

# Perception of the Scientifically Gifted and Long-term Effects of Science Gifted Education Program - from the Students' Perspectives

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**Abstract:** The purpose of this study is to investigate the impacts of a science gifted education program. 155 students who experienced the SNU science gifted education program were interviewed. The interview questions consisted of eligible questions from 'Interview Protocol of Hertzog' (2003) based on 'Recommended Practice in Gifted Education (Shore, Cornell, & Ward, 1991)'. All interviews were immediately transcribed and analyzed qualitatively. It was found that scientifically gifted students had similar concepts of the gifted to what scholars consider as the gifted. Comparing the programs to school education program, the students agreed that the science gifted education program provided more experiments opportunities, higher and deeper level of contents, and more active interactions. Regarding long-term effects, it was found that program influenced on students' decisions for the future, stimuli and expansion of horizons, school work and entrance examinations. Students gained self-confidence and became more interested in science. Some pointed out that they felt greater stimulated, although some indicated an elevated level of self conceit. Implications of science gifted education were found based on these results.

Key words: scientifically gifted students, science gifted education program, program evaluation

## I. Introduction

Although Koreans have relatively high fervor for education, gifted education has not been well implemented due to equalized school education and entrance exam for the college. Only recently, Science and Mathematics gifted education has been started, including the establishment of Science High Schools. As an important part of Science education, Education Centers for the Scientifically Gifted(ECSG) have been set up in 25 universities across the country to nurture Scientifically gifted students. The scientifically gifted students at ECSGs are given opportunities to gain easy access to experts and the up-to-date science facilities of universities so that they may be effectively trained. Early identification and systematic education of the gifted, who are the precious human resources of the nation, are intended for the purpose of nurturing creative problem-solvers who will lead our future society.

Opponents to gifted education contend that special educational programs or opportunities given to gifted

students may lead to elitism and selfishness(Ford, 1995; Sapon-Shevin, 1993) or lower their self-confidence (Coleman & Fults, 1985). Nevertheless, according to other research studies (Brody & Stanley, 1991; Kulik & Kulik, 1992; Lubinski & Benbow, 1994; Swiatek & Benbow, 1991), positive effects have been attested in long-term special programs provided to the gifted. White and Renzulli(1987)'s retrospective study (as cited in Hertzog, 2003) of children who had been involved in an enriched program in New York City found that the participants attributed a "lifelong love for learning, pleasure in independent work, and joy in interacting with similarly high-ability students" (p.4) to their program participation.

Nevertheless, program evaluation has been considered an important, it has been neglected and guidance has been limited(Callahan, 2004). Fetterman (1993) claimed that gifted education program requires definite and introspective perception towards its purpose and characteristics more than any other programs, underlining the importance of program

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evaluation. Borland(1997) said that it is very important to improve and progress program in terms of educators' expertise and ethical perspectives, emphasizing that it can be achieved through program evaluation. These researchers emphasize the necessity of identifying which program effects can be achieved through the implementation of program evaluation, and achieving further progress in gifted education program based on the program evaluation results.

One of the most neglected aspects of the evaluation of gifted programs has been longitudinal or long-term impact assessment. The evaluation studies in this compendium(Avery, VanTassel-Baska, & O'Neill, 1997; Landrum, 2001) report on student outcomes that represent the impact across one- to two-year assessment periods. The literature fails to carefully track or provide a model for the evaluation of the impact of the programs.

Program evaluation methodology mostly employs a pre-post test and a comparison approach of the control group against experimental group; however, there is no specific optimal test existing in this field. In most cases, the tests that generate ceiling-effect are used, which comes with an issue on incorrect evaluation based on inappropriate criteria (Borland, 1989).

Longitudinal evaluation, as all evaluation, requires that school personnel can answer the essential question, "How will these students be different-what will they know, understand, be able to do?" What dispositions will they have when they finish program than they would have been if the gifted program had not existed or they had not participated? Answers to

these questions are foundational to undermining whether a gifted program is effective in achieving its goals, yet often neither articulated nor evaluated (Callahan, 2004)

The purpose of this study is to evaluate gifted education program by analyzing the opinions of gifted students who have actually experienced the science gifted education program on how the gifted education program had given impact upon them, and lay out fundamentals to exercise influence in order to provide more custom-fit education suitable for the purpose of science gifted education based on the evaluation results.

