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Enhancement of Quality in Early Childhood Education : Using the Early Childhood Environment Rating Scale-Extension (ECERS-E) and Revised (ECRES-R) as Formative Assessment Tools for Professional Development - An Experience from Hong Kong

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Abstract

The current study examined the reliability and applicability of the Chinese translated versions of the Early Childhood Environment Rating Scale –Revised (ECERS-R) and Early Childhood Environment Rating Scale –Extension (ECERS-E) as formative tools for use by local practitioners to perform self-evaluations on the various aspects of the educational environments being provided to pre-school children in their own settings with the goal of helping to facilitate changes that may help to enhance the quality of educational experiences for young children. Five registered kindergartens were recruited and received trainings in the administration of the said tools by the PECERA-HK (ECERS) professional team. Three assessment trials were administered in three different phases. For each trial, teacher representatives from each kindergarten completed the assessment using the said tools together with the trainers. Discussions were also held with the trainers on their observations. Internal reliability for the tools was found to be quite robust. Qualitative findings also suggested that the ECERS-R and ECERS-E can serve to assist practitioners in identifying the respective strengths and weaknesses in the educational environment they were providing to children and in setting clear directions for making corresponding improvements.

Keywords**:** quality, early childhood education, environment, curriculum, Hong Kong

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Children's health and all-round development can be significantly affected by the quality of Early Childhood Education (ECE). The learning environment which children are exposed to day in and day out would have significant impacts on young children's immediate as well as future developments. The various elements, both tangible and intangible, comprising the learning environment in the early childhood educational settings are hence worthy of receiving close attention and regular reviews to ensure a high quality of education for the children can be maintained. In the late nineties, the significance of reviewing the quality of early childhood education has begun to gain attention in Hong Kong and initiatives towards measuring the quality of early childhood education have arisen thereafter. In February 2017, the Kindergarten Education Curriculum Guide (Education Bureau, 2017a) was announced and the Free Quality Kindergarten Education Scheme is implementing (Education Bureau, 2017b) in Hong Kong in September 2017. Kindergartens that are under the Free Quality Kindergarten Education Scheme would conduct ongoing annual school self-evaluations and periodic quality reviews by outside reviewers (Education Bureau, 2017c) to identify areas for improvement so as to achieve quality assurance and sustainable development. The performance indicators currently cover items from four domains, namely management and organization, learning and teaching, support to children and school culture, and children's development. Quality assurance baselines and measurement devices, for example, "Performance Indicators" and "Stakeholders Survey" have been proposed and reviewed by local educational authorities to achieve their goals in promoting quality education at the early childhood education level (Becher & Rao, 2012; Hui, Chow, Chan, Chiu, & Sam, 2015; Lisenby, 2011; Ngan Ng, Sun, Lau, & Rao, 2017; Reetu, Renu, & Adarsh, 2017). Often, however, the information collected for this purpose might not be very systematic or might also lack in objectivity. The information might also not be easily applicable to facilitate changes in a timely manner.

Importance of Enriching the Early Childhood Learning Environment

Heckman (2017) found that high quality early childhood education programs matter a lot and produce high child outcomes. The early childhood education environment is a complex system of interacting variables. Each of these variables will have certain roles to play in stimulating young children's learning and development. A reliable tool that could help

practitioners to identify the strengths and weaknesses of these various important variables in the learning environment would undoubtedly help in facilitating improvements to be made to the environment and hence benefiting children's learning and development (Bull, Yao, & Ng, 2017). Two most widely used and established assessment tools of quality of early childhood education are the Early Childhood Environment Rating Scale-Revised (ECERS-R) (Harms, Clifford, & Cryer, 2005) and the Early Childhood Environment Rating Scale - Extension (ECERS-E) (Sylva, Melhuish, Sammons, Siraj-Blatchford, & Taggart, 2010).

