Using Drawings to Assess Children’s Perceptions of Schoolyard Environment: A Case Study of a Primary School in Drama, Greece

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Abstract— This paper presents the results of a research, carried out at the 7th Primary School of Drama, investigating the effect of gender and age on the way children perceive their schoolyard based on the analysis of their drawings. Children’s drawings were used as an alternative tool for researching their ideas, concerns, preferences for schoolyard environment. Analysis of drawings was done with standardized criteria as the frequency of observed nature features and the % of drawing area covered with nature features. Drawings were used because they permit longer involvement of the child than oral interviews or written questionnaires which are not so favourable to children. They are also useful to overcome the demand of long-lasting field observation required to perceive children’s space preferences. The findings of the study indicate that pupils in general perceive their desired schoolyard mainly as a nature habitat. Gender and age differentiations were observed only as regard the build environment.

Keywords- Children, drawings, environmental perceptions, nature, schoolyard.

I. INTRODUCTION

School grounds are academic learning environments and as such they have their pedagogical value [1]. Empirical research studies have demonstrated that outdoor schoolyard learning experiences can be more effective than traditional indoor classroom and have supported teachers and educational authorities to embrace the schoolground learning movement [2]. The consideration of children’s ideas, concerns, and preferences for their desired school environment is given a high priority in the design of their schoolyard through environmental education projects [3]. This is seen as a practical step to stimulate their future interest to participate in local environmental design actions for sustainable development.

Children drawings have been used as diagnostic and assessment tool in this research based on a review of the art education literacy regarding drawing in elementary school. Unlike traditional assessments that focus almost exclusively on verbal and logical intelligence, alternative assessments allow students of different learning styles and abilities to demonstrate their understanding in different ways [4], [5]. Drawing is a natural mode of communication that children rarely resist and that offers a way to express feelings and thoughts in a manner that is less threatening than strictly verbal means [6]. Drawings constitute a relatively easy method of concentration of information from and for the children [7].

Arnheim [8] and Vygotsky [9] argue that art and thinking are closely connected and artistic representations reflect the artist’s thoughts just as much as written text reflects the author’s thoughts. Many researchers have demonstrated that children’s drawings can reflect self-concept, attitudes, wishes, and concerns [10], and is widely acceptable that the content of children's drawing can provide information on their feelings for the world [11]. Children omit objects they strongly dislike in their drawings [12]. Feelings and attitudes toward particular objects influence how individuals process information both verbally and graphically [13]. As reported by Barraza (1999) [14] and Van-Summers [15] children's drawings can provide valuable information for assessing their environmental perceptions, knowledge, interests and experiences. Drawings have not been used to assess student knowledge or attitudes in academic subject areas [16]. Matthews [17] reported that children use drawings to create concepts or objects with which are most familiar. Student drawings of schoolyard environments can serve as indicators of their attitudes and knowledge regarding these areas.

Based on literature data in the fields of art education, alternative assessment and environmental education, it seemed possible and desirable that we could use children drawings as an assessment tool of their ideas for the ideal schoolyard environment and develop a methodological approach to analyse their drawings.

II. THE RESEARCH

The sample of the research was all the 187 pupils aged from 6 to 12, at grades from one to six of the 7th Elementary School of Drama. Children were asked to draw their ideal schoolyard. The drawings were made on an A4 sheet. A wide range of colours was made available to each student. There was no time restriction for the drawings to be completed. Most children completed their drawings in a school-hour (45 min). School children drawings were analysed to evaluate their environmental perceptions, their ideas, expectations and concerns for their schoolyard environment. The analysis of drawings was based on easy-observable and measurable criteria. Data were statistically processed and were used to identify significant differences in the drawings made by different sub-groups of pupils varied in gender and age.

The criteria used were based on the content of drawings, features observed and their frequency and percentage (%) of...
drawing area covered by different features. The features observed in the drawings were categorized into nature and man-made environment and the breakdown of each category was as follows:

1. Nature Environment
   - Soft groundcover
   - Flora
   - Fauna
   - Water
   - Sky

2. Built Environment
   - Playgrounds
   - Other build features
   - Sport grounds and facilities

3. Nature vs. built environment (percentage of the schoolyard area covered by vegetation)
   - The % of drawing area covered by a feature and its relative size in the drawing is used as indicator of children’s preference for the certain feature.

III. DATA ANALYSIS

The results are described as absolute numbers and percentages. Chi-Square tests were used so that statistical importances are detected between the independent variables (gender or age) and depended (bivariate analysis). The differences were considered statistically significant, when the probability of error (p) was smaller the 0.05. The SPSS for Windows, publication 13, computer program was used for the statistical analysis of the research data (SPSS Inc., Illinois, USA).

The drawing activity was a developmentally appropriate method to gather data and to assess the role of gender and age in the children’s drawing of their preferred schoolyard. Although this research examined only two variables (gender and age), multiple sets of attitudes are appeared according to each student’s ideas, needs and desires.

IV. RESULTS

Vegetation (flora) was attractive for the majority of the sample with no significant age differentiation (p=0.66). The breakdown of gender preference to vegetative elements (trees, flowers, and grass) was 61.2% girls and 38.8% boys (significant gender differentiation, p < 0.001). There was a high percentage of preference (68%) for soft groundcover (grass, sand) with no gender differentiation, but with significant (p < 0.001) age differences. There was very low preference for water elements in the schoolyard. 82% of the total sample consider that a water feature would minimize the area available for play and sport activities. These data are explained according to documentation of the importance of nature to children based on several studies on children’s use of large scale environments [18], [19].

