



İZMİR INSTITUTE OF TECHNOLOGY

FACULTY OF ENGINEERING

CIVIL ENGINEERING DEPARTMENT

AR382 Ecological Studies in Architecture

Proposed Study

## Measuring the Impact on Children Engagement in Research

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## BACKGROUND INFORMATION FOR THE STUDY

The **purpose of modeling** this proposed study is to highlight primary and middle school students need for more **experimental education rather than only theoretical education**, because they will have an **easier transition to university, and may trigger interest in research**, if they start **experimenting with science at earlier age**.

### **İzmir Institute of Technology**

Fortunately, there will be the best chance for those families who are nearby to make the most of **İzmir Institute of Technology (İYTE)**. The university was established as a **research center in Turkey** in order to offer a place for scientists and researchers to conduct their research in the various fields of science and engineering. Later they realized the need to branch out into education. Therefore, **the university began to offer programs for students to learn about science and engineering**. Currently **İYTE is considered the hub of research in Turkey and one of the top universities in science and engineering**. The university hosts around **5000 students** in various programs ranging from engineering to science to languages. Moreover, the institute works to create an environment that host student and academics from various backgrounds to benefit from their different perspectives they offer. Furthermore, the university gives the opportunity to conduct their own research on whatever technical topics they feel interested in, and help them in launch their own companies and promote their inventions in the economic market. Some students and lecturers are

coming from different backgrounds offering different perspectives on culture and education.

### **Science Education in Primary and Middle Schools in Turkey**

Generally, it is known **90% - 95%** of Turkish young **students attend public schools** so in order to examine the common young students of Turkey and understand how **to help** them, **a public school must be chosen**.

Observing the young students at a school in **İzmir city** are **underachieving in multiple classes**. They show a lack of interest in attending and participating in the activities that the school is assigning them. In addition, according to their teachers, they also show lack of curiosity due to the complete focus on theoretical education and completely abandoning any need to apply it in real life.

Primary and middle school Education in Turkey heavily encourages students to memorize theoretical information in order to pass exams that are designed only to measure memorization skills rather than test any other skills needed in university and later work life.

In addition, by examining the curriculum that majority of primary and middle schools across Turkey use to educate young students, the lack of focus on applied education, while the over focus on **theoretical education is overtly visible**. **For example** it is a fact that in the region of **Buca**, in the city of **İzmir**, multiple schools either have one science lab or none at all. Even in the schools with a science lab the teachers and the staff of the school tend **to only encourage the students to improve their grades by only reading and memorizing text books**. **For instance**, in one primary school the records show that the 5<sup>th</sup> grade **students only visited the science lab** three times during their academic year. **They**

only read from textbooks and observed the scientific equipment without being allowed to touch or use them.

Therefore, changes in the education methods of the young students in Turkey are needed. That is why this study offers more detailed look at the actual issues through visiting more primary and middle schools across Turkey, and the collected data will be examined. The study is taking place in İYTE by experienced researchers and will come up with a set of steps and solutions to improve the education experience of young students in Turkey and hopefully across the world.

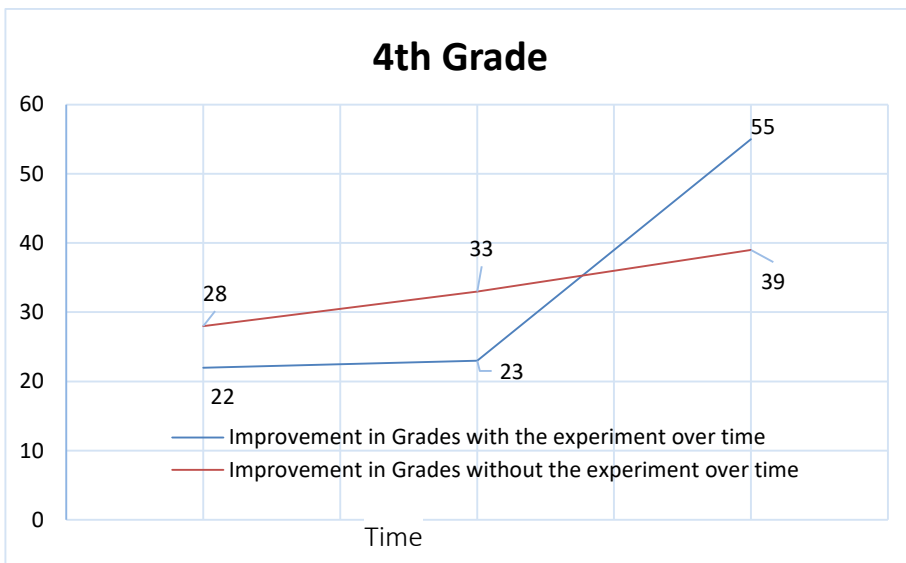
## LITERATURE REVIEW OF SIMILAR RESEARCH