## II. Methods

### 1. Participants

Students attending science gifted education centers affiliated to universities in Seoul were initially screened from Seoul-based middle schools since their scientific giftedness was praised and recommended by their school principal, science teacher or classroom teacher. Then, they were selected through an examination, executed by each relevant committee, in order to understand their ability to creative problem solving skills and, finally, through in-depth interviews. At the "S" Science Gifted Education Center, students are educated for 100 hours per year. The purpose of the program is intended to maximize the development of the students' potentials and contribute to the nation by motivating scientific giftedness to improve self-directed learning ability and researching capability through the provision of the best possible program

**Table 1**

*The year when the students who participated in this study attended the "S" Science Gifted Education Center and their sections*

Year \ Section	Mathematics	IT	Physics	Chemistry	Biology	Earth Science	Total
1998	1	0	6	4	7	7	25
1999	3	0	3	2	4	5	17
2000	7	0	2	11	0	10	30
2001	2	0	8	2	1	0	13
2002	4	3	4	1	7	7	26
2003	8	7	3	3	11	10	42
2004	0	1	0	0	0	1	2
Total	25	11	26	23	30	40	155

fitted to the students' abilities and interests.

This study was conducted using 155 students who participated in telephone interviews. These students were selected from among all the students who had completed the programs from the first to the seventh year held by the science gifted education center of S University.

The students that participated in this study are shown in the following table Table 1.

## 2. Research Design and Analysis

The contact information of students who completed the first year to the seventh year of the program was collected, and informational interview questionnaire was composed. Interview questionnaire was composed of appropriate questions deemed to be valid under domestic circumstances excerpted from Hertzog(2003)'s interview protocol designed on the categorical basis of Recommended Practices in Gifted Education (Shore *et al*, 1991). Three professors in the department of science education and five graduate students examined interview protocol. The questionnaire is attached in the appendix.

The questions were about who is thought to be gifted student, how much different or similar the educational experience obtained in the science gifted education center was from that of one's regular school, or what impact was given to them through such an educational experience. In order to verify whether this questionnaire was composed of valid questions to appropriately identify the effects of science gifted education program, its face validity was verified by two specialists, two teachers, and four graduate students.

Research data were collected via phone interview; however, only a few of students were available to be reached via home phone because students do not spend much time at home. In order to contact students who were not available via home phone, cell phone numbers were acquired to be used for giving calls to them, and there were still some students to whom the call was not easily made so that 2-3 times of calls were made in average. The amount of time spent in interview was mostly between 10 to 30 minutes. All the phone interview contents were transcribed during the interview or after the interview

was done, and it was encoded by the use of the coding system suggested by Bogdan and Biklen(2006); when the appropriate category was not found, it was described as shown in the transcription. Researchers were independently conducting the first round of encoding process, and then they were reconvened to perform a qualitative analysis while continuing discussion.

## III. Results

From the analysis results of questions' categories used in this study out of 'Hertzog's interview protocol' (2003), whose questions were composed based on the general issues on gifted education, it was found that the primary realm of questions included the definition and recognition of the scientifically gifted, opinions on the differences of gifted education from general education, and how the experience of gifted education program had impact upon one's school life and own life. The significantly notable theme obtained from the collected data is described as follows.

### 1. Perception of the scientifically gifted

#### 1) Definition of scientifically gifted students from the students' perspectives

The question about who is considered to be the gifted and whether those students in the program are appropriately identified or not (which is becoming an issue in the gifted education field) was investigated through the perspectives of students who were educated with other students considered as gifted. Quite a few students considered other students from the same program as gifted, often fondly remembering them. The students placed in the science gifted education class represent the definition of the scientifically gifted in very versatile ways, and their collective ideas that are significantly notable are found to be represent similar trends as the definition of the gifted that claimed by gifted education scholars. In particular, many opinions were overlapping with three ring definitions of Renzulli(1978): capability above average level, task-oriented ability, and creativity. Also, there were many references to the aptitude in the specialized academic field, which was also found in Tennanbaum(1983) and the US

Educational Department. In particular, there were many opinions regarding the environmental factor, part of Tennenbaum(1983) factors.