The holistic nature of the ECERS-R and ECERS-E quality measures has attracted a lot of research attention to assess and discuss early childhood education quality management across different areas in the World, for instance, in Europe (Warash, Markstrom, & Lucci, 2005; Sheridan & Schuster, 2001), Asia (Bull et al., 2017; Hu & Szente, 2009; Sheridan, Giota, Han, & Kwon, 2009), Australia (Ishimine & Wilson, 2009), Latin and South America (Herrera, Mathiesen, Merino, & Recart, 2005), South Africa (Biersteker, Dawes, Hendricks, & Tredoux, 2016). The findings generated from studies using the scales have revealed close connections between quality of the early childhood environment and children's outcomes, and pointed to the needs to adapt the instrument with consideration to accommodate cultural variations and implications for actions to be taken by ECE practitioners and policy makers on improving the quality of education in their own settings.

There has been research evidence suggesting, for example, that with an improved quality of the early childhood environment, young children's interests towards reading and writing can be raised (Cunningham, 2008), early childhood student's behavioral regulations can be improved (Carter & Van Norman, 2010), and mastery of language can be enhanced (Burchinal, Howes, Pianta, Bryant, Early, Clifford, & Barbarin, 2008). The quality of the interactions between ECE practitioners and the children and their parents, and also the learning programs per se have also been regarded as constituting significant parts in the whole pre-school education ecology. Carlson (1999), for example, has constructed a model related to ECE practitioners' professional development. Elements, namely, "Parent Partnerships", "Respectful Interactions and Environments" and "Connections between Early Childhood and Elementary Education" are among the six different elements included in his professional development model for ECE practitioners, along with elements of

"Diversity", "Seeing Issues from Multiple Perspectives" and "Early Childhood Education as a force for Change". Other studies, for example, Cunningham (2008) and Snow, Burns, and Griffin (1998) have also found that the quality of a literacy teaching and learning early childhood program are an important factor for positive effects on language and literacy skills.

Purpose of the Present Study

Within the current realm of research on assessing early childhood education quality in Hong Kong, there has not been much deliberate effort paid to adapt well-researched early childhood education environment assessment instruments and further promote its use in Hong Kong. The purpose of the study is to test out on the effectiveness and applicability of providing to pre-schools with another option of using two evidence-based standardized tools, namely, the Early Childhood Environment Rating Scale–Revised (ECERS-R) (released in 1998) and Early Childhood Environment Rating Scale –Extension (ECERS-E) (released in 2010), to complement the existing tools for use in the self-evaluation process by ECE practitioners of making their school settings a more effective and sustainable learning environment for children. By examining the applicability of the two standardized tools in real-life settings and learning from the information and through the experiences in this research process, it is hoped that the project will act as a springboard for early childhood educators to enrich their practices and provisions and move into the new era of quality ECE that will help children unleash their potentials in all aspects.

Research Objectives

The current research plays a precursor role in examining the applicability of the Hong Kong Chinese versions of ECERS- R and ECERS-E for use in the local early childhood educational settings. In addition to examining the reliability of the two instruments, its effectiveness in terms of identifying areas for improvement in real-life educational environments by practitioners as well as logistic and practical issues were looked into.

Method

Participants

Five selected registered kindergartens (which have been registered in compliance with the Education Ordinance of EDB) were recruited to participate in this research by convenience sampling. The school characteristics are listed in Table 1. Representatives from each kindergartens received training on the administration of the Chinese versions of ECERS- R and ECERS-E as formative assessment tools for use in their own settings. Four of the five kindergartens are operated by Non-Governmental Organizations and one by non-profit making organizations. Students mainly come from lower and middle class with working parents. A total of seven classrooms, ten teachers and six facilitators were involved. Each school nominated two teachers as seed teachers to co-observe and rate one or two classroom environments. One or two facilitators co-worked with the seed teachers in every school. Facilitators are all early childhood educators with extensive expertise and experience.

Instruments

The Early Childhood Environment Rating Scale-Revised (ECERS-R) (Harms et al., 2005) and Extension (ECERS-E) (Sylva et al., 2010) are among some of the most widely adopted instruments for use in evaluating the quality of classroom and pedagogical environment in early childhood education settings. In the present study, the two scales have been translated into Chinese (with permissions from their original authors) and adopted for use in the local ECE settings. Back translation was also performed to ensure the accuracy of the translation from Chinese to English. The scales provide a comprehensive framework for carrying out formative assessment by ECE practitioners on the quality of the educational environment of their own school setting. There are a total of 43 items in the seven subscales of “Space and Furnishings”, “Personal Care Routines”, “Language Reasoning”, “Activities”, “Interactions”, “Program Structure” and “Parents and Staff” in the ECERS-R, and 15 items in the four subscales of “Literacy”, “Mathematics”, “Science and the Environment” and “Diversity” in ECERS-E.