There is significant evidence among those working with child development and early education that **4-years-old** children gain exposure to a high-quality early learning environment (e.g., Rami and Rami, 2004). **Years from birth to 5 years old are considered a critical period to build the foundations of good thinking, behavior, and feelings.** Child development experts show that it is during these years that children acquire language, cognitive, social, emotional, and supervisory skills that predict their future performance in many areas (Trawick Smith, 2014; Woolfolk & Perry, 2012). However, Brophy (2006) suggested that economically disadvantaged children are less quantitatively and qualitatively prepared for school activities. He also noted that poor students, in particular, have less access to educational books, games, toys at home, and are less exposed to educational experiences outside the home (for example, traveling to zoos or museums). There are also qualitative constraints or gaps (**e.g., modeling and experiments**). Lack of access to literature provides another constraint on children of poverty (Liang, 1998).

Also another specific study was conducted in a middle school in Australia where the school invited students from the nearby university and asked them **to prepare a presentation about their departments and present it to the middle school students.** One of the college students talked about why he chose to study architecture and he brought with him models of buildings that he designed and he showed it to the middle school students and explained to them the process of designing them. Another college student talked about his choice to study physics and the skills that he is learning and the experiments that he is performing in his department.

The school saw a great response from the young students, so they committed to do that every year, and by the time the young students finish high school they would already be prepared to choose their field of interest in college. A lot of them stated that the reason for their specific choice is based on the experience. The experience that they had in middle school when they attended a presentation made by a college student about the field they chose. (Alfred Norman, 2009).

One more study took place in the **United Kingdom** in **Moorlands** primary school where the 4<sup>th</sup> grade students participated in the study. **The experiment showed that** when a group of students taking **biology class** only by reading and **observing pictures** from a textbook **could not perform well in their exam. They performed much better** after their teacher **changed his method of teaching.** The teacher changed the theoretical method to a **combination of theoretical and experimental method by taking the 4<sup>th</sup> grade students to lab of the school twice a week and allowing them to do experiment on animals** that they see in their textbooks. (Figure 1)



(Figure 1) shows students activity.

## LOCATION

As mentioned in the previous section, that a school must be chosen for this study; thus, a school (**Gülbağçe Primary School**), located in a village, called Gülbağçe 50 km outside İzmir city, is chosen. The school is the only primary school in the village, which means all the young students of the village go there. It **hosts between 200 – 250 young students age 7 – 12, which is more than the average number of students in an urban primary school in İzmir. The number of students normally ranges between 100 – 150 students in a primary school in İzmir.** However, this will be **good for the study** because when **more young students** participate in the experiment. **more data will be available to analyze** and understand what should be done to help the young students of Turkey.



(Figure 2) shows the density of kids in a village class.

Furthermore, the reason for choosing this particular primary school is because of its ideal location being very close to İYTE. Also, the school is in a **village area, education in village schools does not commonly rise to the standards of education in urban schools.** This is due to many factors, ranging from lack of support from the government **to lack of highly-educated teachers.**



(Figure 3) Shows the locations of both İYTE and Gülbahçe Primary School.

## METHODOLOGY

After it is settled that (Gülbahçe Primary School) will be the location of our experiment, the process of collecting data will start by

- Sending **five students group** from different departments of İzmir institute of technology where the experiment is taking place to the primary school. The students will represent their departments of the university.
  - **Civil engineering.**
  - **Mechanical Engineering.**
  - **Electrical Engineering.**
  - **Computer Engineering**
  - **Molecular Biology and Genetics.**

The reason to select the students specifically from those **five departments** is because of the **skills** that the students learned while studying in these departments which will be very **helpful in this study**. The students that were chosen are in their **final year** of their bachelors' education in the university so they come with a lot of experience when it comes to **conducting, observing and forming research**. All of these skills come

in hand while engineers have experiment about a **specific topic**.

