

Delineating and Analysis School Enrolment Areas by MWVD Method and GIS: In Case of Rasht City , Iran

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Unlike most developed countries, no enforced enrolment areas exist in Iran to guide school selection and allow students to make the most convenient commutes to the nearest schools. This lack of defined school enrolment areas a higher standard of schools in which to enroll students, parents seeking better and more reputable schools often have no choice but to send children in schools outside the local area. In the case of the Iranian city of Rasht, this parental choice based system of school selection has resulted in commutes that are longer than necessary for the junior high school students who journey on foot or on the public buses, city taxis, and private mini-buses that comprise the city's public and private transport.

Despite the relative ease of getting to school in developed countries, a daily journey to the city in Iran is a heavy burden on students and their families. Without the convenience of a school bus or carpooling, most students had to travel longer distances than necessary by foot from their homes to catch a taxi or rented private bus along main routes. Not only are such means of conveyance adding to the considerable cost families of sending their children to the schools in Rasht, they were also less safe. Daily travel in taxis or rented buses also meant higher exposure to the risk of injury or even death. Isolated incidence rapes by drivers in the taxis of Iran's informal job sector also compounds the commuting dangers for female students. Another consequence of lengthy journeys to city schools by foot and rented vehicles included decreased time and energy for homework or other activities at home.

In order to reduce the problems that students face daily in their commutes to schools in Iran delineating optimum boundaries between schools is the major aim of this research. The study area of this research includes Rasht city and its junior high schools located in northern part of Iran in Gilan province, Rasht County. The reduction in population growth has also affected the number of younger people especially students. Although the expected benefits of this trend are increased accessibility to schools, many students have to commute longer than necessary to get to them.

There are 85 public junior high schools with a total student population of 26,873 students for the 2003-2004 school years. These students attend the 40 male-only and 45 all female junior high students scattered throughout the city. Since the environment around public schools is often more unsafe, particularly in the case female students for whom the risks are amplified, and such schools are greater in number than private ones, the focus was on delimiting enrolment areas for public female junior high or PFJH schools.

The hazards and serious inconvenience when commuting in Iran makes research into methods that can minimize the length of current commutes for students when possible an urgent concern, particularly for the more vulnerable female students. This is possible with delineate enrollment areas to each school.

In order to delineate school enrolment boundaries the research utilized the multiplicatively weighted Voronoi diagram (MWVD) method and applied a specialist packaged called WVD18 (Mu Lan, 2004) for the construction of diagrams that would represent the enrolment areas for each school. Each diagram was then constructed in relation to the number of students to represent the weighted factor. Following this approach, larger schools tended to have larger enrolment areas and vice versa for smaller schools. Once the boundaries that would represent each school enrolment area were completed, they were analyzed spatially using Arc/Info, software of the Geographical Information System (GIS). In order to examine if the delimited boundaries minimized travel times and distances for students at schools, the five studied schools were again analyzed for more detailed study.