Concerning the built environment, there is a significant gender differentiation (p=0.005) on the type of preferred playgrounds. Breakdown of gender preferences to playgrounds was 56.6% girls and 43.4% boys. Sport fields were features observed in the drawings of 54.7% of participating boys and 45.3 of girls with a significant gender differentiation (p =0.033). There was also significant (p < 0.001) age differentiation to sport fields’ preference advancing with the age. These findings correspond to Piaget’s developmental stages of play (practice games, symbolic games, games with rules).

Analysis of data shown in the Table 2 demonstrates that in 63% of the pupils’ drawings vegetation covers 50% of the total drawing surface with no age or gender differentiation. In in 50% of the drawings vegetation (trees, shrubs, flowers and grass) covered 2/3 of the drawing surface.

The capacity of natural environments to satisfy some developmental needs of young children is recognized by many researchers and design professionals. Children’s high preference to nature environment could be justified by the degree of complexity, plasticity and manipulability that has a natural setting, which allow child to experience many developmentally significant play behaviour [20].

### TABLE I
**GENDER AND AGE PREFERENCE TO NATURE AND BUILT ENVIRONMENT BASED ON % COVERAGE OF DRAWING'S SURFACE**

<table>
<thead>
<tr>
<th>School Class</th>
<th>Gender</th>
<th>Absolute number and percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Boys</td>
<td>Girls</td>
</tr>
<tr>
<td></td>
<td>Year 1</td>
<td>Year 2</td>
</tr>
<tr>
<td>Soft ground cover</td>
<td>29(1)</td>
<td>19(1)</td>
</tr>
<tr>
<td>Flora</td>
<td>22(1)</td>
<td>19(1)</td>
</tr>
<tr>
<td>Fauna</td>
<td>19(1)</td>
<td>12(1)</td>
</tr>
<tr>
<td>Water</td>
<td>20(1)</td>
<td>14(1)</td>
</tr>
<tr>
<td>Sky</td>
<td>19(1)</td>
<td>12(1)</td>
</tr>
</tbody>
</table>

### TABLE II
**% OF DRAWING AREA COVERED BY NATURE FEATURES**

(quantitative analysis)
<table>
<thead>
<tr>
<th>School Class</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Boys</td>
</tr>
<tr>
<td>Year 1</td>
<td>0%</td>
</tr>
<tr>
<td>Year 2</td>
<td>2/3</td>
</tr>
<tr>
<td>Year 3</td>
<td>0%</td>
</tr>
<tr>
<td>Year 4</td>
<td>3</td>
</tr>
<tr>
<td>Year 5</td>
<td>2</td>
</tr>
<tr>
<td>Year 6</td>
<td>6</td>
</tr>
</tbody>
</table>

**V. DISCUSSION**

The results support Chambers' argument [24] that in addition to eliminating linguistic barriers, drawings enable comparisons between students of different ages and gender.

Children's drawings were useful tools in providing valuable information for the assessment of children's environmental perceptions. Studies on perceptions, attitudes and knowledge should be key components in the preparation of programmes for environmental education and schoolyard design, management and conservation. Knowledge about students’ perceptions and attitudes concerning their schoolyard may make it possible to provide the basic tools for designing the new schoolyard based on students’ ideas, needs and desires that will enhance not only the school but the community as well.

In addition to the value of drawings as a reflection of students' emotional perceptions, research indicates drawings can reflect students’ knowledge about the subjects in a drawing [25]. Generally, drawings by elementary students include more details and realistic representations for subjects they know more about.

Therefore although the findings of this study support the value of using drawings as diagnostic and assessment tools, further research should be conducted to determine if drawings created over time can be compared and used to document changes in student ideas, concerns, and/or attitudes against schoolyard habitat as a result of exposure to and instruction in, schoolyard environments. Future studies could involve using drawing activities as a pre-assessment document students' baseline knowledge and perceptions before implementing a schoolyard-based environmental education curriculum. Students could then complete post-assessment drawings and differences in pre and post scores could be used to document changes in student knowledge and perceptions.

Children’s preferences to schoolyard environments as expressed in their drawings had certain implications to the approach in the design of the schoolyard of the 7th Elementary School of Drama, Greece. We believe that the consideration of children’s drawings could generate more creative and child-attracted approaches to the design and treatment of schoolyards in Greece which are sterile places, completely devoid of imagination, offering no educational stimulus, nor cultivating environmental conscience.

**REFERENCES**


K. Tamoutselli: earned a B.S. in Horticulture and a Ph.D. in Education at Aristotle University of Thessaloniki, Greece, and an MPhil in Landscape Architecture at Edinburgh University. For the last 9 years, she has worked as Advisor for Environmental Education for the Ministry of Education in Thessaloniki, Greece. She has also lectured at Thrace University in academic areas such as Sustainable Development and Landscape Design. She is lecturer on Environmental Education and Education for Sustainable Development at Aristotle University of Thessaloniki. She focuses on the empowerment of Greek teachers to work out EE projects for the participative redevelopment of schools environments. She has published many articles on EE and educational materials and has helped to rejuvenate many schoolyards in Greece according to sustainable standards. In addition, she has coordinated (2001-2006) a national EE network named “My Schoolgrounds” which was sponsored by the Greek Ministry of Education. She is member of the council caretakers of the Environment International and founder and president of Caretakers of the Environment Greece.

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