The students in İzmir institute of technology will go to the primary school and introduce themselves to the **principle**, and **teachers** of the school and especially to the **families of the kids**. Then they will explain the study that the university is trying to conduct an experiment and ask if the school would like to participate in it. If they agree to participate in the experiment, the students will start by observing the environment of the school and **collecting data** about the.

- a) Number of **class rooms** in the school and
- b) **Number of science labs** that the school have at their disposal and.
- c) **Number of teachers** and **young students** and also examining the methods that the teachers use to teach the young students by attending multiple teaching sessions of various teachers. Furthermore
- d) **examining the curriculum** of the students and the textbooks they use and how much time the students spend in the school and
- e) **collecting** notes from the teachers about the **average exam performance** of each class, in order to compare it with average exam performance of other primary schools around Turkey, to determine the **level of the students** in (Gülbahçe Primary School). Moreover, the **İYTE** students will conduct a survey of the school's young students and teachers and the local residents of Gülbahçe village about **İYTE**. They will be asked what do they know about the university and have they ever visit it or do they know anyone who studies or work there.

All these questions and more will help the study be more comprehensive and conclusive.

The experiment that is going to be conducted in the future is a common experiment, that is taught in any engineering or scientific university, it is **based on four steps that start with**

- ❖ **observing,**
- ❖ **collecting data,**
- ❖ **analyzing,**
- ❖ **conclusion**

In this case, this experiment will observe a primary school and its students. The observation will be done by university students that attend İYTE. They will be observing (Gülbahçe Primary School). The **objective of this experiment is to find out how the university can help the students to improve their educational experience and to show them the possibilities of their future, if they continue to work hard in their primary education.**

At the initial stage, identifying the current level of the primary school student will be important, and this will be done by collecting data that ranges from their grades in various classes to their participation and cooperation with each other and with their teachers. The data collected will be then analyzed by İYTE **students.**

## **PROPOSED LENGTH OF THE STUDY**

The **experiment will be done in 1 year by the fourth year students** until they graduate. In the future, if the impact of İZTECH on nearby schools would improve, **the duration will be changed to 2 years.** For such case experiment will be done by **third class students** of the İYTE.

## **COLLECTING DATA REGARDING PROBLEMS**

In the last couple of years, the university started to realize that the **new coming students** from various schools in Turkey are **having problems adjusting to the environment** that university presents. This has been seen **especially in students coming from village high schools, where education is below the standards of an urban high school.** Therefore, the professors and the teachers of the university arranged a meeting to discuss the reason for such a problem. They **settled on the idea of sending a group of students to a nearby village middle school to study the environment of the young students, see their daily classes and activities and collect data in order to identify the problem and offer a set of steps to take to help the young students with their transition from their own schools to the university.**

## **PARTICIPANTS**

The team that will conduct the experience will pay a visit to the chosen school and meet with the **principal, teachers, more importantly, to the family of the kids,** to explain them the study and how it will hopefully benefit their institution and the young students that will attend in **İZTECH school.** Then, the team will ask the teachers and families, if they want to **participate in the research that is taking place in İzmir institute of technology,** if they agree, the experiment will begin by choosing a group of young students from the **4<sup>th</sup> grade and examining their grades in different topics ranging from math to biology to English...etc.**

**Interviews with the teachers and families** of the young students will give the study a **closer look** at them individually through **asking questions** like how often they **miss school** and how do they **interact with each**

other, what is their **favorite class**, does the school offer **field trips**, and if so **do the young students participate in them**, do the young students communicate to their families that they are enjoying school.

## CONCLUDING REMARKS:

The goal of this proposed experiment is going to focus on the effects of early childhood engagement in research or education (ECE). In this study, **İYTE** will have positive impacts on the **pre, primary, middle and high schools, around İYTE**, in the future academic environment.

Using the **skills** that we have learned in **İYTE** we are going to present the students of the school that we chose with more research and **application oriented education by bringing them to our campus, including them in our experiments and exposing them to the way they will be doing things when they get to the higher levels of their education.**

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