

Assessing the Quality of Kindergarten Environments with the Early Childhood Environment Rating Scale

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ABSTRACT

The Early Childhood Environment Rating Scale (ECERS) has been developed as a screening instrument for a quality assessment of early childhood provisions (Harms & Clifford, 1980). The following chapter describes a German adaptation of the ECERS and its application in group settings for children from three to six years of age (German kindergarten). Data are reported with regard to item statistics, the reliability of the scale, its factor structure, and its relations to some external criteria. In general, the results suggest the appropriateness of the ECERS on the whole for assessing the quality of German kindergarten environments. However, some cultural modifications have to be made to obtain a better adaptation to the German kindergarten situation.

INTRODUCTION

In the last two decades, the proportion of young children cared for in an extra-familial early childhood provision has enormously increased in the Federal Republic of Germany as well as in other countries. For example, in the Federal Republic the supply ratio - i.e. the ratio of the number of kindergarten places to the number of all children between the age of 3 to 6 - has increased from 33 % in 1965 to 80 % in 1985 (Tietze, Roßbach & Ufermann, 1989). However, there are still some shortages of places in the less well-provided regions of the country and a strong debate is in progress regarding the organisation of the places available in such a manner that the hours of opening and the duration of daily operating correspond better with the requirements and the life rhythms of families. Besides the quantitative development of early childhood provisions, a growing concern for qualitative improvements of preschool settings can be observed. This discussion, which is in some aspects just commencing, relates to the maintenance and improvement of standards of early childhood settings. The quality of early childhood environments is also a matter of debate in other countries. In the U.S. for example, at least two large-scale programs

are attempting to raise the quality standards of preschool settings and preschool teachers: the *Center Accreditation Program* of the National Association for the Education of Young Children (Bredekamp, 1987) and the *Child Development Associate Program* (Hamby, 1981). However, the process by which the quality of a setting or a teacher is assessed - and probably improved - and some sort of a quality stamp certifying them requires a longer period of time. A different approach is followed by Thelma Harms and Richard M. Clifford from the Frank Porter Graham Child Development Center at the University of North Carolina at Chapel Hill. The two authors developed the *Early Childhood Environment Rating Scale (ECERS)* - a kind of screening instrument for a quality assessment of early childhood provisions (Harms & Clifford, 1980, 1983). The ECERS can be used in a variety of early childhood group settings for the care and education of children from birth to the age of six, including for example full center day care, part day preschool programs or kindergarten. In addition, a special version for family day care was developed, as well.

It was the feature of a rapidly applicable screening instrument for assessing quality that led us at the University of Münster to develop and test a German adaptation of the ECERS. The German version is restricted to application in group settings for children from three to six years of age, i.e. the German kindergarten. The main objectives of this chapter are to describe the ECERS, to explore the appropriateness of the scale for a culturally different educational environment, to assess the reliability of subscales and the total scale, to explore its factor structure, to compare item statistics with those of the U.S. original, and to look at its validity with regard to external criteria.

THE EARLY CHILDHOOD ENVIRONMENT RATING SCALE

The original version of the Early Childhood Environment Rating Scale (ECERS) is designed for application in areas of research and teacher training. The scale can be used for both the evaluation of a setting by external professionals as well as self-evaluation by classroom teachers. In the U.S., many research studies on early childhood group settings have used the ECERS as one of their instruments. The ECERS gives an overall picture of the surroundings that have been created for young children. In the scale, environment is defined in a much broader sense than usually, including organisation of space, equipment and activities to stimulate

development, adult supervision and interaction, and time schedule (Harms & Clifford, 1986).

Included in the scale are 37 items, organised under seven categories: 1. Personal Care Routines, 2. Furnishing and Display, 3. Language-Reasoning Experiences, 4. Fine and Gross Motor Activities, 5. Creative Activities, 6. Social Development, and 7. Adult Needs. Each item is presented on a 7-point scale, with descriptors for four levels of quality: 1 (inadequate), 3 (minimal), 5 (good), and 7 (excellent). A score of 1 means no provision is made in either the physical environment or materials on that dimension. A score of 3 denotes minimal material, space or supervision provided. A score of 5 requires adequate materials in space set aside for activities with supervision. A score of 7 requires that all attributes of a score of 5 be present plus provision for encouraging independent use by the children and evidence of teacher planning for individual differences¹. The midpoint ratings (2, 4, and 6) are used when all of the lower descriptor requirements are met but only part of the higher descriptors are present. The scale is administered by a trained rater during and after an observation period of about one and a half hours. One classroom at a time can be rated. The ratings should be based on the current situation that can be observed or is reported by the teacher, not on future plans.

