K., Mohammad Davodi, A., & Nazim, F. (2019). Presenting a model of the effectiveness of in-service training for primary education managers in Hormozgan province. *Psychological Science Quarterly*, 75-745. [in Persian]

Imran A, (2013), The Effect of Training on Employee Performance, *European Journal of Business and Management*, 5 (4), 137-147.

Jain, G., Sharma, N., & Shrivastava, A. (2021). Enhancing training effectiveness for organizations through blockchain-enabled training effectiveness measurement (BETEM). *Journal of Organizational Change Management.* https://doi.org/10.1108/JOCM-10-2020-0303

Junejo, M. I., Sarwar, S., & Ahmed, R. R. (2018). Impact of in-service training on performance of teachers a case of STEVTA Karachi region. *International Journal of Experiential Learning & Case Studies*, 2(2), 50-60.

Kater, N. (2013). The Perceived Value of the Return on Investment of Accounting

Leadership for Employers. University of Pretoria.

Khilichli, B. (2018). *Excellence of human resources: evaluation of planning and improvement*. Tehran: Institute of Productivity and Human Resources. [in Persian]

Magen-Nagar, N., & Firstater, E. (2019). The obstacles to ICT implementation in the kindergarten environment: Kindergarten teachers' beliefs. *Journal of Research in Childhood Education*, *33*(2), 165-179. https://doi.org/10.1080/02568543.2019.1577769

Mezirow, J. (2003). Transformative learning as discourse. *Journal of Transformative Education*.1(1),58-63. https://doi.org/10.1177/1541344603252172

Mishkoh, Z., & Rezaei, Sadegh. (2020). Assessing the needs of in-service training of primary school teachers in Tehran's 2nd district. *Internship studies in teacher training*, 1(4), 111-136. [in Persian]

Mohanty, P. C., Dash, M., Dash, M., & Das, S. (2019). A study on factors influencing training effectiveness. *Revista Espacios*, *40*, 7-15.

Pfoser, S., Putz, L. M., & Jung, E. (2020). Recommendations for human resources development in Danube inland ports. In *International Conference on Dynamics in Logistics* (pp. 3-20). Springer, Cham. https://doi.org/10.1007/978-3-030-44783-0_1

Rezaei, B., & Rezaei, M. (2019). Examining the understanding and expression of names and the reliability of two visual tests of understanding and expression of names in educable mentally retarded children of Shahrhamadan. *Ibn Sina Clinical Medicine Journal*, 27, 45-52. [in Persian] https://doi.org/10.29252/ajcm.27.1.45

Ryan, M., Alliott, O., & Ikeda, E. (2022). Features of effective staff training programmes within school-based interventions targeting student activity behaviour: a systematic review and meta-analysis. *Int J Behav Nutr Phys Act* 19, 125. https://doi.org/10.1186/s12966-022-01361-6

Shakri Khalilabad, F., Gholami, H., Salehian, M., Bagharian Farutagha, F. (2021). In-service training of employees, an important approach to promote and develop organizational human capital. *Horizon of Medical Science Education Development*, 13, 41-60. [in Persian]

Shet, S. V., Patil, S. V., & Chandawarkar, M. R. (2019). Competency based superior performance and organizational effectiveness, *International Journal of Productivity and performance management*. 68(4): 753-773. https://doi.org/10.1108/IJPPM-03-2018-0128

UMAR, A., TAMSAH, H., Mattalatta, M., Baharuddin, B., & LATIEF R, A. (2020). Training-effectiveness and team-performance in public organization. *The Journal of Asian Finance, Economics, and Business*, 7(11), 1021-1031. https://doi.org/10.13106/jafeb.2020.vol7.no11.1021

Vladescu, J., & Marano, K. (2023). *Staff Training*. In: Matson, J.L. (eds) Handbook of Applied Behavior Analysis. Autism and Child Psychopathology Series. Springer, Cham. https://doi.org/10.1007/978-3-031-19964-6_35

Wang, J., Lin, Y. I., & Hou, S. Y. (2015). A data mining approach for training evaluation in simulation-based training. *Computers & Industrial Engineering*, *80*, 171-180. https://doi.org/10.1016/j.cie.2014.12.008

Yalpanian, B., Nazim, F., & Karimzadeh, P. (2020). Identifying the effective factors on human resources training in Islamic Azad University and providing the ideal model (Study case: Islamic Azad Universities of Tehran province). *Educational Management Innovations*, 16(4), 121-135. [in Persian] https://doi.org/10.35870/ijmsit.v2i1.460

Yulianto, E., Sanosra, A., & Herlambang, T. (2022). Analysis of The Effect of Competence and Education and Training on Employee Performance Through Work Commitment as Intervening Variable (Study at the East Java Provincial Forestry Service). *International Journal of Management Science and Information Technology*, *2*(1), 12–18.