

Building Kindergarten Teachers' Curriculum Implementation Competence: A Collaborative Innovation Model

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Abstract

Curriculum implementation competence is of great significance for professional kindergarten teachers, and contributes to the success of curricular reform and children's development. This paper takes the four-year experience of an in-service teacher (for children aged 3 - 6) training program in a Chinese kindergarten as a case, and tries to explore and form a process model of collaborative innovation to enhance kindergarten teachers' curriculum implementation competence. This model consists of the following six stages: the preparation stage, the initial perception stage, the training stage, the practice stage, the development of research ability stage and the evaluation and feedback stage.

Keywords

Kindergarten Teachers, Curriculum Implementation Competence, Collaborative Innovation Model

1. Introduction

Developing and improving teachers' curriculum implementation competence is of great significance to teachers' professional development, the promotion of curricular reform and children's development. Apart from a simple extension of planning and adoption processes, curriculum implementation is a phenomenon in its own right. Implementation refers to the actual use of an innovation or what an innovation consists of in practice (Fullan & Pomfret, 1977). The connotation development and quality improvement of kindergarten is the basic orientation and normal of future education development. The key lies in the improvement of teachers' quality (Cai, 2020). Only with high-quality teachers can a

kindergarten be considered as high-quality in a real sense.

The reform of early childhood education in China is marked by the promulgation of *Guidance for Kindergarten Education (Trial)* (hereinafter referred to as “*Guidance*”) in September 2001. It clarifies the ideas and objectives, content and requirements, organization and implementation, and educational evaluation of kindergarten educational activities. Teachers need to make educational plans and organize educational activities according to the guiding ideology and basic requirements of the *Guidance* and the actual needs of children’s development, so as to further update educational concepts and improve pedagogical skills. After the *Guidance*, *Guidelines for the Learning and Development of Children Aged 3 - 6* (hereinafter referred to as “*Guidelines*”) was promulgated by the Ministry of Education (2012a), taking “laying a good quality foundation for children’s subsequent learning and lifelong development as the goal, and promoting the coordinated development of children’s physical, intellectual, moral and aesthetic aspects the core. By putting forward the learning and development goals and corresponding education suggestions for children aged 3 - 6, we can help kindergarten teachers (hereinafter referred to as teachers) and even parents understand the basic laws and characteristics of children’s learning and development aged 3 - 6, and propose reasonable expectations for children’s development, so as to promote teachers to implement scientific care and education, and let children have a happy and meaningful childhood (MOE, 2012a)”. Both *Guidance* and *Guidelines* highlight the importance of the law of children’s development and the healthy and comprehensive development of children as well as the need to substitute the original “Teacher centered” education concept and provide scientific basis for teachers in kindergarten education. The view on children and education provides a clear direction for teachers to implement the scientific-based concept in education. With certain flexibility, the *Guidance and Guidelines* provide teachers with both great autonomy and challenges rather than serving as a curriculum standard, entailing the corresponding ability of teachers to actively participate in the curriculum construction, which can improve their professional skills constantly.

In educational activities, teachers co-exist and grow with the curriculum. On the one hand, understanding and participating in the curriculum is an important part of teachers’ work and life; on the other hand, curriculum relies on teachers’ understanding and implementation to realize its significance and value (Wang, 2011). When teachers implement curriculum, they usually follow a curriculum fidelity, curriculum adaptation or curriculum enactment approach (Shawer, 2017). In the enactment approach, a curriculum does not only rely on an external planned curriculum, moreover, “curriculum knowledge changed from an externally defined body into an ongoing process of constructions of experiences that result from teacher and student interactions (Shawer, 2017)”. It can be seen that teachers should maintain a harmonious relationship of interdependence and mutual promotion with the curriculum, update the concept and behavior of the curriculum in time, and improve the implementation competence to adapt

to the curriculum. In fact, due to the limitations of their own situation or environment, they have few opportunities to receive trainings or take part in curriculum development, thus they can hardly update their curriculum consciousness or improve their curriculum implementation competence. They feel that they have a heavy work load, the shared decision-making process may present time demands for teachers involved (Ho, 2010). Their approach of participation in the process is not well defined and very difficult on teachers, so they face many challenges regarding their involvement in curriculum development (Ramparsad, 2001).

2. The Practice Orientation of Kindergarten Teachers' Curriculum Implementation Competence

The teacher involved in curriculum organization has many roles and responsibilities (Alsubaie, 2016). They may need to implement the curriculum in a science-based and innovative way in line with the developmental needs of children and the circumstances in the region and the kindergarten. Both the curriculum theory and practice are of the same importance for developing a teacher's curriculum competence. Teaching involves intent, and a teacher's core knowledge of teaching stems from its practice (Shkedi, 2009). Therefore, the curriculum implementation competence should be discussed in practice. With proper guidance, the teachers need to accumulate experience in practice and integrate diversified practical skills. As the main body of curriculum implementation, teachers are participants and practitioners in curriculum activities. Better teachers support better learning because they are most knowledgeable about the practice of teaching and are responsible for introducing the curriculum in the classroom (Alsubaie, 2016). In curriculum implementation, teachers need to constantly choose favorable curriculum behaviors, and revise and improve curriculum practice. Therefore, from the perspective of curriculum practice, the development of teachers' curriculum implementation competence is subjective, reflective and constructive. Teachers play a dominant role in curriculum implementation and effectively choose curriculum behaviors and strategies. At the same time, teachers need to integrate their own practical wisdom into the new curriculum practice, and constantly reflect and revise their existing curriculum experience. Mligo's (2016) study indicates that due to practitioners' inexperience with the curriculum and application practice, implementation is not successful. The development of teachers' curriculum implementation competence is a dynamic process rather than static and fixed. It is an active process in which their curriculum implementation competence is developed constantly in the process of solving curriculum practice problems.

Teachers' curriculum implementation competence is teachers' ability to put the curriculum plan into practice (Zhao, 2007). As an important component of teachers' professional quality, it is not only reflected in Teachers' pedagogical skills, but also includes teachers' competence of curricular recognizing and understanding, practice and implementation, research and reflection (Figure 1).