Table 1. *School Characteristics of the Five Participating Kindergarten and Nurseries*

School Name **Detailed Information**	A. Full day Nursery for2-6years old in Chaiwan Estate	B. Full day Nursery for 2-6years old in Kwun Tong	C. Full day Nursery for2-6years old in Tin Sui Wai	D. Full day Nursery for2-6 years old in Tai Kwo Ling	E. Half day & full day kindergarten for 2-6 years old in Tin Sui Wai
School Category	Non-profit-making	Non-profit-making	Non-profit-making	Non-profit-making	Non-profit-making
Total No. of Principal & Teaching Staff (Data as of Sept. 2015)	10	7	11	13	39
Academic Qualification	Degree holders: 6 Non-degree holders: 4	Degree holders: 3 Non-degree holders: 4	Degree holders: 9 Non-degree holders: 9	Degree holders:4 Non-degree holders: 9	Degree holders:15 Non-degree holders: 24
Professional Qualification	QTE(E) or above: 10	QTE(E) or above: 6 Qualified EG Teachers: 1	QTE(E) or above: 11	QTE(E) or above:12 Qualified EG Teachers:1	QTE(E) or above:34 Qualified EG Teachers: 4 Other teacher trainings: 1
No. of Enrolment	112	60	109	135	446
Teacher to pupil ratio (Data as of Sept. 2015)	Morning: 1:11.1 Afternoon: 1:12.3	Morning: 1:8.6 Afternoon: 1:8.6	Morning:1:9.9 Afternoon:1:9.9	Morning: 1:10.4 Afternoon: 1:10.4	Morning:1:8.2 Afternoon:1:6.7
Curriculum type	Local	Local	Local	Local	Local
No. of Registered Classrooms	4	2	4	5	18
Learning assessment	Daily on-going observation and assessment	Daily observation and continuous assessment	AA journey of learning profile is kept for each student. Ongoing and conclusive assessments are also done	Continuous assessment throughout the school year is adopted. The learning progress of each child will be kept in the 'Children Personal and Professional Development and Learning Record' and 'Individual Learning portfolio'	A child's learning outcome is assessed based on records of ongoing observation. No examinations or tests are given.
Learning /Teaching approach & activities	Curricula feature theme-based learning and project-based learning, and focus on children's life experience and physical quality	Curriculum is implemented by mixed learning and thematic instruction approach	Curriculum emphasises self-directed learning of students with topic studies. Also implemented by Whole Language Approach and Operational Mathematics	Integrated Curriculum, Whole Language Learning Approach, Project Learning Approach, Situational Learning, Shared Reading Approach and Phonemic Awareness are adopted	Cantonese and English are the teaching media. Children develop bi-literate and tri-lingual abilities in the immersive way. Putonghua lessons taught by Putonghua specialists. The curriculum is designed with reference to children's development and interest