### (1) Creativity

Creativity is considered an essential factor in the gifted education field. Among many definitions made by students, creativity was the answer the most students mentioned (approx. 15.5%), which has also claimed by many scholars including Renzulli(1978) or Feldhusen(1985). For example, response included “student with a creative thinking ability<2002, Earth Science>”, “Student whose thought are more eccentric and abundant than other people<2002, Biology>”, “a student with creative and eccentric ideas rather than ones with beforehand studies<2003, Mathematics>”.

Even though many students suggested creativity related factors as a definition of the scientifically gifted, their ways to describe creativity were various; some of them include, “One who can observe something from the different perspective than that of other people<2003, Earth Science>”, “one who keeps trying new things taking a risk of accident, rather than a exemplary student<2003, Earth Science>”, and “I believe that the truly gifted is a person who kill a cow with a small pocket knife instead of an ax or butcher's knife<2003, Mathematics>” and so on. One example is as follows.

Regardless of whether the preceded learning was made or not, I think the gifted is a person who has the capability to solve a problem in one's own creativity and one of a kind method, and ability to approach the problem in different ways with excellent insight and even though he/she cannot quickly solve the problem. It is someone who can come up with a method, no one ever thought of, on a clueless question<2003, Mathematics>.

### (2) Task Commitment and Effort

The second most indicated characteristic were task commitment and effort, and thus by answering as, “the students who are enthusiastic about the things they like, and who want to a deeper knowledge and puts efforts into it<2002, Biology>”, Many students mentioned that effort is also an important factor for the education for the gifted even though there is no doubt that the students are gifted: “gifted students are

those who try hard until they are satisfied<2003, Mathematics>”, and another student spoke in detail: “The attitude to appreciate having a little more prominent gifted than others and to show the efforts to further develop them. I consider it as a student has a passion on what he or she likes, desires to go in depth, and give efforts to do so<2002, Earth Science>”.

Another example of a student who emphasized task commitment and effort expressed it this way:

I think a gifted student is someone who likes to explore, and thinks "why" about everything. Also another characteristic of the gifted is someone who tries to solve important problems and put lots of efforts into it. Also when they are interested in something, they shows a higher than usual level of concentration <2003, Biology>.

### (3) Academic Capability

Many of scientifically gifted students thought as the gifted associated with excellent academic capability, and the most frequently mentioned ability sectors were comprehension and thinking abilities described as, ‘A student with the capability of super-comprehension a specific field<1988 Physics>’, and it was found that they do not consider the gifted very special and different person. 40 students gave a response related to the academic capability, and one of those said that, “A person born with better comprehension and thinking abilities by nature. However, I don't think he/she is not such a unique and eccentric person as we've seen in the mass media<1999, Physics>.” And another student mentioned as follows,

I think the gifted are those who are fallen out of the  $m+3\sigma$  ranges when individual capabilities are represented via the standard normal distribution. Actual performance of such an ability is surely likely to depend upon the external environmental influence, and the gifted education program is performed to form its environment<2002, IT>.

Some students indicated that interest and passion together with inborn ability are important factors; however, inborn academic ability should play the most important role here. One student said, “gifted and talented in specific field means someone well-trained in specific field, and moreover, possessing a

lot of concern and superior inborn ability over others in the field is an important condition, that's the simple difference from excellence. Without inborn academic ability? well...<2000, Mathematics>”.