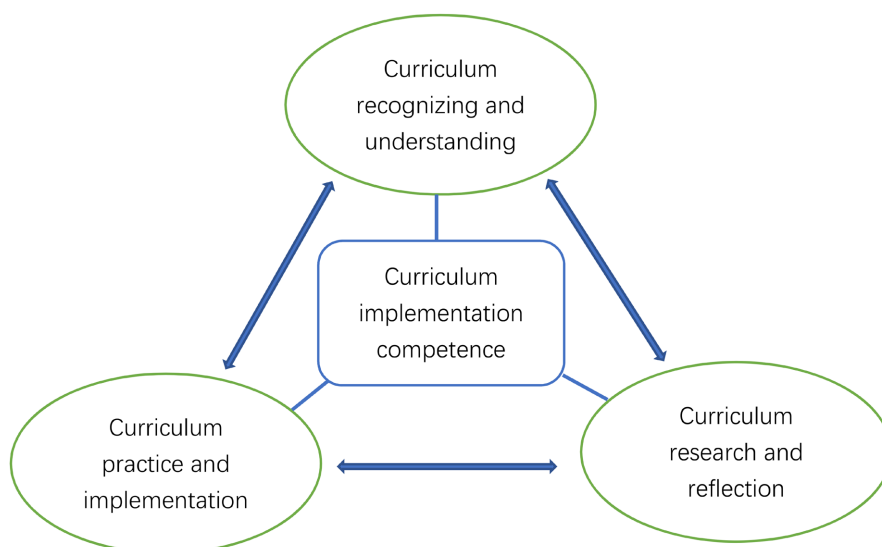


Figure 1. Structure of kindergarten teachers' curriculum implementation competence.

The competence of curriculum recognizing and understanding refers to the ability to understand curriculum theoretical knowledge, educational view and curriculum view, domain pedagogical content knowledge and kindergarten-based curriculum concept. Practice and implementation competence includes observation and analysis competence, activity design competence, activity organization and guidance competence, diversified educational environment creation competence, teaching evaluation competence, communication and cooperation competence, etc. The research and reflection competence focuses on the ability to analyze, refine, summarize, improve and innovate the problems in the process of curriculum implementation.

3. Problems in the Education Programs for the Development of Teachers' Curriculum Implementation Competence

Education remains the main form and path to develop teachers' curriculum implementation competence, mainly including pre-service education, in-service training, school-based centralized training, school-based teaching and research etc., which has greatly contributed to the improvement of kindergarten teachers' curriculum implementation competence. However, from the existing theoretical research and practical results, there remain some problems in the current development of teachers' curriculum implementation competence (Zuo, 2020; Xu, 2019). The problems include insufficient systematization of the training plan, lack of practice orientation and insufficient sustainable follow-up support for the training.

3.1. Insufficient Systematization of the Training Plan

Due to the late start in practice and research of teachers' curriculum competence training in China, and there remain many problems. The improvement of curricular competence requires the joint efforts of the trainers and participants. To

optimize the supply side in training, education program providers need to conduct sufficient training needs investigations. However, at present, the research of training need is hindered by several problems, such as insufficient investigations or formality. The development of the training plan fails to directly involve district-and-county-level education administrative departments, teaching researchers and teacher participants. The needs of the trainees cannot be clearly defined as training plans are often developed only based on logical inference, ignoring the practical needs of kindergarten teachers, which leads to the absence of systematization of training content. The one-sided designed training plans focus more on general needs than individual needs of regional and kindergarten teachers. This has greatly influenced the training effect, which is characterized by single training forms, insufficient practicality, teachers' low enthusiasm for participation, unscientific evaluation, etc. (Zheng & Shi, 2021).

3.2. Lack of Practice Orientation

Despite it is easy to master the theoretical knowledge of curriculum and teaching, it is difficult for adult learners to apply the knowledge into practice. After education, a teacher fails to transform from solely teaching objective knowledge to actively solving in complex situations. Knowles (1980, 1984) finds that adult learners are motivated to learn by internal, rather than external factors and suggests that adult educators develop learning objectives based on the learner's needs, interests, and skill levels. Boud, Cohen, and Walker (1993) believe that learning builds on and flows from experience and learning can only occur if the experience of the learner is engaged, at least at some level. The methods and ideas of explaining practice, coping with practice and changing practice are what they need most and are most interested in, which is easier to meet the targeted and effective learning requirements of teachers. The effectiveness of education is reflected in the teachers' understanding of the learned theory and the degree of practical transformation. Only the implemented theory can really play a role in teachers' professional development. However, the current education program is sometimes hardly touch the internal cognitive power to promote teachers' self-development, which results in the lack of enthusiasm and investment in learning.

At present, most of the trainers are college experts and excellent kindergarten front-line principals and teachers. On the surface, the training takes into account both theory and practice, but in detail, the training themes lack problem-oriented organic integration. The teacher trainees basically take "listening" and "seeing" as the major learning approach. The training process lacks the experience of operation, participation and reflection. Indeed, the content organized by the logic of knowledge can help the participating teachers master knowledge more systematically. But for most teachers, what they lack is the ability to transform theoretical content into practical skills. Due to the lack of practice, participation, interaction and reflection, some teachers are passively involved in training rather than proactively participate in it, leading to the loss of

the motivation of professional growth.

3.3. Insufficient Sustainable Following Up Support after Training

The *Curriculum Standard for Teacher Education (Trial)* issued by the Ministry of Education (2011) highlights the concept of “education oriented, practice oriented and lifelong learning”. By analyzing excellent teachers’ sustainable professional development programs, researchers found that teachers benefit most when they are encouraged to take the initiative to learn, participate professional dialogue and reflection (Xu, 2019). It is a very conducive way to “set a cooperative climate for learning in the classroom (Knowles, 1984)”, on the basis of their specific work practice and problems. It can be seen that teachers’ sustainable professional development theory based on teachers’ professional growth is more conducive as it emphasizes the subjectivity, situationality, practicality, cooperativeness and sustainability of teachers’ professional growth.

