

# Striving for Excellence: The Challenge of Educating Highly Able/Gifted Students

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**Abstract:** Some students are more academically able than others. Some teachers believe that the academically able/gifted students can easily make it on their own. More often, emphasis in the literature is directed at how educators can help the students of lower academic ability, rather than pointing towards methods of teaching which can be used to motivate able learners. Research has indeed shown the existence of gifted underachievers. This paper looks briefly into a study which was conducted with the aim of establishing who the gifted students are and what qualitative differences exist between the gifted and their average same-age peers studying physics. The need to give a different but not elitist education to the gifted is highlighted in order to give an opportunity to gifted learners to reach their full potential. Recommendations will be put forward to emphasize the importance of improving awareness of the special needs of the gifted, promoting ways to best cater for these students at school and at home.

**Keywords:** highly able/gifted, cognitive development, high intellectual ability

**G**ood educators know that all students, whatever their age and ability, need their fair share of individual attention. It is not only the weak but also the gifted students who need to feel at ease, content, and fulfilled within their learning environment. In the classroom, many a teacher recognizes that some students are more academically able than others but it is easy to fall into the trap of accepting that the academically highly able/gifted students can easily make it on their own. Such a situation may lead to unmotivated, bored, and underachieving students who could have performed so much better had the right learning environment been made available to them.

## **The nature of giftedness**

We look with awe at people who strive for perfection, doing their best to do what they do for the love of just getting a job well done. We all have our limitations but people who are highly able tend to test themselves to their limit and their achievements may strike all the rest as incredible. Having said this, we all should know that the best performance is achieved by people who really work hard for it. Nothing comes from nothing. But then, how can giftedness be defined?

### ***Early work on giftedness***

The study of giftedness stretches back into the nineteenth century. In England, Sir Francis Galton, a renowned English scientist, studied the origins and development of genius. Later studies in France by A. Binet and T. Simon helped in the development of a standardized scale providing a score called ‘mental age’.<sup>1</sup> In the USA, L.M. Terman began to work on the refinement of the ‘mental age’ scale. In 1916 he published the first form of the Stanford Revision of the Binet-Simon Scale which gave the Intelligent Quotient (IQ) as the score. This instrument was assumed to be a measure of innate intelligence.<sup>2</sup> Indeed, Terman’s work led to the outburst of the ‘myth’ that the able individual has superior qualities overall ... and this perhaps may be the reason why people, including some educators today, still think that to provide the right educational environment for the gifted is somewhat elitist.

### ***Broadening the view of giftedness***

As more studies were conducted, researchers realized that judging a child as mentally superior should not be based solely upon an IQ. It became evident that intelligence was a far more complex matter than was generally believed. In the early sixties, particularly under the influence of Jerome Bruner’s theories about knowledge and learning, the appropriateness of the curriculum for the conceptual level of individual gifted children was also considered. The domination of IQ was seriously challenged and more interest was sparked in creativity

1 J.R. Whitmore, *Giftedness, Conflict and Underachievement* (Boston, 1980).

2 H. Cravens, ‘A scientific project locked in time’, *American Psychologist*, Vol. 47, No. 2 (1992), 183.

and the assessment of creative thinking. Personality and behaviour characteristics of the gifted were given more importance.<sup>3</sup> It became apparent that there was no such thing as a typical gifted child. Harry Passow supports this when saying: ‘the gifted ... are clearly not a homogeneous group’.<sup>4</sup>

***Defining giftedness — the needs of the gifted***

As the interest in the gifted increased, the awareness that the gifted do have special needs also increased. Eric Ogilvie (1973) suggested that ‘to be gifted is to be outstanding in general or specific abilities in a relatively broad or narrow field of endeavour. In his broad definition, he suggests that six areas could be considered: physical talent, mechanical ingenuity, visual and performing abilities, outstanding leadership and social awareness, creativity and high intelligence.’<sup>5</sup>

In 1983, Howard Gardner classified human intellectual activity into seven components covering a wide variety of intelligence. Gardner’s original seven frames of mind are:

- linguistic,
- musical,
- spatial,
- logico-mathematical,
- body kinaesthetic,
- insightful skills for analysing ourselves,
- insightful skills for analysing others.<sup>6</sup>

According to Gardner, an individual’s abilities can be high in one component and low in others, high in all or many, and so on.

Ogilvie also referred to the needs of the gifted, namely:

- to have contact with average peers,
- to have contact with children of comparable levels of ability,
- to be stretched and challenged even to the point of experiencing failure and humbling experiences,
- to be guided rather than directed through a more academic approach to a greater depth of treatment,

3 Whitmore.

4 D. George, *The Challenge of the Able Child* (Great Britain, 1995).

5 Quoted in *ibid.*, 8.

6 J.W. Santrock, *Adolescence: An Introduction*, 5<sup>th</sup> edn. (Dallas, 1993), 164; D. Montgomery, *Educating the Able* (London and New York, 1996), 19.