#### (4) Special Aptitude

Students also mentioned an ability in a special area which was defined by Tannenbaum(1983) and the US Education Department and emphasized ability and aptitude in a special area. For example: “Someone who can concentrate in the area in which they have interest to compare with other subjects, and actually there are many people like that<1999, Biology>”, “Someone who has a high desire to learn in some area<2002, Physics>”, “a student either has a possibility of or superiority over other students in specific field<1998, Chemistry>”, “Someone who likes and enjoys a particular area so that they are able to solve the problems more easily<2004, Earth Science>”. One student described her opinion in this way:

A prodigy is someone who is talented in one particular area, not someone who can excel in all areas. Gifted student is someone who is talented in a specific area, however, schools tend to select only students who are good at everything, so it seemed that there were not many gifted students in the program<2001, Chemistry>

#### (5) Environment and studying in advance

The students shared a particular opinion that environment and studying in advance are important with such answers: “The students who studied in advance compared to other students<2003, Earth Science>”, “Students who take advantage of the opportunities they are given. Surely the gifted students exist, but the most gifted are students who respond well to society<1999, Earth Science>”, “Students who study in advance and adjusted to it well<1998, Physics>.” Also, some students mentioned the environment which was included in the definition of the gifted by Tannenbaum (1983), they said, “Of course, they should be smart, but a home and family environment which is conducive to their education is also important, Oh, yeah, maybe in our country?<2002, Physics>”, “I think they were raised in a good educational environment<2000, Physics>”.

It is evident that there are students consider education and training in advance as an important factor through such answers as, “I think gifted/talents and genius are divided concepts. Gifted and talented have received more of beforehand studies, and have the studies obtained benefits up to some degree. Here, this training plays a big role, of course”.

#### (6) Other Opinions

There were such opinions that gifted and talented cannot be defined or there is not such thing as gifted and talented, gifted and talented is a person who cares for others, a person who found the field he or she can do well in, or a lucky person. Some students considered the possibility than the achievement: “Someone who has a great deal of potential to become someone great if they develop their ability <2000, Chemistry>.” Also, some students mentioned; “Someone who has a wider thinking range<2004, IT>, or ”those who think deeply at large<2000, Chemistry>“.

#### 2) Were the students at the center really gifted?

The most frequently mentioned answer was that 50% or above of the students at the center were gifted. However, there were many students who stated that it was less than 50%. The particular opinion of regarding it as a result from early or beforehand studies was dominant by answering “There were about three. Most of them are students attended science related institutes for a while, or (like myself) dummies that have slightly higher grades point than others<1998, Physics>”. Another student said, “I think students who received much beforehand training from institutes were accepted more at the center<2002, Biology>”, “there are not such students (open-minded students), but only the ones received beforehand studies<1998, Earth Science>.” It is followed by stating that there were only few of them followed by such opinions they were not sure. Other opinions include “I cannot remember what the year was, but the most students in mentorship classes were those students<2004, Earth Science>”, as for the students at Science Gifted Education Center, the students considered only the students in mentorship classes were really gifted.

## 2. Comparison with the school education

Students were asked what similarities or differences exist between the science gifted education center program and general school program. Most students answered that they preferred a greater number of experimentation at the center because they could not have enough opportunities to do experimentation at the school classroom. Many others mentioned that contents, the depth and the level of the program are very different. Also, active interactions between teacher and students was expressed as the difference.

### (1) Opportunities of experimentation

Many students reflected happy memories of experimentations from the science gifted education center program that they would not normally have experienced in a normal school classroom. One student said, “The classes were fun because of the higher number of experimentation<2003, Chemistry>”, “Live education and real experiments. It was not the study that already knows the results. You will never find at school<2000, Chemistry>”

Moreover, there is no equipment and many students aren't able to participate in the experiment together, so the experimentation is impossible in a normal school classroom. Even if we are able to take an experimentation in class, because we need to complete the experiment in a short time, it is difficult to establish an hypothesis, get a result, and discuss the result, so it feels nothing was gained from the short and simple experiment. So the deep level of lab classes in the gifted child center satisfied my enthusiasm and desire toward experimentation and thinking <2003, Biology>.

### (2) The contents of the program

Students who mentioned the difference in the contents said: “The program was not stereotypical <2000, Earth Science>”, “We learn how to derive a formula instead of just memorizing the formulas <1998, Earth Science>”, “There were many reasoning activities, also it was possible to learn new hypothesis<1998, Earth Science>”. Below are more examples of students who mentioned the differences in contents.