On the one hand, though participants can quickly receive the relevant theoretical information in a short period of time and carry out short-term teaching practice in today’s short-term centralized training programs, various problems continue to emerge in the process of complex curriculum implementation. Teachers hope to carry out various forms of experience sharing, mutual learning and practical improvement activities with their peers in view of the practical problems faced in teaching practice and their own development, so as to enhance their practical ability. Without follow-up help and support, it is difficult for teachers to have critical reflection and form new practical views. On the other hand, the acquisition of professional ability needs to be based on their own teaching practice. Only through real practice and experience in the process of problem-solving, could they obtain theoretical support and improve individual research ability.

4. Curriculum Implementation Competence of Kindergarten Teachers: Developing in Action Research

The so-called practice-oriented development of teachers’ curriculum implementation competence should start from the education and teaching scene, carry out continuous dialogues with curriculum policies, curriculum standards and teaching materials on the basis of teachers’ increasing ability to understand curriculum, form a consensus, and constantly revise and improve the development process of curriculum implementation in classroom teaching practice. Action research encourages a teacher to be reflective of his own practice in order to enhance self-reflective inquiry that is now being used in school-based curriculum development, professional development, school improvement schemes, and so on, and as such, it actively involves teachers as participants in their own educational process (McNiff, 1986). The more teachers experimented with action research, the more they regarded it as a research process that reconstructs their own knowledge and connects that new knowledge with the “wider issues of cur-

riculum, teaching and reform” (Simms, 2013). It considers the specific problems in curriculum practice and takes into consideration the flexibility, changeability and suitability of curriculum implementation. In the research, teachers serve as researchers exploring the problems in curriculum implementation and the methods and strategies adopted in specific curriculum practice. As it contributes to not only the understanding of curriculum implementation, but also the concretization of abstract curriculum theory, the process of teachers’ action research is the formative process of teachers’ curriculum competence. It is designed to transform immature and even wrong experience into mature and well-formed curriculum ideas.

There are many factors that affect the effectiveness of curriculum practice. Teachers are encouraged to study practical problems from real practice. Due to the complexity, variability and difficulty in the understanding of curriculum implementation, and the cognitive limitations, method limitations and space-time constraints faced by research designers and implementers, a variety of challenges and problems will hinder the development in curriculum implementation. Therefore, it needs to go through the process of practice, cognition, re-practice, re-cognition. Teachers as researchers, that is, teachers find problems in practice. The complexity and diversity of curriculum practice determine that teachers should become researchers. Action research place practitioners in the position of being observers and learners in their own classrooms—learning by doing (Campbell, 2013).

5. A Process Model of Collaborative Innovation to Promote Kindergarten Teachers’ Curriculum Implementation Competence

In September 2012, the Ministry of Education (2012b) and other departments jointly issued *The Opinions on Deepening the Reform of Teacher Education*, requiring “promoting the reform of teacher training model and establishing a new mechanism for joint training for teachers by colleges and universities, local governments and primary and secondary schools (kindergartens and secondary vocational schools)”. This paper attempts to reconstruct the teacher education and training system, address low the effectiveness in teacher training and the backwardness of teacher training curriculum and promote the construction of teacher educators’ professional development platform. Beijing Institute of Education (BJIE) actively introduces a new model of teacher education in which institute (college), local governments (training institutions), primary and secondary schools (kindergartens) cooperate with each other, and strives to explore a multi-dimensional collaborative innovation mechanism to improve the level of in-service teachers, basic education research, teacher educators’ professional development and discipline platform construction. Different from the early PDS (professional development school) model, this model puts a priority on the decision-making by and support of district governments (training institutions) in

the process of collaborative training.

BJIE launched the Collaborative Innovation School Plan in 2016 in order to better serve the comprehensive reform and development of basic education in Beijing, the development of primary and secondary schools and kindergartens, and the professional development of principals and teachers. The plan adopts the RLD (research, learning and development) model, in which the research co-operation alliance carries out action research around the key, difficult and hot issues faced in schools' (kindergartens') operation, education and teaching practice, conducts project learning based on the existing problems, and promotes mutual development through problem solving. Instead of a simple training, research or work model, it is an action research model based on practice research, or a model to improve the quality and teacher proficiency of a supported school (kindergarten).

5.1. Characteristics of Collaborative Innovation Model for Promoting Kindergarten Teachers' Curriculum Implementation Competence

5.1.1. Practice Orientation of Implementation Process

Originally, this collaborative innovation model is designed to fill the gap between teachers' pedagogical beliefs and classroom practice in the process of teacher education, and help teachers to form high-extent practical proficiency in managing education and teaching practice. To help teachers become capable and competent practitioners requires that they have training in self-awareness, knowledge acquisition, and skill building (Kramer, 1998). Therefore, on the basis of full respect for the actual needs of teachers and a large number of researches and interviews, the training goals are determined by front-line teaching practice experts, kindergarten principals and teaching and research directors, district and county teaching and research personnel and college experts. With both theory and practice are well combined in the training content, it not only boasts the theoretical guidance but also focuses on the practical orientation expected by teachers.

5.1.2. Collaborative Management Mechanism

The program pays attention to the coordination of several parties in the specific training practice. First is the collaboration expert team, consist of chief experts, program leaders, well-known front-line principals, principal, education and care directors from program kindergarten and directors, and teaching and research personnel from district or county committee or local teaching and research center. Following years of cooperation, these experts have become a collaborative community for teacher training, forming a stable, professional, excellent and collaborative training expert team, familiar with the needs of front-line teachers. The second is the coordination of management mechanism. The program team tries out the program leader responsible system, and the program leader undertakes the organization, coordination and management of the program. The rele-

vant government departments of the district where the kindergarten is located provide favorable external support in organizing, managing and coordinating the resources of all parties, linking colleges, institutions and kindergartens, formulating measures and supervising the implementation of the program.

5.1.3. Sustainability of the Training Program

With the level of theoretical research as the primary, theoretical researchers may fail to fully understand the actual curriculum competence of kindergarten teachers. With a relatively conservative and indifferent attitude toward research methods, researchers merely stay at the level of theoretical construction, which is the superficial part in implementation competence development, leading to the scarcity of breakthroughs and innovation in methods.

Action research assists practitioners and other stakeholders in identifying the needs, assessing the development processes, and evaluating the outcomes of the changes they define, design, and implement (Beverly, 1993). But weak in research skills, front-line teachers are hardly able to translate the practical experience into the general theories. The gap between research subjects affects the research depth and quality of kindergarten teachers' curriculum competence.

