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The impact of school design on academic achievement in the Palestinian territories: an empirical study
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The impact of school design on academic achievement in the Palestinian territories: an empirical study[1]

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This article outlines a research project that aimed to gather first-hand data from school users (pupils, teachers, school principals), as well as academic performance data from pupils. The project compared data obtained from users of "new and site-specific" and "standard" schools in order to show whether more attractive and site-specific designs have a positive effect on learning.

INTRODUCTION

Under Employment Generation Programmes (EGP) I-VII, between 1996 and 2007 a significant programme, largely financed through the KfW Development Bank, was launched. A large number of teaching facilities in the Palestinian Territories were renovated and new schools were built, and are currently in use. The architectural style of eight recently-built schools, carried out between 2004 and 2007 under EGP VII, was innovative and site-specific compared to "standard" school designs (traditionally "I", "L" or "U" shaped buildings that are not site-specific). Various design elements aimed to create a more attractive environment for pupils, *e.g.* wall colours, window surfaces, large interior common spaces, courtyards.

If architecturally adapted new school buildings are appreciated by pupils and teachers who work and study there, would appreciation of a better school environment also be reflected in pupils' academic performance? A research project to gather first-hand data from school users was set in motion. The study focused on Arabic language and Mathematics and compared results with that of pupils who studied in standard schools. The new schools chosen for this project were amongst those built under EGP VII.

While all due care was to be given to the collection of data, it was evident from the outset that the large number of intervening variables when conducting research qualified the study as empirical but not as experimental. At best, it was thought that the data would point to significant results confirming the validity of the hypothesis.

1. The study was prepared by Dr. Kaj Noschis from Colloquia Sarl for, and in co-operation with, MEHE.

THE RESEARCH PROJECT: SELECTION CRITERIA

This study was discussed with the Assessment and Evaluation Centre of the Ministry of Education and Higher Education in Ramallah before being implemented. Situated within the context (and constraints) of the West Bank in 2007-2008, and working with limited resources, the research was conducted as follows:

- A team set out to select up to three schools among the seven most recently built and completed, the key criterion being their geographical diversity.
- The team needed to be able to pair off these schools with "control"[2] schools and the researchers needed to have access to them. Consequently, this criterion restricted the study to girls' schools only.

  Selected schools:
  First pair: Al Jalazoon, Ramallah (new) versus Al Mageda Waseela, Ramallah (control).
  Second pair: Deir-Sharaf, Nablus (new) versus Bezzaria, Nablus (control).
  Third pair: Zahrat Al Mada'en, Hebron (new) versus Al Yarmouk, Hebron (control).
- Research on the student population needed to be limited to two age groups. For practical purposes, the team chose 4th grade pupils (nine year-old girls) and 10th grade pupils (15 year-old girls). Performance tests in Arabic and Mathematics were available – or were to become available – in the West Bank for 4th and 10th grade pupils. This was the primary reason for involving these two school grades in the study.
- Cohorts were formed with up to 25 randomly selected pupils from two classes per age group in the selected schools. As one of the new schools (Al Jalazoon, Ramallah) had only 10th grade and no 4th grade classes, and another of the new schools (Zahrat Al Mada'en, Hebron) had only 4th grade and no 10th grade classes, the selection was limited to two classes of only one grade in both of these cases. The same choice was made for the corresponding control schools. In the case of the Deir-Sharaf school in Nablus it was possible to work with both 4th grade and 10th grade classes, but only one class per grade, so one class from each level was included and 1+1 classes from the corresponding control school in Nablus. In total, this meant 12 classes (2+2, 2+2, 2+2) of 25 pupils involved in the study, adding up to a total of 300 pupils (12 x 25).
- The schools were chosen in such a way as to ensure that the socio-economic conditions of all the pupils' families located in the three localities involved in the study (Ramallah, Nablus and Hebron) were comparable. Calculations were based on demographic data from the Assessment and Evaluation Centre of the Ministry of Education and Higher Education in Ramallah.
- With 50 pupils per school, the research focused on a sample of between 15% – 20% of each school's student population. Two teachers per class (in the case of parallel classes this meant only one teacher) as well as all six school principals were also involved in the study. With two classes per grade, to a certain extent the team could control the "teacher" variable in this study.