The items on both instruments are scored on a 7- point scale (from '1' indicating inadequacy to '7' indicating 'of exceptionally high standard'). Scoring is to be done by practitioners after completing observations in a classroom. The reliability of both ECERS-R and ECERS-E are quite robust. The internal reliability of the ECERS-R ranged from 0.71 to 0.88 across the subscales and the internal reliability of the ECERS-E is from 0.83 to 0.97. Individual items of the two scales are listed as follows: ECERS-R includes 43 items from seven subscales (Space and Furnishings – 8 items, e.g., "indoor space" getting a "7" means that "natural light can be controlled"; Personal Care Routines – 6 items, e.g., "greeting/departing" getting a "7" means that "when they arrive, children are helped to become involved in activities, if needed"; Language Reasoning – 4 items, e.g., "books and pictures" getting a "7" means that "some books related to current classroom activities or theme" are available; Activities – 10 items, e.g., "fine motor" getting a "7" means that "materials rotated to maintain interest"; Interaction – 5 items, e.g., "supervision of gross motor activities" getting a "7" means that " staff talk with children about ideas related to their play"; Program Structure – 4 items, e.g., "schedule" getting a "7" means that "smooth transitions between daily events"; Parents and Staff – 6 items, e.g., "provisions for parents" getting a "7" means that "parents asked for an evaluation of the program annually"); ECERS-E includes 18 items from four subscales (Literacy – 6 items, e.g., "print in the environment" getting a "7" means that "discussion of environmental print takes place and often related to objects of personal interest of the children"; Mathematics – 4 items, e.g., "counting and the application of counting" getting a "7" means that "all children are actively encouraged to take part in counting objects in a variety of contexts"; Science and Environment – 5 items, e.g., "natural materials" getting a "7" means that "children are encouraged to bring natural materials into the center"; Diversity – 3 items, e.g., "planning for individual learning needs" getting a "7" means that "the planning and organization for social interaction enables children of all developmental stages and backgrounds to participate at an appropriate level in both individual and common tasks").

Procedures

In the early stage, the PECERA-HK (ECERS) professional team visited kindergartens and nurseries and carried out assessments on-site to assess the applicability and verify the

reliability of ECERS-R and ECERS-E in its original and translated version. The team then revised any possible discrepancies in the translation of ECERS- R and ECERS -E and finalizing the translated versions. Training on the rationale and use of the tools were then provided to participants from the kindergartens by the PECERA-HK (ECERS) professional team. Using the Chinese version of the scales, the trainers, teachers and administrators from the kindergartens then completed three pilot assessment trials in three different phases respectively. For each trial, by using the ECERS-R and ECERS -E, teacher representatives from each kindergarten completed assessment together with the trainers, and discussed the observations and evaluation after each assessment trial.

Results

On the reliability of the ECERS-R and ECERS -E, the level in terms of consistency in scoring across time in the three different trials by raters (both trainers and teachers) is reported in Tables 2 and 3 below.

Table 2. *Complete Consensus of Scores and Agreement of Scores within 1 Mark of Consensus between Trainers and Teachers across the 3 Different Trials in ECERS-R*

ECERS- R / Participant	Time 1: Complete Consensus	Time 2: Complete Consensus	Time 3: Complete Consensus	Time 1: Agreement of scores within 1 mark of consensus	Time 2: Agreement of scores within 1 mark of consensus	Time 3: Agreement of scores within 1 mark of consensus
Kindergarten A	21 /43	23 /43	28 /43	7 /43	9 /43	10 /43
Kindergarten B	21 /43	14 /43	26 /43	4 /43	9 /43	11 /43
Kindergarten C	27 /43	21 /43	23 /43	1 /43	4 /43	5 /43
Kindergarten D	15 /43	17 /43	21 /43	9 /43	6 /43	7 /43
Kindergarten E	30 /43	31/43	25 /43	3 /43	5/43	6 /43

Table 3. *Complete Consensus of Scores and Agreement of Scores within 1 Mark of Consensus between Trainers and Teachers across the 3 Different Trials in ECERS-E*

ECERS- R / Participant	Time 1: Complete Consensus	Time 2: Complete Consensus	Time 3: Complete Consensus	Time 1: Agreement of scores within 1 mark of consensus	Time 2: Agreement of scores within 1 mark of consensus	Time 3: Agreement of scores within 1 mark of consensus
Kindergarten A	0 /15	6 /15	7 /15	7 /15	3 /15	5 /15
Kindergarten B	9 /15	10 /15	10 /15	4 /15	3 /15	5 /15
Kindergarten C	14 /15	7 /15	13 /15	1 /15	7 /15	2 /15
Kindergarten D	5 /15	9 /15	3 /15	1 /15	5 /15	8 /15
Kindergarten E	10/15	10 /15	3 /15	5/15	5 /15	8 /15

As shown in Table 2, the numbers of consensus scores between trainers and teachers in Kindergarten A, B and D show a general trend of increase from time 1 to time 3. For Kindergartens C and E, inconsistent results are obtained with a fluctuating trend noted on the complete consensus scores across time but consistent increase trend noted on the agreement of scores within 1 mark of consensus. As displayed in Table 3, the numbers of consensus scores between raters in Kindergartens A and B had been show a trend of increasing rater consistency. Fluctuations were noted in the consistency in scores for Kindergarten C, D and E. However, consistency based on the agreement of scores within 1 mark of consensus is noted to be on the increase across time in Kindergarten 4 and 5. These results, when taken as a whole, indicated that there is in general a trend of increasing consistency across time among raters on the administration of both the ECERS-R and ECERS-E.