Improving the quality of teaching is always the most basic pursuit of education. To promote the long-term development of kindergartens, college teachers must go deep into the classroom, study the process of learning and teaching and improve the leaning effect. The main task of college teachers is to polish the teaching with front-line teachers, study the content of teaching materials, study the students' learning situation, revise the teaching plan and reflect on classroom teaching, which will benefit front-line teachers in teaching.

5.1.4. Collaborative Community and Blended Learning

The kindergartens included by BJIE collaborative innovation plan are different in their history, conditions, resources and foundation. In line with the actual situation of the kindergartens, we have determined the goal orientation and recent tasks of cooperation, formulated a support strategy for each kindergarten, and sent a support team to each school. It is also an alliance and a good communication platform on which kindergartens arrange relevant teachers to participate in specific activities of kindergarten demonstrations in the same district, and kindergartens with similar research topics can also carry out cross-regional communication. This communication mechanism enables kindergarten principals and teachers to broaden their horizons and promote learning, thinking and practice.

6. A Process Model of Collaborative Innovation Program —A Case of XL Kindergarten

In line with the above characteristics of the development of teachers' curricular competence based on collaborative innovation, with the consideration of practicality and feasibility and the combination of all development stages of teachers' curriculum implementation competence, we put forward a linear model com-

posed of six training stages (**Table 1**), which are the preparation stage, the initial perception stage, the training stage, the practice stage, the development of research ability stage and the evaluation and feedback stage. Because the development of kindergarten teachers' curriculum implementation competence is a spiral instead of a circle, the implementation of each stage of the whole model is repeated in cycles.

XL Kindergarten, founded in 2008, is a municipal rural kindergarten under the dual management of district education committee and sub-district street office. The kindergarten has 336 children divided into nine teaching classes, and 61 teachers, All of whom have a bachelor degree or above, including 21 early childhood education majors, five non-normal majors and four with certificates transferred from other primary and secondary schools. There are 10 teachers with 1 - 5 years teaching experience, one honored as the district-level backbone teacher and two awarded as the kindergarten-level backbone teacher. With the goal of building Life Education kindergarten-based curriculum set in 2018, the principal of the kindergarten hopes to improve education quality based on the construction of the curriculum.

Knowledge about curricular purposes and structures provides a framework within which teachers can select and adapt materials in ways that are consistent with designers' intentions (Davis & Varma, 2008). The early investigation results illustrate teachers' insufficient professional knowledge about curriculum development, exemplified by their superficial understanding of the concept and connotation of the Life Education curriculum advocated by the kindergarten and the low awareness of their own proficiency and value. Teachers are expected to grasp the changes and trends of today's kindergarten curriculum reform, establish a correct outlook on children, education and children's development, take an all-round view on curriculum, and improve their own proficiency and value while understanding the curriculum.

After establishing the educational beliefs, teachers are expected to strive to translate the educational concept into teaching behavior, which is reflected in the curriculum content. And it is necessary to build a curriculum framework to promote the common development of teachers and children in line with children's life. And teachers should serve as listeners, observers, supporters, collaborators and guides of children's learning activities in curriculum implementation. Both the starting point and foothold of life education curriculum keep to children's learning and development. The construction of curriculum should respect children's interests and choices, pay attention to children's experience and needs, and clarify how to observe and state the observation results during observation process. However, in the early stage of their career, without keen observation of the actual teaching situation, teachers find it difficult to accurately predict the possible problems in teaching, use appropriate language or behavior to effectively capture children's attention and interest, or successfully complete the teaching tasks and achieve the predetermined teaching objectives.

To truly participate in the construction of Life Education curriculum, teachers should be equipped with not merely rich knowledge and ability of education and teaching, but certain knowledge of curriculum design and evaluation and operational technologies such as activity design, organization, implementation and development and utilization of curriculum resources. However, today, there remains lag behind the expectations in this regard. The curriculum implementation competence is most closely related to teachers as they are expected to transform the concept of Life Education curriculum into curriculum practice in implementation. Based on the existing level and development characteristics of teachers' curriculum competence, we propose the following linear model of training process (Table 1).

6.1. Preparation Stage: Construction of Operation Mechanism of Collaborative Innovation

Before the program is officially launched, the operation mechanism of the collaborative innovation model system must be first completed to promote the improvement of teachers' curriculum implementation competence. With clear articles defining certain rights, responsibilities and obligations of all parties, each party can recognize its own position and responsibility, so as to provide guarantee for the normal operation of the collaborative innovation model system.

The operation system of the program generally involves six groups with the aim to ensure the science-based and effective operation of the whole system and maximize the function of the system. 1) The management team, mainly composed of institute (college) leaders and relevant directors from academic affairs departments, is responsible for the overall planning, overall deployment, inspection, evaluation and reward of the project. 2) The expert group mainly plays a guiding and promoting role in the collaborative innovation system, mainly involving the researchers and teachers of the institute (college) participating in the collaborative innovation program, mainly including the program leader, responsible experts, institute (college) teachers related to the program training content, and well-known front-line principals and teachers. They undertake the tasks of training, follow-up and evaluation in the process of program design and promotion. 3) The teaching and research group takes charge of intermediate coordination, promotion and follow-up leading development in the system. It mainly includes two sub-groups, namely, the regional teaching and research team composed of teachers from the teaching and research institutions of the District Education Committee and the teaching and research team established by the kindergarten; The former plays the role of the intermediary between the program leader of the institute (college) and the kindergarten. A teaching and research leader of the kindergarten is appointed by the District Education Committee to support and lead the sustainable development of kindergarten teachers' curriculum implementation competence. The latter, composed of the principal, the deputy principal, the grade group leaders and some backbone title teachers, serves as the intermediary between researchers, teaching and research departments

Table 1. The process model of collaborative innovation to enhance kindergarten teachers' curriculum implementation competence.