2. In what follows we prefer the term "control" schools to "standard" schools, as only 1.5 out of three schools was strictly speaking a school with a "standard" as opposed to "site-specific" design.

DATA COLLECTION INSTRUMENTS

Nine methodological instruments were used to collect research data. The aim was to gather information from users about their interaction with their school buildings and describe how pupils, teachers and principals experienced and evaluated their schools. In addition, data were collected on pupils' academic progress in two domains (Arabic and Mathematics). These results were correlated with the pupils' exposure to their school environments, in particular when "new and site-specific" school buildings were compared with "control" schools.

The interview questions were developed on the basis of previous research conducted on similar topics (*i.e.* the evaluation of school environments). They were refined after the first round of visits to the schools and as a result of discussions among the researchers. In order to ensure that the data were both reliable and easily understandable for both respondents and researchers, the information was collected through personal interviews with individuals (principals, teachers and pupils), rather than through written surveys. Interviewers were requested to make sure that questions were fully understood and answers properly noted. The survey comprised the following nine points:

1. An interview with individual principals (34 questions) and two teachers from each class.
2. A 40-question observational notation sheet.
3. A 42-question interview.
4. All 300 pupils (4th grade and 10th grade) were asked to make a drawing of their school.
5. All 300 pupils (4th grade and 10th grade) were asked to answer a series of 12 questions related to academic self-esteem.
6. All 4th and 10th grade pupils of the classes involved in the study took a one-hour standardised Arabic language skill test and a Mathematics skill test at the end of the school year.
7. Two teachers per class were asked to evaluate pupils' progress (knowledge and maturity).
8. The 10th grade girls from four schools (one class per school) were asked to write a short essay about their school, the general environment and how they envisaged their future (further studies or other plans).
9. Architectural surveys of the six school building complexes were carried out by two experienced architects.

The above-mentioned tools were prepared and translated in collaboration with the Assessment and Evaluation Centre of the Ministry of Education and Higher Education in Ramallah. The tests in Arabic and Mathematics were also prepared and implemented by the Centre. The tests took place in May at the end of the school year, and the results were made available to the research team.

KEY STUDY RESULTS

The main bulk of the data resulting from this study is consistent in that the data point to a correlation between, on the one hand, the physical characteristics of the built school environment and, on the other hand, the academic performance of pupils (in Arabic and to a lesser extent in Mathematics). There is also a correlation between their evaluation (appreciation and use) of their school environment and their representation of it through creative drawing. This is the case for 10th grade pupils (15-16 year-old girls), *i.e.* pupils who had been attending "new" schools for the last one to three years interacted with their new school buildings more positively and also did better in school than their peers attending standard or "old" school buildings. This correlated with the evaluation of the same environments by teachers and respective principals.

FURTHER RESULTS AND CONCLUSIONS

On the whole, the research team's results corroborate existing evidence about the importance of the school environment for academic achievement. The team found that performance in Arabic seemed to be a stronger indicator than Mathematics, while in other studies it has been the other way round. Although several results need to be explored further, one interesting new finding is that pupils' drawings of their school could be an indicator of how attractive they find the school environment. On the other hand, they are possibly a reflection of the school building's capacity to stimulate creativity.

In this study, 10th graders (15-16 year-olds) seemed to be aware of their school's objective characteristics (positive and negative). Although this is not surprising, it is strange that 4th graders (9 year-olds) seemed less critical of their school environment. Could this be due to the simple pleasure of going to school? Such a hypothesis can be corroborated with data from other studies in developing society contexts where going to school is felt as a privilege.

Although the survey section of the study led to the formulation of some recommendations for future planning of local schools, the results from the self-esteem instrument (step No. 5 above) were inconclusive: the data did not reveal any differences between the 12 classes that took part in the study. In other (American) studies, the instrument has proven quite discriminating, so it is puzzling that this was not the case in this study. Furthermore, after several cross-analyses of the data in the context of Palestinian and Arabic languages, the instrument's discriminating quality seems to be poor, and requires additional validation.

It should also be remembered that this study only involved girls. Results need to be completed and compared with data from boys' schools in order to compare girls' and boys' habits in terms of playing and moving around in the courtyards and school buildings. A broader study would also permit a better comparison of their academic performance in the Palestinian setting.

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