Three key questions guided the selection of the 37 items:

- 1) What do children need in any group setting in order to make developmentally appropriate gains physically, socially, intellectually, and emotionally?
- 2) How should teachers structure the environment to best meet children's developmental needs?
- 3) What do teachers themselves need in the setting in order to do a professional job?

¹ For example, item 23 "Blocks" from the category 5 "Creative activities": 1 - Few blocks and accessories. Not enough space to play with blocks; 3 - No special block area set aside, but space available for block play. Blocks and accessories enough for at least two children to play at one time; 5 - Special block area set aside out of traffic with convenient storage. Space, blocks, and accessories for three or more children at one time. Area available for at least one hour each day including some mornings and some afternoons each week; 7 - Special block area with suitable surface (e.g. flat rug). Variety of large and small blocks and accessories, with storage organized to encourage independent use (e.g. with pictures on shelves to show where blocks belong).

The *basic educational orientations* in the instrument are:

- 1) Children are active learners.
- 2) Children also learn through interaction with their parents, teachers and other adults; therefore, planning for interaction and productive use of appropriate play and routine activities is an important part of the teacher's role.
- 3) A physical environment that is organised and functions so that children can be maximally independent and successful allows more time for productive interaction, discussion, and enjoyment.
- 4) Children need emotional warmth, softness, protected space, and predictable routines to feel secure and protected.
- 5) In order to obtain good environments for children, the needs of the adults in that environment must also be met.

METHODS

The ECERS was translated with only very few modifications into German in order to provide for a direct comparison of the German and the U.S. version. In two smaller studies, the German adaptation was tested. The first study includes 43 classes from 18 kindergartens (part day programs only). Each class was rated by a trained *external rater* after an observation period of about one and a half hours. In addition, a small questionnaire was given to the directors of the 18 kindergartens asking for some global characteristics such as size of the kindergarten, teacher qualifications and socio-demographic composition of the catchment-area of the kindergarten (Hagen, 1984; Hagen & Roßbach, 1987). The second study includes 25 classes from 25 kindergartens in which both the ratings of an *external observer* and of the *teacher herself* exist (Sander, 1986). In both studies, the kindergartens vary according to the SES background characteristics of the residential areas of the kindergartens. This chapter only deals with the ratings of the external observers.

ANALYSIS AND RESULTS

German and U.S. means in the 37 items of the ECERS

In a first step, we compared the German item means with the combined results from various U.S. studies. Table 1 contains the German means for the 68 classes and the U.S. means for 91 classes for three to five year old

children (data presented by Harms & Clifford at the NAEYC-meeting in Anaheim, 1988).²

To begin with, a large number of items are identically or almost identically rated in German classes as compared to the U.S.: 15 items show a difference of less than or equal to two tenths of a scale point. However, there exists a tendency towards higher ratings in Germany: 30 of all 37 items in German classes (81.1 %) are rated higher than or equal to 5.0, whereas this is only true of 23 items (62.2 %) in the U.S.

This trend for higher ratings is also reflected in the differences between the total mean item ratings in both countries. In the U.S., the item means range from 3.8 to 5.8, no extreme mean exists. In Germany, some items have extremely low means (e.g. the items 3, 31 and 33 are under 2.0), others have extremely high means (e.g. the items 4, 23 and 35 are above 6.0); not considering the very low items 3, 31 and 33, the range lies between 4.6 and 6.6. Thus, in general, the 37 scales seem to be more appropriate for the U.S. situation. In addition, in Germany some items have low standard deviations indicating that German classes do not differ in regard to that quality aspect of a classroom (without table).³

Table 2 contains the five lowest and the five highest items for both countries.

² In the second German study, item 3 (nap/rest) was estimated only in classes with care over the lunch time period. Since this was only true of two classes, the mean of item 3 is exclusively related to the first study in 43 classes. In the first study, item 33 (provisions for exceptional children) was estimated in all classes, in the second study only in cases where exceptional children exist (8 classes). Since both items were used differently in the two studies, the total mean item rating is calculated without item 3 and 33 (included, the total mean would be 5.1).

³ In the first study of 43 classes, for example, 12 items have a standard deviation of less than 1.0, four items of even less than or equal to .5. In an U.S. study by Baily, Clifford & Harms (1982) only two items are reported for 56 non-handicapped preschool classrooms with a standard deviation of less than 1.0.