Stages	Main tasks	Participants	Major activities	Carrier of achievements
The preparation stage	<ul style="list-style-type: none"> • construction of operation mechanism 	<ul style="list-style-type: none"> • management team • expert group • well-known principals and teachers) • teaching and research group • practice group • support group 	<ul style="list-style-type: none"> • complete the operation system 	<ul style="list-style-type: none"> • rules and regulations of operation mechanism
The initial perception stage	<ul style="list-style-type: none"> • help teachers to improve curriculum beliefs and values 	<ul style="list-style-type: none"> • expert group • teaching and research group • practice group 	<ul style="list-style-type: none"> • re-understand the value of education (lectures) • learn curriculum knowledge (lectures, group discussions, survey) • deepen the understanding or domain pedagogical content knowledge (pck) (lectures, books guided reading, collective and group teaching and research activities) 	<ul style="list-style-type: none"> • survey report of teachers' curriculum beliefs and values
The training stage	<ul style="list-style-type: none"> • preliminary formation of kindergarten teachers' curriculum implementation competence 	<ul style="list-style-type: none"> • expert group • well-known principals and teachers) • teaching and research group • practice group 	<ul style="list-style-type: none"> • form kindergarten teachers' curriculum implementation competence (problem-based learning, case study, observation, analysis, discussion, presentation, expert guided learning) 	<ul style="list-style-type: none"> • teaching plans; observation records
The practice stage	<ul style="list-style-type: none"> • form and improve teachers' curriculum implementation competence 	<ul style="list-style-type: none"> • expert group • well-known principals and teachers) • teaching and research group • practice group 	<ul style="list-style-type: none"> • classroom practice (individual teaching preparation; classroom practice; self-reflection; group reflection; collective teaching and research activities; practice improvement) 	<ul style="list-style-type: none"> • revised teaching plans; activity cases; improved teaching behavior
The development of research ability stage	<ul style="list-style-type: none"> • improvement of research ability of curriculum implementation competence 	<ul style="list-style-type: none"> • expert group • well-known principals and teachers) • teaching and research group • practice group 	<ul style="list-style-type: none"> • research methods trainings • research group activities • apply research projects • publish research papers 	<ul style="list-style-type: none"> • the framework system and implementation path of Life Education curriculum • approved research projects; • research papers
The evaluation and feedback stage	<ul style="list-style-type: none"> • evaluation of the effect of the program 	<ul style="list-style-type: none"> • management team • expert group • well-known principals and teachers) • teaching and research group • practice group • support group 	<ul style="list-style-type: none"> • process evaluation (teaching behavior diagnosis; feedback; behavior improvement) • summative evaluation (operation system evaluation; feedback; improvement of system) 	<ul style="list-style-type: none"> • evaluation reports • improved operation system

and front-line teachers and the main promoter of the viability development of teachers' curriculum ability. 4) The practice group is the implementer of the curriculum, which is mainly composed of front-line teachers in kindergartens. 5) The coordination group plays an essential part in coordination to maximize the common interests of the parties involved, including the coordinators sent by the institute (college), District Education Committee and kindergarten, bearing different responsibilities respectively. The college coordinator is responsible for docking with the District Education Committee and kindergartens; The district teaching and research staff, the intermediate link of the whole system, is responsible for connecting the college, the Education Committee and the kindergarten; The coordinators of kindergartens mostly convey the program information to front-line teachers. 6) The support group, mainly composed of member representatives from administrative departments at the institute (college), regional and kindergarten levels, provides support for the smooth operation of the system.

In the process of actual implementation, members of each group deal with overlapped tasks. For example, regional teaching and research staff may participate in the work of both the research group and the coordination group and the support group. Kindergarten leaders are not only members of the research group, but also members of the coordination group, the support group and the practice group. All the parties can be flexibly deployed in line with the actual situation to ensure efficient operation of the system.

6.2. The Initial Perception Stage of Kindergarten-Based Curriculum Identity and Understanding

Teachers' curriculum awareness is an important prerequisite for kindergarten curriculum implementation as they are the main body of kindergarten curriculum construction. One's understanding of curriculum, invariably, affects the extent of engagement one can have with the curriculum (Maphosa & Mutopa, 2012). Therefore, kindergarten leaders need to lead teachers to actively participate in kindergarten curriculum construction and improve their professional development in this process. At this stage, teachers first need to fully recognize the significance of the curriculum and improve their understanding of the curriculum. Curriculum understanding ability is an overall ability to grasp the concept, nature, objectives and content of the curriculum. For a long time, the individual development of teachers in XL kindergarten is relatively isolated from the overall development of the kindergarten. Most of the teachers only focus on the teaching materials in their hands in terms of the understanding of the curriculum. Teachers are not very clear about the purpose and reasons of the curriculum innovation proposed by the kindergarten—they are vague about why to carry out curriculum innovation. Therefore, teachers are organized to fully study the overall curriculum planning of the kindergarten to improve their understanding of the core concept and overall structure of kindergarten curriculum construction. It is perceived that the kindergarten-based curriculum is developed based on the development need of the children and the kindergarten, and its de-

velopment and implementation require the participation of each teacher. Teachers should transform their role from a simple knowledge imparter to a researcher, re-examining their daily teaching activities as part of the research. Therefore, the main task of this stage is to help teachers improve curriculum beliefs and values. Reflecting the curriculum culture, curriculum spirit and curriculum ethics, and the development of children, the stage directly affects teachers' curriculum view, teaching view, teachers' view and students' view, and directly determines teachers' teaching behavior.

First of all, teachers are asked to re-understand what is the concept of science-based education. They are asked to return to the question of the origin of education: what is education, why to carry out education, how to carry out education and the results of education. Different answers to these questions reflect teachers' different understanding of educational values. Only by accurately grasping the logical relationship between the above basic elements of education can we use the concept of science-based education to guide the curriculum understanding. Second, the teachers are guided to have an in-depth understanding of domain pedagogical content knowledge. The background and social motivation of Dr. Shulman's concept of pedagogical content knowledge are the social demand for teachers' proficiency, and he believes "teaching deserved a professional status" (Shulman, 1987). The proficiency of domain pedagogical content knowledge of the program is reflected in: 1) Teachers are required to concentrate on grasping the domain characteristics of teaching activities to have a comprehensive grasp of the points they teach when implementing educational activities. 2) When implementing educational and teaching activities, teachers should pay attention to the teaching content and the methods for transferring the teaching content to practice efficiently, so as to achieve the teaching objectives. 3) It embodies the modern people-oriented educational concept, which takes children as the starting point of education and teaching, respect children's nature and improves their potential and promotes children's all-round development. Third, deepen the understanding of the content of the "Guidelines". Fourth, improve the understanding of the concept of kindergarten-based curriculum.

