Research on Influencing Factors of Kindergarten Teachers’ Professional Development Based on AHP Hierarchical Analysis

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Abstract
In order to investigate the influencing factors of kindergarten teachers' professional development, the AHP hierarchical analysis is researched in this paper. The comprehensive quality evaluation of kindergarten teachers is a complex systematic project, which is the establishment of more complete and scientific evaluation indicators, and the use of effective evaluation model. Kindergarten teacher evaluation is referred to preschool education teachers as the evaluation object, the correct guidance of educational values, school psychological education and preschool education teachers should undertake the task according to the target in accordance with the procedures, the use of scientific methods, the help of modern technology, extensive collection of information, the value of the individual quality of preschool teachers to improve teachers’ work to strengthen the leadership of the school, professional development and construction management. Only by this means, it can strengthen and improve the decision-making process which provides the basis for teachers. The experiment result shows the AHP hierarchical analysis method is effective.

Keywords: Influencing factor, Kindergarten, Teachers’ professional development, AHP hierarchical analysis

1. Introduction

The State Council promulgated the “national medium and long term educational reform and development plan outline (2010-2020 years)” in July 2010, which included the development of preschool education in the list of national development tasks in the past ten years. In November 2010, some opinions on the development of preschool education in the State Council were published”. The popularization of preschool education and the improvement of the quality of preschool education in rural areas have been the most concerned issues in recent years. These two documents pointed out the direction of preschool education development, and fundamentally promoted the quality of preschool education. Under such a request, kindergarten teachers must have a more understanding of children's physical and mental development rules, more actively inspect and reflect on preschool teachers' teaching activities, and pay more attention to their own professional development. Therefore, the teaching practice wisdom of kindergarten teachers is the best helper. A great deal of research has been done on the wisdom of teachers, teaching practice and intelligent teaching. Due to different cultural beliefs, different times background and different life experiences, researchers on the course have different views on practical wisdom. But they all agree that, for teachers, practical wisdom plays a vital role in the teaching and the career development (Neokleous, 2015; Avdeyeva, 2015).

The essence of kindergarten teachers' practical wisdom education embodies the life meaning of preschool teachers and promotes the development of children. On this basis, it can be affirmed that practical wisdom education is a kind of knowledge or ability formed in kindergarten teaching activities, which is used to guide children's knowledge acquisition and personality formation (Mendive, 2016). This ability can help kindergarten teachers organize teaching activities, deal with unexpected problems, and better reflect the teaching progress. In this study, the practical wisdom of kindergarten teachers has six characteristics: practical, creative, generative, reflective, implicit and transferable. Positive understanding in the teaching activities, and reflect the implementation of kindergarten teachers' teaching practice wisdom, this study discusses the connotation of kindergarten teachers’ wisdom of teaching practice, based on the concept and characteristics of kindergarten teachers' teaching practice, pointed out that the content of wisdom, situation and localization has three dimensions. At the same time, teachers, children and events constitute the three element structure. The application of the wisdom of kindergarten teachers' teaching practice is to make the real localization, contextualization and idealization, and connect with teachers, children and events. It embodies teachers' education belief, creates teaching environment, designs teaching activities, and deals with children's personal events. Teachers' teaching practice wisdom is closely related to personal life experience. It is through a variety of calendars trying to harvest in their long lived experiences. It serves as a bridge between life and work, connecting the two. The two parts are development, change and reconstruction. Although there are many ways for kindergarten teaching to bring into play the wisdom of teaching practice, the most basic cycle of any structure is "building reflection reconstruction". The development process can be divided into two stages: pre service training and in-service training. Figure 1 shows the schematic diagram of teacher evaluation model (Coughlin, 2015; Early, 2017).
Therefore, the existing problems in the practice of kindergarten teacher evaluation should take a scientific attitude, review and reflection, from kindergarten teacher evaluation system research activities, the essential characteristics of internal law, fully understand and grasp the point of view, evaluation of kindergarten teachers, kindergarten teachers to form a perfect evaluation system theory. In a word, the research on kindergarten teacher evaluation not only provides a new idea for the development of school psychological education evaluation theory and practice, but also enriches and develops the theory of school psychological education evaluation (Bowne, 2015; Hur, 2015).