The class in a normal school was not so impressive, but

the gifted education center approached the same contents in various ways, and produced new results <2003, Mathematics>.

I felt like I learned something that I wouldn't have learned in a regular school. They study the things that are out of the range indicated by the Ministry of Education. If the education from a middle and high school is passive education, it was more active education. I think it was more similar to a university class <1998, Chemistry>.

### (3) Depth and level of the program

33 students emphasized the higher and deeper level of a gifted education program: “The level was higher. It required thinking<2000, Earth Science>”, “It approached the same contents more deeply and emphasized problem solving so I was able to think more deeply about the results<1999, Earth Science>.” “Regular schools are very simple. However, a gifted education center requires the students to think<2003, IT>.” The representative answer among them is as follows.

It was very different. Because the level of class in a normal school is just 'average level', so it is impossible to imagine the challenging or enriched education like the kind that is available at a gifted education center. In a regular school, they teach us the surface of the knowledge, however, the gifted education center started with the deeper contents with the assumption that we know all of the surface knowledge. Because I liked to think and discuss like that deeply, I enjoyed putting effort to know more about that surface knowledge <2003, Earth Science>.

### (4) Active interactions

The students dominantly mentioned active interactions between teacher and students of the Gifted Education Center. For example, “In school, it's one-way, in center, it's two-way interaction<2003, Earth Science>”, “If the school education is the process of imitating subject and process, the center education is the process of creating and adjusting to the subject. It was a much livelier class<2001, Physics>”. The environment that allows asking questions and having discussions with peers was expressed as the difference. The following comments show this clearly, “Students are not encouraged to ask questions in a normal

school. But in the center, we were encouraged to ask anything even it was weird<1998, Physics>”, “various experiments and discussion classes make it different from school education, it can be done in school by teachers. However, taking classes with excellent students and having discussions with them is surely different”

#### (5) Others

Some students mentioned creative education and self leading, high opportunities of participation as the positive thing. There were such other opinions that opportunities to closely see professionals, the better facilities and environment, much more discussion, hands-on activities, problem solving, and more “thought-provoking.” were good. However, some students mentioned that there were no particular differences. Also, there were opinions that they heavily emphasize on regulations, therefore theoretical basics were the same as school. One student said, “The control of the students and the emphasis on rules and regulations was the same<2000, Mathematics>”. Moreover, some students from science high school said, “In science high school, intellectual curiosity gets stimulated. I had many discussions with my friend. The center lacks such and such<2000, Earth Science>” meaning his science high school is better. Finally, there were several responses that it was hard to share discussions because all the students were way too good by themselves.

### 3. Effects of the Science Gifted Education program.

Students were asked to define the effects of the Science Gifted Education program. Most students answered that the experience from the center effected on their decision for the future, school work and entrance examinations, promotion of interest in science, the stimulation and broadening of visions of the future, and increased self-confidence.

#### (1) Effects on decisions for the future.

There were many students who confessed that they dreamed of entering a Science high school after they finished the gifted education program, and that they liked and studied the science better than before, so it

has been determined that the gifted education center greatly affected their decisions on their futures. One student said, “It was an opportunity for me to do better. I decided to go to a Science High school after enrolling in the gifted education center<Chemistry, 2004>”, and another student mentioned, “If I didn't come here, then I might not think of Seoul Science High school and KAIST<Biology, 2000>”. There were many cases where the program influenced gifted students on deciding their majors: “I have decided to apply for science high school just after I started attending the Gifted education center<2002, Earth Science>”, “It influenced me greatly in further my education in science high school<2001, Physics>.”