6.3. The Training Stage of Curriculum Implementation Competence

The core of this stage is the preliminary formation of kindergarten teachers' curriculum implementation competence. In this research, kindergarten teachers' curriculum implementation competence refers to the dynamic ability of teachers in the process of curriculum implementation, specifically including observation and analysis competence, activity design competence, activity organization and guidance competence, diversified educational environment creation competence, teaching evaluation competence, communication and cooperation competence, etc. Kindergarten teachers' curriculum implementation competence actually includes many dimensions, such as concept, attitude, knowledge, ability and so on. Diversified training methods are adopted in the training stage to better mobilize teachers' learning motivation, enable them to actively accept know-

ledge and promote their reflection and development. The training process is designed based on the problems encountered by teachers in practice. This problem-based learning improves the effectiveness of training in many forms, such as expert lectures, on-site guidance, participatory learning, problem inquiry learning, on-site observation, case study, experience learning, practice community, information technology assistance and so on.

For example, the main purpose of children's observation and analysis competence training is to help teachers solve the problems encountered in observing children's behavior in the process of curriculum implementation, understand the role of observation in kindergarten curriculum design and implementation, and master the knowledge and skills of observation and analysis, so as to effectively support children's learning and development. 1) Summing up experience. The program leaders or the responsible experts design or refine a case according to the teacher's experience in educational practice, such as an observation plan, an observation record, a classroom record and other materials in line with the training objectives and contents. In this process, the project leader and responsible experts provide guidance for solving problems, the trainees complete the corresponding tasks, and the district teaching and research staff give support according to their needs. 2) Situational sharing and reflection. The principal conducts collective or group teaching and research activities, identifies the problems of individual teachers and summarizes common problems in the form of sharing, reflection and discussion. As the main body of this section, the trainees (teachers) can also participate in the process of integrating and sharing their own educational experience. And experts are mainly responsible for stimulating teachers' reflection. 3) Experience summary and refinement. In this section, with the support of experts, teachers summarize their reflection and the problems found, and develop principles and strategies that can be used for reference. The main task of program leader and experts is to answer teachers' questions and sort out relevant strategies with teachers. 4) Apply strategies in practice. This section is designed to test the effectiveness of the strategy in real educational situation, and decide whether to continue the existing learning or the next cycle according to the actual effect. The task of the program leader and responsible experts is to identify the effect of training and design new tasks.

It is worth mentioning that the training of curriculum implementation competence is deepening with time. For example, at the early stage the training aims to improve the basic abilities of curriculum implementation, and later the further development and flexible application of various abilities in specific teaching practice, such as, from understanding the general structure and steps of the observation plan to mastering scientific and appropriate observation methods.

6.4. The Practice Stage of Curriculum Implementation Competence

This stage aims to form and improve teachers' curriculum implementation competence. The specific methods are as follows: firstly, teachers carry out be-

nign interaction with children in the process of curriculum implementation, consciously transform individual understanding and teaching skills of Life Education curriculum into curriculum behavior, and act as the main body of curriculum leader, and successfully strengthen all the impetus provided by various life-oriented curriculum innovation activities. Secondly, develop the teachers' comprehensive competence of curriculum implementation with teaching practice and research, the concept of life education curriculum, the skills of curriculum implementation, the reflection results and the strategies of formation obtained in the training put into practice. Taking children's observation and analysis ability as an example, teachers' observation plans, observation records and observation tools have become increasingly systematic and scientific in constant modifications and improvement of teachers' teaching behavior.

There are two types of teaching research activities based on teaching practice, of which one is for teachers' individual growth and the other is for common problems. For the teaching and research of individual growth, university experts and researchers mainly offer long-term and continuous suggestions and guidance according to the classroom behavior in the implementation of teachers' Life Education curriculum, or discuss and provide feedback on a teacher's demonstration class. The other type of teaching and research is to timely guide teachers to address the acute problems faced. For example, the Covid-19 pandemic in 2020 brought many unusual changes to children's lives and challenges to teachers' work. It has become a part of children's life. When the epidemic got moderated and the children returned to the kindergarten, the kindergarten planned to take the initiative to incorporate relevant information into the life education curriculum. This has led to teachers' reflection on the curriculum construction of kindergartens, as well as many new questions, such as "How can our Life Education activities deal with the post-pandemic life?" "Should we carry out special epidemic curriculum construction?" "How to integrate pandemic related content into Life Education curriculum?" "Is it necessary to adjust our existing curriculum objectives because of the epidemic?" "How to translate this special experience into valuable educational activities and recognize its educational significance". Therefore, we added epidemic-related content to the training, launching a "cloud" training activity with a focus on the theme of "the importance of following social rules" in the epidemic period.

Communication is an effective way to promote mutual learning and common development among teachers, program leaders, researchers, teaching researchers from universities, kindergartens and regions. At the initial stage of the program, communication was considered as a regular activity between teachers in the kindergarten, teachers and teaching researchers, and teachers and program leaders and experts. It was mainly designed to promote the development of kindergarten itself. In the middle and later stages, we designed cross district communication between kindergartens, which was conducive to the exchange and sharing of information and the development of teachers and kindergartens. In addition, there were many exchanges among researchers, university experts and

teaching and research staff, contributing to deeper understanding of the implementation of the program and their own professional development.

6.5. The Development of Research Ability Stage Related to Curriculum Implementation

The improvement of kindergarten teachers' curriculum implementation competence needs professional training, teachers' own reflection, and the support of learning team under the guidance of experts. *Bergera et al. (2005)* discovered that teacher research, while a robust and interesting professional development activity for individual teachers, is strongly reliant on external supports and leadership. With the progress in the program, teachers gradually have research consciousness, research thinking and research methods by case study and analysis. Over the past four years, under the leadership of the program team and the principal of the kindergarten, a professional learning team has been gradually established. In a harmonious and relaxing development atmosphere, everyone has further identified their rights, obligations, responsibilities and development direction. Through many on-site teaching and research activities, on the one hand, they learn from and share a lot with each other. On the other hand, they fully leverage their strengths according to their own interests and hobbies, constantly improve their educational ideas in the collision of multiple thinking, and establish their own unique style and research character in their own development. Among them, there are personalized research groups for different research topics, such as science, art, mathematics, information and life. The group leader is a teacher with relevant interests or expertise. Other teachers choose two groups freely to participate in activities. In addition, there is a research group especially responsible for research.