Based on the cluster analysis model and AHP hierarchical analysis, pedagogy, psychology, management and system science is used as the theoretical basis, this paper systematically studies the current evaluation system of kindergarten teachers in China by using a variety of research methods. Through the research, find out the existing problems of kindergarten teacher evaluation system, and analyze the causes and characteristics of kindergarten teacher evaluation mainly reveals the inherent law and; on the basis of previous research, put forward the basis and principle of the evaluation system of kindergarten teachers, constructs the evaluation index system of preschool teachers in primary school.

![Figure 1. Schematic diagram of teacher evaluation model](image1)

### 2. Key technologies involved in system design process

#### 2.1. Fuzzy clustering analysis technique

Clustering analysis refers to the analysis of the process of grouping a set of physical or abstract objects into similar classes. To evaluate the quality of clustering results is another important stage, clustering is a management program, there is no objective criteria to evaluate the clustering results, it is a kind of effective evaluation, the index of general geometric properties, including internal separation between class and class coupling, the quality is generally to evaluate the clustering results, effective index in the determination of the number of the class is often played an important role, the best value of effective index is expected to get from the real number, a common class number is decided to select the optimum values for a particular class of effective index, is the validity of the standard index the real number of this index can, many existing standards for separate data set can be obtained very good results, but for the complex number Data sets, however, usually do not work, for example, for a class of overlapping classes. The schematic diagram of fuzzy clustering analysis is shown in Figure 2. Cluster analysis to achieve the core code listed as follows.

![Figure 2. Schematic diagram of cluster analysis](image2)
2.2 Data mining technology

It is a step in database knowledge discovery (KDD). Data mining generally refers to the process of hiding information from a large amount of data. Data mining is often associated with computer science, statistics, and through online analysis processing, information retrieval, machine learning, expert system (depending on the old rules of thumb) and pattern recognition and many other methods to achieve the above objectives. Need is the mother of invention. In recent years, data mining has attracted a great deal of attention in the information industry, the main reason is that there are a large number of data, can be widely used, and the urgent need to convert these data into useful information and knowledge. Access to information and knowledge can be widely used in a variety of applications, including business management, production control, market analysis, engineering design and scientific exploration, etc.. The experimental results show that the improved Apriori algorithm has greatly improved the efficiency of the operation; the rules can also be used to help the school management departments to carry out targeted poverty. Apriori schematic diagram shown in Figure 3, Apriori algorithm to achieve the core code listed as follows. Apriori algorithm is widely used in the field of mobile communication. Mobile value-added services have gradually become the most dynamic, the most potential, and the most attractive business in the mobile communications market. With the recovery of the industry, more and more value-added services show a strong momentum of development, showing a variety of applications, marketing, brand management, centralized management, deepening the characteristics of cooperation. In view of this trend, Apriori algorithm is widely used in association rule mining. Based on the Web data warehouse platform for value-added services of a telecom operator is under construction, the survey data from the mobile value-added business of mining related treatment, so as to obtain useful information about user behavior indirectly reflect the market dynamic characteristics and demand, has very important reference value in guiding the information operator’s business operations and the decision of the service provider.
for row in samples:
    for item in row:
        if item not in fre_list:
            fre_list.append(item)
            new_dict[item] = 1
        else:
            new_dict[item] = new_dict[item] + 1
fre_list.sort()
print "candidate set:"
print_dict(new_dict)
for key in fre_list:
    if new_dict[key] < min_support:
        del new_dict[key]
print "after pruning:"
print_dict(new_dict)
record_list = fre_list
record_dict = record_dict
def get_candidateset():