Table 1: Item Means

Item name	FRG (n = 68)	U.S.(n = 91)
<i>Personal care routines</i>		
1. Greeting/departing	5.7	5.3
2. Meals/snacks	4.9	5.4
3. Nap/rest	1.0	5.1
4. Diapering/toileting	6.6	5.3
5. Personal grooming	5.1	5.1
<i>Furnishing and display for children</i>		
6. Routine care furnishings	5.6	5.5
7. Learning furnishings	5.4	4.8
8. Furnishings-relaxation	4.6	4.4
9. Room arrangement	5.8	5.1
10. Child-related display	5.1	4.6
<i>Language-reasoning experiences</i>		
11. Understanding of language	5.3	5.4
12. Using language	5.5	5.6
13. Reasoning	5.1	5.1
14. Informal use of language	5.8	5.4
<i>Fine and gross motor activities</i>		
15. Fine motor	5.7	5.7
16. Supervision (fine motor)	5.7	5.7
17. Space for gross motor	5.2	4.9
18. Gross motor equipment	5.2	4.4
19. Scheduled time for gross motor	5.5	5.5
20. Supervision (gross motor)	5.3	5.4
<i>Creative activities</i>		
21. Art	5.5	4.7
22. Music/movement	4.7	5.6
23. Blocks	6.2	4.5
24. Sand/waterplay	5.0	4.2
25. Dramatic play	4.8	3.9
26. Schedule (creative activities)	5.2	5.4
27. Supervision (creative activities)	5.7	5.8
<i>Social development</i>		
28. Space to be alone	5.0	3.8
29. Free play	5.9	5.1
30. Group time	5.2	5.1
31. Cultural awareness	1.9	3.8
32. Tone	5.6	5.7
33. Provisions for exceptional children	1.6	4.7
<i>Adult needs</i>		
34. Adult personal area	5.1	4.0
35. Professional growth opportunities	6.1	5.4
36. Adult meeting area	5.0	4.9
37. Provisions for parents	5.2	5.7
TOTAL MEAN ITEM RATING	5.3	5.0

Table 2: Lowest and Highest Items

FRG (n=68)			
<i>Lowest items</i>	M	<i>Highest items</i>	M
3. Nap/rest	1.0	4. Diapering/toileting	6.6
33. Provisions for exceptional children	1.6	23. Blocks	6.2
31. Cultural awareness	1.9	35. Prof. growth opport.	6.1
8. Furnishings-relaxation	4.6	29. Free play	5.9
22. Music/movement	4.7	9. Room arrangement	5.8
		14. Informal language	5.8
U.S. (n=91)			
<i>Lowest items</i>	M	<i>Highest items</i>	M
28. Space to be alone	3.8	27. Supervision (creat.)	5.8
31. Cultural awareness	3.8	15. Fine motor	5.7
25. Dramatic play	3.9	16. Supervision (fine motor)	5.7
34. Adult personal area	4.0	32. Tone	5.7
24. Sand/water play	4.2	37. Provisions for parents	5.7

With regard to the lowest items in Germany, nap/rest (3), provisions for exceptional children (33) and cultural awareness (31) are for almost all classes rated as inadequate. However, these results are as expected: item 3 is explicitly related to nap and rest time which is usually not provided in German kindergartens without care over lunch time. Since only such settings were rated, the low mean is as expected. Item 33, provisions for exceptional children, is related to an integrative stimulation of exceptional children in the mainstream, which is only just beginning in German kindergartens.⁴ Item 31, cultural awareness, is related to the ethnic and racial variety in American settings which are different from the situation in Germany. In German kindergartens, multi-cultural education is just commenc-

⁴ In the first study, item 33 was rated in all 43 classes with a mean of 1.0. In the second study, the item was only rated in classes in which exceptional children exist (8 classes). As expected, a higher mean of 4.6 was achieved. However, as compared to the other items this mean still belongs to the lowest.

ing.⁵ The next item (item 8, furnishings-relaxation) has a mean which is almost 3 points higher, thus also indicating the tendency for higher ratings in Germany. In the U.S., only one of the German low items also belongs to the lowest items: item 31 (cultural awareness).

Considering the five highest items in Germany, the trend for higher ratings as compared to the U.S. can also be seen. Item 4, diapering/toileting, is rated as excellent in almost all classes. This does not come as a surprise, since sanitary provisions which satisfy the developmental requirements of children belong to the standards emphasised in German kindergartens and are supervised by the youth welfare offices. Other very high ratings concern blocks (item 23), professional growth opportunities (item 35) and free play (item 29), i.e. aspects with a long tradition in German kindergartens such as blocks and free play or aspects which are being currently debated in Germany such as the professional growth opportunities. Not one of the highest German items belongs to the highest items in the U.S..