Teachers constantly generate new needs in the practice of Life Education curriculum, and continue to study a certain problem under the guidance of the program expert team. The research achievement plays an important role in curriculum implementation. After several years of research, the kindergarten has established the framework system and followed an implementation path of Life Education curriculum, with a number of municipal and district research projects approved and teaching case collections published. Many teachers have published research papers and won awards in teaching competitions at different levels.

6.6. Evaluation and Feedback Stage of Curriculum Implementation Competence

Process evaluation runs through the whole training and research process. All parties actively and timely find problems in the program implementation process and make corrections accordingly, including those in teachers' individual curriculum implementation competence and kindergarten teachers' overall curriculum implementation competence (**Table 2**). The summative evaluation mainly focuses on the overall operation system of the whole program, and the evaluation of the implementation effect of the program. Through effective evaluation, teachers can

Table 2. Kindergarten teachers' change before and after action research.

curriculum implementation competence	before action research	after action research	evaluation methods
observation and analysis competence	confusion in observation objectives, plans and methods; deviation from "children oriented"	master and apply observation methods; understand and support children's learning and development as the starting point	qualitative method
activity design competence	confusion in how to design activities, how set objectives, focuses, etc.	understand the basic principles and specific requirements of activities to effectively promote children's development	qualitative method
activity organization and guidance competence	more attention is on how to follow routine and make the activities go smoothly	more focus on children's creativity and children's play	quantitative method qualitative method
environment creation competence	create the environment according to the age characteristics of children	enable children to interact with the environment and to promote children's deep learning	quantitative method
teaching evaluation competence	few teachers have evaluations and reflections	keep evaluation and reflection records based on their own teaching behavior	quantitative method qualitative method
resource utilization competence	select resources according to their own needs, operability, or existing materials	select resources according to diversified needs of children and curriculum	qualitative method quantitative method

constantly improve themselves. At the same time, from the perspective of program operation, relevant parties can timely adjust the corresponding external environment to ensure greater effectiveness in the operation of the project.

7. Analysis on the Effectiveness of Collaborative Innovation Model of Kindergarten Teachers' Curriculum Implementation Competence

In order to ensure the effectiveness of the training plan, the project team conducted a post training questionnaire survey on 41 principals and teachers participating in the training before and after the implementation of the program (the recovery rate was 100%). After that, interviews were designed for the principal, vice principal, teaching director and kindergarten teachers who participated in the training. In addition, the observation and recording method was adopted to understand the changes of teachers before and after training. Based on the above data and evaluation, it is found that the collaborative innovation model has a significant effect on improving the curriculum implementation competence of kindergarten teachers.

7.1. Improvement of Kindergarten Teachers' Cognition and Understanding of Kindergarten-Based Curriculum Knowledge

Before the training, 5 teachers were randomly selected from senior, middle and

junior classes to have interviews about the knowledge of kindergarten-based curriculum. The results showed that the 5 teachers were not familiar with this part of knowledge.

Interview materials before training:

Do you know the elements of kindergarten curriculum?

B: I don't know.

Z: I don't know.

Do you know what is kindergarten-based curriculum?

Z: Kindergarten-based curriculum should be the most distinctive curriculum in kindergarten.

O: I'm not sure.

What is the curriculum implementation of kindergarten teachers?

L: Is it the process of organizing children's activities?

G: I don't know.

What do you think of the role of teachers in curriculum implementation?

Z: Assistance role.

L: Organize activities and observe children in the process.

Do you know the concept of life education curriculum of your kindergarten?

Z: I'm not sure

G: Does that mean education should close to children's life? Uncertain.

The answers of the selected teachers show that they failed to fully understand and master the concept, constituent elements, the role of teachers and the concept and structure of the kindergarten-based curriculum before the training. This indicates their insufficient knowledge of kindergarten-based curriculum theory and insufficient participation in the construction of kindergarten-based curriculum. The project team designed different types of training strategies, including professional lectures, workshops, group learning, activity research, teaching video analysis, class observation and evaluation, literature research, on-site guidance and other methods, with which teachers can experience the implementation process of kindergarten-based curriculum in person. After training, the project team interviewed these teachers again. The answers are as follows:

What do you think of good kindergarten-based curriculum after training?

Z: I think good kindergarten-based curriculum means teachers can participate in the construction process together with the principal on the basis of mastering the curriculum knowledge. The curriculum should reflect the characteristics of kindergartens and give consideration to the all-round development of children. The most important thing is to be child-centered, and make full use of the resources and conditions of kindergartens to develop kindergarten-based curriculum.

After training, what qualities do you think teachers should have to participate in the construction of kindergarten-based curriculum?

Z: I think we should first master the relevant knowledge of the curriculum, at least know what is the curriculum and what is the kindergarten-based curricu-

lum, have a scientific view on children and curriculum, and master each domain.

How do you understand the life education curriculum of your kindergarten?

At the beginning, I was not clear about the concept of Life Education curriculum. I always felt that it was the responsibility of kindergarten leaders. Now I finally understand the concept—“derived from life, integrated into life and for life” put forward by the principal, that is, education should be integrated with children’s life, respect children’s interests and development needs, and make the process of education become the process of their life experience. This concept guides the behavior of my curriculum implementation.

It can be seen that after the training, teachers’ understanding of the curriculum has been greatly improved, illustrating the effect of the training.

7.2. 6 Competences of Curriculum Practice and Implementation Have Been Improved

In this program, practice and implementation competence mainly includes observation and analysis competence, activity design competence, activity organization and guidance competence, diversified educational environment creation competence, teaching evaluation competence, communication and cooperation competence.