#### (2) Influence on school works and the entrance examinations

Even though the purpose of gifted education program is not designed to improve school grades or to help on entrance exams, students expressed the results as doing so. Students who found it helpful on high school study and on the entrance examinations such as, “I have learned how to conduct experiments and compose reports, and found all of them helpful on furthering education, were the highest: “It is helpful on school works and exams<2000, Earth Science>”, “Materials I went over at the Gifted Education Center were helpful after entering high school... <1999, Physics>”,

#### (3) Promotion of interest in Science

21 students answered that the program increased their interest in science, and it is because of the style of education which is dramatically different from a regular school. “After I attended the gifted education center, I was more interested in science so I was able to concentrate more in school.” 1999, Biology>. “I think it was a very valuable time because I gained more interests and confidence in Science. Especially, I have a great confidence in the Earth Science... <1999, Earth Science>”, “I have always liked Science, but I have found it more interesting while attending the gifted and talented education center, and now I have confidence in physics<2003, Earth Science>”. There were such opinions that the students gained interest and confidence in Science and in general, as

well as in the fields of subjects such as Mathematics and Science to which they belonged.

#### (4) Stimuli and broaden visions

Many students said that either they were stimulated or had opportunities to broaden their visions of their futures through the activities of the center. The examples of stimulated students' answer are as follows: "Association with advanced friends who will lead the future of science fields, served as a stimulus and a challenge to me<2001, Physics>", "I was stimulated by meeting new students, and became competitive<2004, Earth Science>." Some other students attributed the program effects on broadening their visions of the future. For example, "It was a new experience I could not have done anywhere else. The education method, professors, experiments, location and everything else...It was an whole new world <2002, IT>", "The best part was that I was able to spend my time more effectively, and I felt that my visions were broadened<2003, Chemistry>".

#### (5) Self-confidence

Many students commented that gifted program experiences gave them self-confidence and self-conceit. One student said, "I could have more sense of self-confidence and self-conceit just because I was in the program for the gifted, yet unable to put more efforts and study in depth still remain as inconvenienced <1999, Earth science>", Another student said, "I have gained self-confidence studying a wide range of knowledge, and I thought why not studying further in the field<2001, Chemistry>." Other attributed their high self-confidence to having work hard and overcome challenges such as mastering difficult material. "Well... the experience of studying at the gifted education center enabled me to not only adjust to my school but also to the college atmosphere. If I put my mind to it, I can do it<1999, Chemistry>".

#### (6) Other opinions

There were some opinions such as, "I had to ask for many favors to adjust my schedule to attend the classes, but it did not interfere on my study much, and it was more of pleasant experiences<2001, Biology>", "Saturday afternoons can be wasted easily, I

made the best out of it by attending the center; I used the time more efficiently than others, and there was none of jealousy and envy from my friends<2000, Chemistry>",

Overwhelmingly, the students brought up positive points, but there were some negative responses, "If I have to verify, it made the school study as boring as it already is more boring<1998, Physics>."

On the whole, it can be concluded that students felt positive about their experiences. Most of the students interviewed were happy to have participated in gifted programs because the programs better prepared them for their future.

## IV. Conclusion and Discussion

Longitudinal and retrospective studies would have enabled the field of gifted education to examine factors that contributed to develop an individual's giftedness. In this study, the students who experienced a science gifted education program expressed how they perceived gifted students and students in the program, what they found from the comparison between regular schools and the gifted education center, and what they consider as the effects of the science gifted education program. The rationale of the interview questions yielded responses that have been expressed by many well-known issues in gifted education.

First of all, the question about who is considered to be the gifted, students answered that students with creativity, task commitment and effort, academic capability, special aptitude and environment and prior studies. It was appeared that scientifically gifted students themselves represent the definition of a scientifically gifted in very versatile ways, and their collective ideas that are significantly notable are found to be represent similar trends as the definition of the gifted claimed by gifted education scholars. It has been dominantly expressed that the elements of gifted students overlap with the three ring definitions of Renzulli(1978): capability above average level, task-oriented ability, and creativity. Many mentioned aptitude in the specialized academic field, which is also found in Tennenbaum(1983) and the US Educational Department. In particular, there were many



students who regarded the environmental factor, just like Tennenbaum(1983). Whether its selection process is appropriately practiced or not, which is becoming an issue in the gifted education field, was investigated through the view of students who were educated with other students called the gifted. However, it is found that students considered themselves as not being gifted students; moreover, quite a few other students from the same program were gifted students who possess the characteristics that they consider as the gifted. Whether this is the students' honest view on themselves or it just reflects the characteristics of Korean culture that regards modesty as a virtue needs to be studied more. Whichever is true, scientifically gifted students were selected through certain procedures, and can be said to have certain characteristics, and therefore, they need to be educated what responsibilities and duties they have to take in the future. They can be taught naturally in the educational programs, as 'the model of self-regulating learner of Batts' in the USA indicates (Renzulli, 1986).