In general, the means of the items are higher in Germany as compared to the U.S., some items even show ceiling-effects. This seems to be due to the different situation in and regulations for German kindergartens as compared to the U.S. preschool settings. On the other side, a lot of items can also be directly used in German settings. As a result, about 20 % of the items have to be modified to obtain a better adaptation to the German situation.

Reliabilities and Factor Structure

Harms and Clifford (1980, p. 38 f.) report - for ratings of 25 classrooms - internal consistencies for the total scale (composite scale of all items) of $\text{Alpha} = .83$ and for the seven subscales (composite scales of the corresponding items) of $\text{Alpha} = .32$ to $.76$. For the 43 classes of the first study in Germany we obtained $\text{Alpha} = .93$ for the total scale and $\text{Alpha} = .43$ to $.76$ for the subscales. Thus, the reliabilities are comparable. However, the corrected item-total-correlations are unsatisfactory, some items even have negative item-total-correlations. In addition, some items have higher correlations with other scales than with the scale to which they theoretically belong.

⁵ However, an increase in the amount of multi-cultural education is directly reflected in the scale. The second study was conducted in an area with a high percentage of children from a different cultural background (mainly Turkish children). The need for a multi-cultural education is reflected in a higher mean rating (3.0) for these kindergartens.

These inconsistencies led us to explore the dimensions of the ECERS using factor analysis procedures. The factor analysis was done with the ratings of the 43 classes of the first study and with a reduced set of items excluding six items (3, 4, 23, 24, 31, 33) because of problems with the item statistics.⁶ A factor analysis with three factors was selected (principal component analysis, VARIMAX rotation). The three factors account for 53 % of the total variance, the first factor accounts for 23.4 % of the variance, the second for 15.0 % and the third for 14.6 %. Table 3 contains the loadings and communalities. Only loadings greater than or equal to .3 are included. The items are grouped according to their loadings.

A first inspection of Table 3 shows that a large number of items have high loadings and communalities. However, some items are very complex and show higher loadings on more than one factor. With regard to a simple factor structure, those items should be reformulated in the direction of one factor - if such a sharpening is theoretically desirable. Factor 1 can be labelled *space-material equipment* since most of the items relate to the availability and use of space and materials for different activities.⁷ Factor 2 relates to the *atmosphere* in the class and the *guidance by the teacher* as can be seen from the items with the highest loadings. Factor 3 addresses the *involvement of the teachers with regard to special activities*, i.e. activities which are not totally obvious in German kindergartens (for example: personal grooming or meals/snacks).

The factor structure does not reproduce the underlying seven subscales; a comparison with a factor analysis of the U.S. data is not possible since - at the moment - such a factor analysis is not available. In Hong Kong, a factor analysis with 53 classrooms and a slightly different set of items (three new items; exclusion of four "old" items: 1. Greeting/ departing, 3. Nap/ rest, 5. Personal grooming, and 33. Provisions for exceptional children) was conducted (Tse, personal communication). Five factors could be identified which account for 67.1 % of the variance (without table).

⁶ A factor analysis with 31 items and only 43 cases should be considered with caution. Therefore, different factor analyses with smaller subsets of items also were conducted. However, they point to the same factor structure as the analysis with the set of the 31 items.

⁷ This designation is perhaps not quite appropriate as in the case of every item it is not merely the presence but - as far as the higher values are concerned - the particular utilization of space and material that is important.

Table 3: Loadings and Communalities (h^2)

Item name	Loadings factor			h^2
	1	2	3	
36. Adult meeting area	.76	-	-	.63
9. Room arrangement	.74	-	-	.58
18. Gross motor equipment	.74	-	-	.57
35. Professional growth opportunity	.69	-	-	.49
7. Learning furnishings	.68	-	-	.47
6. Routine care furnishings	.68	.44	-	.65
29. Free play	.67	.42	.35	.74
17. Space for gross motor	.66	-	-	.50
34. Adult personal area	.62	-	-	.45
15. Fine motor	.56	-	.37	.53
28. Space to be alone	.56	-	.53	.62
13. Reasoning	.54	-	.46	.56
25. Dramatic play	.53	-	.41	.52
21. Art	.52	.43	.40	.62
11. Understanding of language	.52	-	.45	.52
30. Group time	.48	-	-	.37
8. Furnishings-relaxation	.45	-	-	.27
32. Tone	-	.85	-	.75
1. Greeting/departing	-	.73	-	.79
16. Supervision (fine motor)	-	.72	.50	.64
14. Informal use of language	-	.65	-	.46
27. Supervision (creative activities)	-	.58	-	.46
12. Using language	-	.55	.46	.53
26. Schedule (creative activities)	.30	.41	.39	.42
20. Supervision (gross motor)	.33	.41	-	.28
10. Child-related display	.36	.40	.31	.39
5. Personal grooming	-	-	.74	.60
2. Meals/snacks	-	-	.69	.53
37. Provisions for parents	-	-	.68	.52
22. Music/movement	-	.39	.55	.49
19. Scheduled time for gross motor	.44	-	.50	.46