Figure 3. Schematic diagram of Apriori algorithm

2.3 Evaluation of comprehensive quality of Kindergarten teachers

Kindergarten teachers are the main body of basic education, the disseminators of human civilization and the soul of mankind. The labor value of kindergarten teachers is reflected in the shaping of students' personality and open mind. Therefore, the comprehensive quality of kindergarten teachers should start from five aspects, namely, moral quality, professional quality, humanistic quality, academic quality and innovative quality. Teachers' moral quality is called teacher's morality, which is social morality. Teachers' professional ethics, including teachers' professional value orientation, professional emotion, professional principles and norms, etc., "The kindergarten teachers who are teachers of normal, teacher's occupation characteristics and occupation characteristics are summarized, but also for the modern teachers' personality, teachers' moral character always reflected in the teacher's noble personality, has inspired the power to produce the effect on students' subtle pursuit of life and personality, such as celebrities in the world Harvard University" pursuit of truth, independent thinking, pay attention to people "is not a slogan, but the power of spirit, the true ruler of every Harvard teachers have to measure their own behavior and moral standards for the rulers of the spirit of the Harvard, Harvard at the same time, great teacher, great example of the role, also influenced generations of Harvard in the world, causing the G to revive the shock, unremitting pursuit. Educational innovation has become one of the hottest topics in Chinese educational circles. The essence of educational innovation is theoretical innovation and academic innovation. Innovation is one of the important qualities of kindergarten teachers. The innovative quality of teachers includes innovation ability, creative thinking ability and innovation ability. The positive thinking in middle school, the combination of academic research and teaching, the interaction between teachers and students are beneficial to the stimulation of innovation.

3. The establishment of evaluation index system of kindergarten teachers' comprehensive quality
Teacher evaluation is an important function of kindergarten human resource management, and it is an important basis for kindergarten teachers to motivate, promote, train and dismiss human resources management activities. Scientific and reasonable evaluation results can play a role in communication, coordination and control. The evaluation of kindergarten teachers’ comprehensive quality refers to the performance of teachers in their work. It is the standard of teachers’ behavior and standards to evaluate the teacher's labor process, labor behavior and labor achievement through the feedback of evaluation results, and to improve the level of teaching and scientific research. The two important tasks of kindergarten teachers is the teaching and research goals, they all have a profound relationship: from a cognitive point of view, "the relationship between the source" and "flow", through the teaching can be found in the field of research, through scientific research can solve the problem very well; from the point of view of talent cultivation, improve the relationship among them is the foundation of teaching activities is the basis of scientific research activities, practice is an important means to improve teaching quality.

Analytic hierarchy process (AHP) is a decision method proposed in 1970s. It is the evaluation object or problem as a system, according to the nature of the problem and achieve the overall goal of the problem is divided into different elements, and according to the relationship between elements and elements of membership according to the different elements of multi-level combination, thus forming a multi-level architecture, structured problem. Hierarchical analysis of the basic characteristics of law structure is comprehensive decomposition according to the people's thinking and judgment, the complex problem is decomposed into various components, and then form an ordered hierarchy according to the dominant relationship, determine the importance of each layer of elements of the 22 level comparison, and then integrated the total level of importance of the target level relative to the hierarchical structure, because the analytic hierarchy process from the outset by the theory support and recognition, and has been continuously improved. At present, there are many methods to determine the weight, such as subjective weighting method, expert scoring method, AHP method, because these methods and designers consider the difference of starting point environment, there are great differences. In the four methods, the subjective weight method is the simplest, but its scientific nature is poor, subjectivity is strong, and the design of weights often depends on the personal preferences of the evaluators. Expert scoring method rely on personal experience and expert knowledge to score, so the proportion of subjective evaluation method is more scientific and objective, but due to the need to hire experts and coordination experts and the final data between the work statistics, so the work is more complex. AHP is the most complex of the four methods, method of work the most, but the most scientific method, first through the expert evaluation to determine the relative importance of each index, and then analyze the results, and establishing the evaluation matrix between the indexes, finally calculates the weights of the evaluation index by matrix analysis. In general, the subjective weighting method fully reflects a willingness and preference: Delphi method by the independent expert score with subjective score is greatly reduced, but because the Delphi method is a plurality of independent experts use score so in scientific and objectivity are higher than the expert score; AHP score based on expert. But through accurate quantitative analysis, subjective scoring is added to a minimum. Therefore, analytic hierarchy process (AHP) is the most scientific method and the most widely used method in the four methods. Through the analysis of the evaluation object, the hierarchical structure of the evaluation object is constructed. The intent of the diagram is shown in figure 4. In the process of solving the judgment matrix, there are many methods, such as least square method, eigenvector method, product root method, etc.. However, from a large number of practices, the scientific method of feature vector is the best, so in the process of using analytic hierarchy process, the eigenvector method is usually used to calculate the ranking vector of the judgment matrix.