Overwhelmingly, the biggest differences noted between the regular school program and the gifted education program were the opportunities of experimentation, the level and depth of the contents of the program. Many elements of the differentiated gifted education programs that prominent scholars(Feng, & VanTassel-Baska, 2003, Smutny, 2002, Treffinger, 2004) have identified, such as the level and depth, complexity and abstractness in contents, active interactions between teacher and students as well as among the students, have been conspicuous. However, opportunities of experimentation that most students thought as a difference was peculiar, and it can be assumed that these opinions express the current state of Korean educational conditions. These results were very different from Hertzog(2003)'s study because the students from his study identified student's behavior and teacher's enthusiasm as the biggest difference in the USA. The students in his study also said they developed most of their friendships with the students who were in gifted programs. In contrast, this study did not consider friends or teachers as a difference.

When probing into instructional differences, students in both studies mentioned that there were much

more discussion, hands-on activities, problem solving, and working in groups. Students said that their gifted classes were more "thought-provoking." This sort of education is shown to create a challenge-welcoming attitude.

When scientifically gifted students consider the impacts of the gifted programs on them, especially on their later lives, the benefits seemed to outweigh the costs for these students in gifted programs. Except for some students who answered there were little benefit or they rather developed self-conceit, the responses to their experiences in gifted program were overwhelmingly positive. This result is consistent with what Davalos and Haensly(1997) reported in their study discussing the effects of the long term effects of gifted program.

Callahan(1992) noted that evaluation of gifted programs has assumed that all children involved in gifted programming would benefit from such programming. The programming strategies, activities, and evaluation strategies that have been used all assume that one type of program will be equally effective for all gifted students. What may, in fact, be the case is that certain programming strategies and curriculum are effective for certain gifted students having certain characteristics, but are not effective for others. Therefore, this study used both quantitative and qualitative strategies to determine overall percentages and to find out what works for which individuals under which conditions, what other intervening factors are that influence success, and how the program deals with those factors. Greene(1994) articulated benefits of qualitative methods, saying they "can effectively give voice to the normally silenced and can poignantly illuminate what is typically masked". This study provided voice to a group of students regarding the impact that being in gifted programs had on their lives.

The benefits seem to outweigh the costs for these students in gifted programs. On the whole, the students expressed that a major benefit of participating in a gifted program was that it better prepared them for career paths as lifelong learners by helping them learn how to study autonomously.

Overall, we, as researchers, educators, should note that the students interviewed said that gifted edu-

cation had an overwhelmingly positive impact on their lives. Regardless of the subjects and the years they studied, most students came to understand the meaning of overcoming challenges, enhanced self-esteem, and were introduced to the areas they are currently pursuing in college. Life-altering opportunities that they would cherish all their lives and that would lead their lives have been provided. The message to educators is very clear. The learning environment and the insights gained from these students pose challenges to educators and policy makers to reform gifted and general education, giving educators an opportunity to focus on positive aspects of gifted programs and to work on changing the negative ones such as vanity.

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## Appendix

<b>Personal information</b>			
Name	Year	Section	Address
H.P Number		E-mail	
Higher education		High school	
		University	University Department
About the experience of gifted education	What was the best as you remember among the contents, process, or activities of gifted education?		
	What was the worst as you remember among the contents, process, or activities of gifted education?		
Identification	How did you feel that you heard you'd been selected for the gifted education center program?		
	What do you think a gifted student is?		
	Were there many such students in the center?		
Education	How the education in the gifted student education center was similar to or different from that in your school?		
	What impacts did your experience in the gifted student education center give on your school life or your life on the whole? (such as, it took time away from you, or it gave you the motivation to study better, or other students kept away from you, etc.)		