The factors can be labelled: 1. Provision for the learning activities of children, 2. Engagement and activities of children, 3. Space, material, equipment, 4. Supervision and rapport, and 5. Provisions for needs of adults and children. This factor structure is of high meaning for the preschool situation in Hong Kong, however, the underlying seven subscales of the original ECERS can also only partly be reproduced: Factor 3 "Space, material, equipment" is similar to subscale 4 "Fine and gross motor activities", and factor 5 "Provisions for needs of adults and children" is similar to subscale 7 "Adult needs". As a results of the factor analyses, further work on the theoretical structure of the ECERS has to be done, especially with regard to international comparisons. The results of the German factor analysis point to the necessity of not only translating the items into German, but of reorganising the items to obtain a better fit with both the German kindergarten situation and the underlying theoretical structure.

According to the German factor structure, three composite subscales were devised. The reliability of the subscales (Cronbach's Alpha) are: .90 for space-material equipment (17 items), .82 for atmosphere/ guidance by teacher (9 items) and .74 for involvement of teachers with regard to special activities (5 items). Taking into account the number of items per subscale, the reliability seems to be sufficient. Therefore, we analysed the correlations with some external criteria.

Relations to External Criteria

Neither of the two German studies were planned in order to analyse in a detailed manner the validity of the German adaptation of the ECERS. However, in the first study some information on external criteria is available on the level of the 18 kindergartens in which the 43 classes were rated. Table 4 contains the correlations of the three composite subscales and the total scale (31 items only) with external criteria.

Three external criteria have been considered:

- The first criterion *teacher qualifications* is a composite score of the qualifications of all teachers in a kindergarten (high values relate to better teacher qualifications).
- The second criterion *degree of occupied places* describes the relation between the number of children in a kindergarten and the number of all available places in the same kindergarten, i.e., it describes to what degree the capacities of the kindergarten are used (high values relate to a high level of utilisation of the kindergarten).

- The third criterion *sociotop* relates to the socio-demographic composition of the catchment-area of the kindergarten (high values describe a more favourable composition).

Table 4: Correlations of the ECERS with External Criteria (n = 18 kindergartens)

	Teacher qualifi- cations	Degree of occupied places	Socio- top
1. Space-material equipment	.30	.13	-.09
2. Atmosphere/guidance by teacher	.11	.20	.13
3. Involvement of teachers with regard to special activities	.29	.03	.13
Total ECERS (31 items)	.29	.15	-.01

The correlations of the three subscales and the total scale with the three external criteria turn out to be of only low level. No relation exists with the socio-demographic composition of the catchment-area. However, some indications of the validity of the scales can be found: kindergartens with better qualified teachers tend to have better ratings with regard to space-material equipment, involvement of teachers with regard to special activities and the total scale. Kindergartens in which almost all places are occupied - i.e. kindergartens which seem to be more attractive to parents - have a higher value with regard to atmosphere and guidance by teachers. In general, the ECERS seems to provide a valid measurement of some aspects of a kindergarten. However, the correlations are only of low level, they are based on only 18 kindergartens, and the study was not designed as a test for validity.

CONCLUSION

In general, the results suggest the appropriateness of the ECERS on the whole for assessing the quality of German kindergarten environments. It can be concluded that the ECERS is a promising instrument. However, some major cultural modifications have to be made to obtain a better

adaptation to the German kindergarten situation. In co-operation with the original authors Thelma Harms and Richard M. Clifford, such a modification of the ECERS including work on the theoretical structure will be effected in the near future.

Given the technical features of the German ECERS (factor structure, reliability), the use of the ECERS in evaluation and research should be considered with caution. Further studies must at least be conducted in order to confirm these first results. Another field of application of the ECERS can be seen as a means for providing an evaluation of the kindergarten situation by the teachers themselves and for improving the professional awareness of teachers. Important questions might be: To what extent do the preschool teachers' ratings correspond with those of external raters? Do preschool teachers obtain indicators for improving the quality aspects of their classrooms by using the ECERS? What items of the ECERS are judged most and least important by teachers? What characteristics are missing from the ECERS from the teachers' perspective? Such questions have been followed in another study (Sander, 1986). The results show, that the ECERS could be a promising instrument for teacher self-evaluation and for improving the professional awareness of teachers and thus, at least in some aspects, the quality of their work.

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