The survey of kindergarten teachers’ curriculum practice and implementation competence before training shows that few teachers think they fully master one of them (Figure 2). After the training, a questionnaire survey was conducted on the curriculum practice and implementation competence again. The results show that most teachers believe that participating in collaborative innovation project training is helpful to solve the problems encountered in curriculum implementation practice (Figure 3).

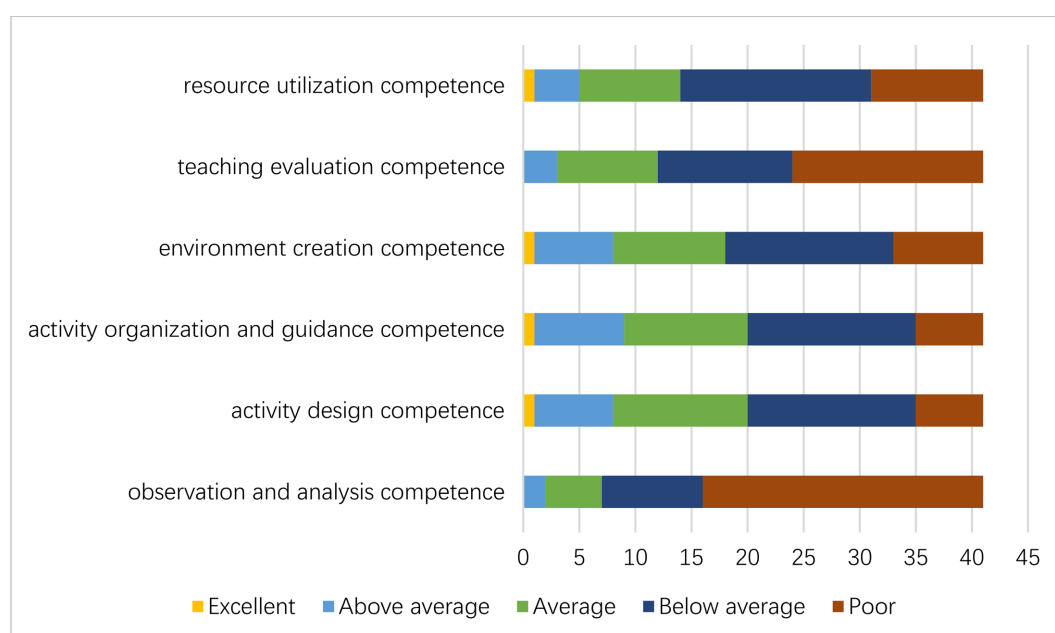


Figure 2. Curriculum practice and implementation competence before training.

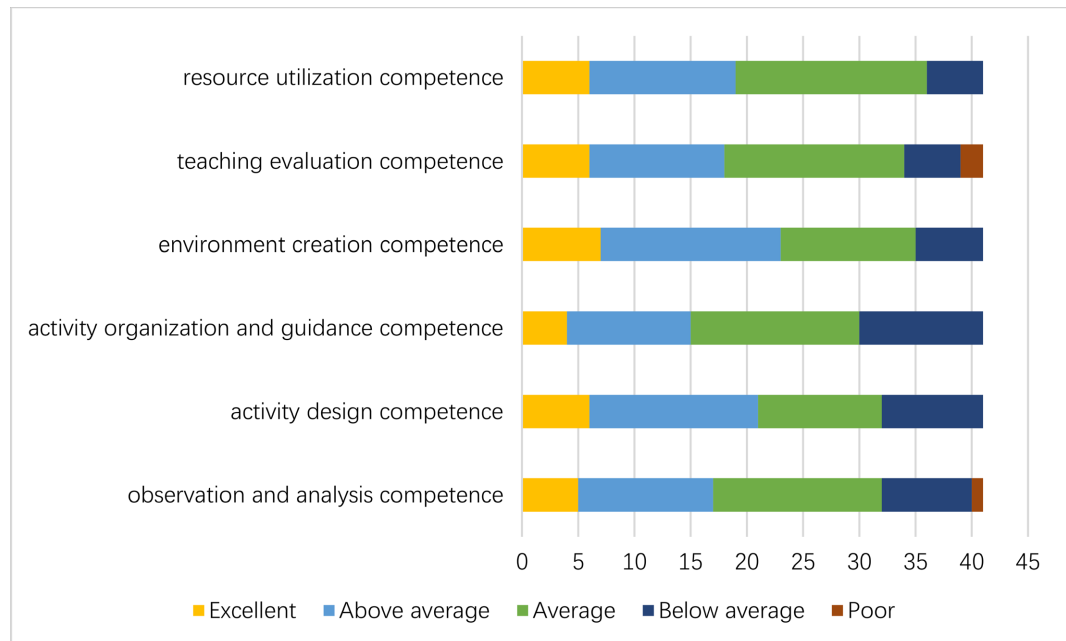


Figure 3. Curriculum practice and implementation competence after training.

7.3. The Curricular Research and Reflection Competence of Kindergarten Teachers Has Been Significantly Enhanced

F, the head of teaching and research, said in the interview, “*In action research, the research team of the kindergarten and I conducted bottom-up and top-down discussions and research together. Through three rounds of action research, in the process of literature review and heated discussions, we have gained a clearer understanding of ‘curriculum’ and ‘Life Education curriculum’ and enhanced our awareness of scientific research. We have mastered the scientific methods of curriculum implementation and teaching research, and improved education and teaching practice. I also have found my own research interests. I won the first prize in the district teaching competition last year and published an academic paper.*” Teachers believe that through the dialogues between different parties in the learning community, they have achieved their professional growth. Collective teaching and research activities enable teachers to pool their wisdom, take children’s learning and development as the goal, and plan the curriculum content and implementation path suitable for children’s level of development.

8. Conclusion

Improving kindergarten teachers’ curriculum implementation competence is an important way to promote their professional development. The training of teachers’ curriculum implementation competence based on collaborative innovation is guided by “practice”, takes multi-party cooperation and continuous deepening as the main form, adopts the paradigm of action research, and gradually finds, studies and solves problems through “participation” and “cooperation”. Because teachers have gone through the process from learning to practice,

this follow-up and long-lasting training is proved to have better effect than the passive training merely based on lectures.

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Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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