After the 3 assessment trials using the ECERS-R and ECERS-E, each kindergarten was able to identify for its own setting the strengths, overlooked weaknesses and improved areas according to the categories listed in ECERS- R and ECERS-E through discussions among teachers and facilitators after the three trials. These findings as reported by each participating kindergartens listed in Table 4 below:

Table 4. *Strength, Identified Weakness and Improved Area Assessed by ECERS-R and ECERS-E of each Kindergarten*

ECERS R	**Strengths**	**identified weaknesses**	**Improvement**
Kindergarten A	Interaction, personal care routines. Language reasoning, Space and Furnishings, parents and staff	Activities	Program Structure
Kindergarten B	Interaction	Activities	Language and reasoning
Kindergarten C	Interaction, Space and Furnishings	Language and reasoning, Activities	Program Structure
Kindergarten D	Interaction, Space and Furnishings, program structure, parents and staff	Personal care routine	Language and reasoning, Activities
Kindergarten E	Interaction, parents and staff, personal care routines	Activities, Space and Furnishings	Program Structure
ECERS-E	**Strengths**	**Identified weaknesses**	**Improvement**
Kindergarten A	Literacy	Science and environment, Diversity	Mathematics
Kindergarten B	Literacy	Science and environment, Diversity	Mathematics
Kindergarten C	Literacy	Science and environment	Diversity
Kindergarten D	Literacy	Science and environment, Diversity	Mathematics
Kindergarten E	Science and environment	Diversity	Literacy

Strengths are defined as items in those categories in ECERS-R that are consistently scored 5 or above rated by both raters across time. For Kindergarten A, raters had given 5 or above score for most of the items in “Interaction”, “Personal care routines”, “Language reasoning” and “Space and “Furnishings, parents and staff” from Time 1 to Time 3. For Kindergarten B, raters had given 5 or above score for most of the items in “Interaction”. For Kindergarten C, raters had given 5 or above score for most of the items in “Interaction”, “Space and Furnishings”. For Kindergarten D, raters had given 5 or above score for most of the items in “Interaction”, “Space and Furnishings”, “Program Structure”, “Parents and Staff”. For Kindergarten E, raters had given 5 or above score for most of the items in “Interaction”, “Parents and Staff”, “Personal Care Routines”.

Weaknesses identified are taken to be items in those categories in ECERS-R that are

consistently scored 3 or below rated by both raters across time. For Kindergarten A and B, raters had given 3 or below score for most of the items in “Activities”. For Kindergarten C, raters had given 3 or below score for most of the items in “Language and reasoning” and “Activities”. For Kindergarten D, raters had given 3 or below score for most of the items in “Personal care routine”. For Kindergarten E, raters had given 3 or below score for most of the items in “Activities” and “Space and Furnishings”. Improved areas are defined it as items rated by both raters in those categories in ECERS-R that had been consistently scored higher across time. For Kindergarten A, C and E, the improved category was “Program Structure”. For Kindergarten B, the improved category was “Language and reasoning”. For Kindergarten D, the improved categories were “Language and reasoning” and “Activities”.

For the ECERS-E, strength, weaknesses and improved area are defined in a similar way as it is for the ECERS-R. As far as identified strengths are concerned, raters from Kindergarten A, B, C and D had given 5 or above score for most of the items in “Literacy” across time. For Kindergarten E, raters had given 5 or above score for most of the items in “Science and environment” across time. For the identified weaknesses, for Kindergarten A, B, and D, raters had given 3 or below score for most of the items in “Science and environment” and “Diversity”. For Kindergarten C, raters had given 3 or below score for most of the items in “Science and environment”. For Kindergarten E, raters had given 3 or below score for most of the items in “diversity”. For improved area, the improved category for Kindergarten A, B and D was “mathematics”. For Kindergarten C, the improved category was “Diversity” and for Kindergarten D, the improved category was “Literacy”.