Figure 4. Constructing the hierarchical structure of evaluation objects
Generally speaking, the value of $B_{ij}$ cannot be accurately judged by the importance of comparison and judgment. If there is an error in the estimation, it will lead to the deviation of the eigenvalue of the judgment matrix. The ideal is to satisfy the judgment matrix consistency condition, if the A bit more important than B, B than C slightly, then A should be more important than C, is the value matrix between the factor should be the logical judgment matrix if cannot satisfy the judgment logic consistency matrix is lost, we must reconstruct the Weights shown in figure 5. In the practice of kindergarten teacher evaluation, more attention has been paid to the development of external power from top to bottom, while the bottom-up internal power has been ignored. The teacher evaluation is still a routine administrative activity, evaluation as a means of management and control of teachers, evaluation is more in order to facilitate the management of the school, the school emphasizes the leading role, will reflect the leader, the professional development of teachers is not a real concern. In the process of practice evaluation, the subjectivity of kindergarten teachers is not enough, respect teachers, master spirit is not good enough, evaluation is "top-down evaluation of my activities"; rather than "bottom-up" review". The development of teacher evaluation, basically are formulated by the school, teachers participate in the evaluation plan and the standard of evaluation is difficult, but also have the right to decide the assessment content, methods, evaluation procedures, evaluation criteria, the evaluation procedure is not very understanding, assessment rarely involved in specific work. These kinds of typical evaluation of others, lack of democratic consciousness, make some teachers feel pressure, it is difficult to actively improve their work, the teacher's opinion on evaluation is not high as for the current evaluation of kindergarten teachers, teachers only as a task, but a negative response. Perform official duties regularly.

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Figure 5. Schematic diagram of evaluation weight

4. The experiment data

The educational activities of kindergarten teachers are very complex, and there are many factors, such as objectivity and quantification. The kindergarten teacher evaluation process should be a qualitative evaluation and quantitative evaluation, the quantitative evaluation information, should try to use quantitative methods for processing, analysis and judgment, in order to improve the objectivity of evaluation and persuasion; for kindergarten teacher evaluation is not easy to quantify the qualitative information, deal with the evaluation of teachers to describe the value judgment, and find a solution to the problem. The combination of quantitative assessment and qualitative assessment not only depends on the workload of teachers, but also depends on the quality of teachers' work. But in the actual evaluation work of kindergarten teachers, but the excessive pursuit of quantitative evaluation, excessive quantification, most schools in the pursuit of a comprehensive, scientific and objective principle, the evaluation of teachers love test score for students, evaluation and improvement of these restrictions and fetters, almost all are endowed with value restrictions and limitations.

Teachers' evaluation results Torgovnik is the sum of these scores, this method is not scientific, the work of teachers is students, between teachers and students is the dialogue and exchange of life, the teacher's work is creative work, there is not difference method using quantitative evaluation method between teachers and students become the main concern; how to objectively and fairly treat teachers do not pay attention to how to guide and encourage teachers to the professional development of teachers to provide constructive advice or information, is not conducive to the professional development of teachers, so this approach is not desirable; at the same time, the blind pursuit of quantitative assessment of teachers, will lead to management team work, decentralized education and energy management, thus affecting the other schools work to deepen. Through the analysis, this paper selects the classic association rule algorithm Apriori algorithm. Mining association rules is to find the relationships among different items from a large number of data items. The first is to find frequent item sets in the kindergarten teachers in the data: according to the related definitions, the frequent item in the data set and at least a predefined minimum support, to ensure consistent counting; the first step from the frequent items, and generate strong association rules. At the same time, according to the definition, these rules must meet the minimum support and minimum confidence set, the user can also add and add other metrics, such
as interest, etc. One of the two steps of association rule mining is the most important first step. At last, the correlation model and mining association rules are determined by the performance of the first step, so it often takes several times to find frequent item sets and processes. The classic association rule algorithm Apriori algorithm is one of the most efficient algorithms for mining frequent item sets in Boolean Association rules. The experiment result is shown in figure 6.

5. Conclusion

The evaluation of kindergarten teachers is an integral part of the evaluation of teachers. With the deepening of the reform of psychology education teaching, the research on the evaluation of kindergarten teachers has received extensive attention. To establish and perfect the evaluation system of kindergarten teachers’ adaptation to the requirements of the new period, plays an important role in implementing the party’s psychology education policy, deepening the teaching reform of psychology education, kindergarten teachers to improve teaching effectiveness, enhance the level of business, kindergarten teachers to promote the professional development of Kindergarten teachers and achieve the goal of school development and social needs of qualified personnel training.

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References