Discussion

There are three major observations in the current study with respect to the two research objectives on examining the applicability of the Hong Kong Chinese versions of ECERS-R and ECERS-E in early childhood educational context in Hong Kong, and their effectiveness as a pair of formative assessment tools to identify areas of strengths and improvements for administrators and teachers.

First, both the Hong Kong Chinese versions of the ECERS-R and ECERS-E scales are reliable instruments to assess the quality of early childhood education environment and

curriculum in Hong Kong. The new Kindergarten Education Curriculum Guide (2017) has further developed a curriculum framework with emphasizes young children's holistic development, caters for learners diversity, promotes an inclusive culture and learning through play. This study provides preliminary evidence that when a rigorous and robust evaluation of the quality of early childhood environments in Hong Kong is needed, these two instruments are reliable and useful indicators for measuring quality of early childhood education within the local context. This finding is consistent with recent literature. The ECERS-R scale is also recommended as a reliable and valid measure for assessing the quality of preschool classrooms recently in Singapore (Bull et al., 2017), South Africa (Biersteker et al., 2016).

Second, research findings suggested that the ECERS-R and ECERS-E provided clear directions for the teachers to utilize the instruments to assess the education services and to equip the practitioners with a formative purpose for professional development. Principals and teachers of the project have suggested that the hands-on experience in collaborating with the facilitators and sharing with other teachers about the strengths and weaknesses have enabled them to be better prepared for focused inspections and comprehensive quality reviews with summative purposes. Through the one year of active participation in observing the classroom environments and curriculum by using the two instruments, the administrators and teachers have gained confidence in conducting formative assessments for their own kindergartens and in general, the consistency of rating in observation across time have mostly increased. Gordon, Fujimoto, Kaestner, Korenman, and Abner (2013) suggested that all indicators of the ECERS-R should be scored continuously as a checklist that provides more information about program strengths and improvements. In the current study and practice, teachers and facilitators have studied through the list of scores after rating it independently and brought the items into discussion and explored ways of improvements.

Third, by using the ECERS-R and E, it enabled practitioners and educators to identify the strengths and characteristics, the improvement as well as the overlooked weaknesses during the observation across time. Specifically, by using ECERS-R and E, we were able to identify "interaction" and "literacy" as the strengths and "activities" and "science and environment" as the weaknesses during the observation for most of the kindergartens in the

current study. It would always be essential for educators and practitioners to have a holistic picture of the education services, and keep improving the identified weaknesses as well as further polishing the strengths in order to providing better education environment. Most importantly, a quality education services could be best evaluated and monitored by validated and reliable measurement tools. In this sense, the introduction of ECERS-R and E could fill in the gaps and limitation with the lack of an objective measurement tools for evaluation of ECE services in the local practice (Becher & Rao, 2012; Hui et al., 2015). The continuous and formative assessment help teachers and administrators build on achievements and capacity to attribute successful experiences and make continuous improvements to controllable and modifiable factors in the classroom environment, such as indoor and outdoor space, and the curriculum, e.g., supporting young children learning literacy, mathematics and science.

The current research does have limitations. For instance, for the purpose of initial assessment trials, the current research only recruited five kindergartens to participate. The small sample size might subject to the issue of generalizability. But still, the qualitative data obtained in the current study enabled us to understand the strength, weaknesses and improved area of the selected kindergarten in a more holistic view across time while might not be possible in conducting a quantitative research. Regardless of the limitation, to our best knowledge, the current research is the pioneer study that adapting standardized early childhood education environment assessment instruments in Hong Kong which aimed to tackle the issues subjectivity in evaluation. Ultimately, the current research has shed light on quality management, emphasizing the needs of maintaining quality education through regular on-going evaluation in early childhood education setting.

To conclude, the current study constitutes a fundamental first step for the local early childhood practitioners to actively engage in quality review on their own early childhood education provisions. Furthermore, it has facilitated the local practitioners further the spirit and practices to other ECE practitioners within and outside their classrooms.

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