- to avoid being set apart but have a chance to set self apart on occasions,
- to pass rapidly through elementary stages and use advanced resources,
- to pursue own lines of research,
- to be exposed to some forms of counselling – and for their parents to be so too,
- to be treated like other children,
- to have contact with teachers gifted in similar fields,
- to have abundant opportunity and encouragement to exercise specific talents.<sup>7</sup>

Indeed, much of the same is emphasized even today!<sup>8</sup>

### ***Modern conceptions of giftedness***

Giftedness is today seen as the interaction of intellectual and non-intellectual factors. Probably the most well-known attempt to redefine giftedness is credited to Joseph Renzulli who left his mark on giftedness with his three ring conception of giftedness (see Fig. 1).<sup>9</sup> ‘It is the interaction among the three clusters that research has shown to be the necessary ingredient for creative-productive accomplishment.’<sup>10</sup>



Fig. 1: Graphic representation of the definition of giftedness<sup>11</sup>

7 Montgomery, p. xi.

8 E. Winner, ‘Ellen Winner on Gifted Children’, *ParentEdge* (May–June 2012).

9 N. Colangelo and B.A. Kerr, ‘Extreme academic talent: Profiles of perfect scorers’, *Journal of Educational Psychology*, Vol. 82, No. 3 (1990), 404.

10 J.S. Renzulli, ‘The three-ring conception of giftedness: a developmental model for creative productivity’, in R.J. Sternberg and J.E. Davidson (eds.), *Conceptions of Giftedness* (UK, USA, and Australia, 1986), 65.

11 *Ibid.*, 74.

By task commitment, Renzulli refers to ‘a focussed form of motivation’ which may be described more exactly using terms like ‘perseverance, endurance, hard work, dedicated practice, and self-confidence’. The hound’s-tooth background in Fig. 1 refers to factors grouped under ‘Personality’ and ‘Environment’ that can further help achieve giftedness.

In Fig. 2, the original Renzulli model is supplemented with a frame illustrating the view that giftedness is not just defined by what is within the rings. A social and cultural dimension was included.<sup>12</sup>

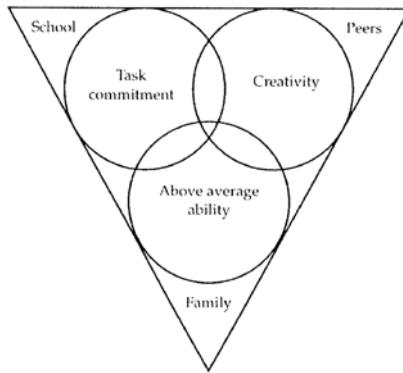


Fig. 2: A multifactorial model of giftedness<sup>13</sup>

Giftedness is not just good performance on an IQ test. Outstanding performance is certainly the point of departure but the role of other intra-individual characteristics like self-confidence, intrinsic motivation, and dedicated practice, can be seen as pre-conditions for such performance.

### **A study conducted with highly able/gifted science students**

While it is possible to describe the variety of performance skills in which the gifted child excels, yet, it is difficult to determine *how* or *why*

12 R. J. Mönks and H. W. van Boxtel, ‘Gifted adolescents: a developmental perspective’ (1985), in Montgomery, 13.

13 R. J. Mönks, ‘Ein interaktives Modell der Hochbegabung’ (1992), 194, quoted in Montgomery, 13.

a child can perform these skills more competently than other children of different abilities. Very few studies have examined the differences in cognitive processing between individuals. A relatively recent study<sup>14</sup> has, however, focussed on brain activity of various children and suggested that gifted children distribute the cognitive resources essential to cope with hypothesis generation more efficiently. Even so, the study talks of a specific physical process in the brain and not about some general mode of development of intelligence.

My study focused on high intellectual ability. The nature of high ability, as well as the mode of development of intelligence were key issues being researched. The model constructed by Jean Piaget in his Theory of Cognitive Development<sup>15</sup> was deemed appropriate for such work. Through the use of some Piagetian tests of development, this study sought to demonstrate whether students showing good performance in a specific area of study, also have a good measure of logical thought.

### ***The aims of the study***

The primary aim of this study was to establish whether there exists a difference in the level of cognitive development as exhibited by highly able/gifted science students (mean chronological age 14 years 4½ months) when compared to their peers of the same chronological age. Furthermore, it was deemed interesting to compare the performance of these gifted students to older science students, both highly able and average ones (mean chronological age 17 years 3¾ months).

### ***Identifying the subjects***

An important step undertaken in this study was to identify the subjects. 'For western culture ... there is strong evidence that gifted students have entered formal operations by ages 12 to 13.'<sup>16</sup> It was decided, therefore, that 13- to 14-year-olds would be suitable candidates to work with.

14 J. Seung-Hyunet *et al.*, 'Differences in brain information transmission between gifted and normal children during scientific hypothesis generation', *Brain and Cognition*, Vol. 62 (2006), 191.

15 J.B. Shields, *The Gifted Child* (London, 1968), 62.

16 K.R. Carter and J.E. Ormrod, 'Acquisition of formal operations by intellectually gifted children', *Gifted Child Quarterly*, Vol. 26, No. 3 (1982); J. Lynch, 'Fast-paced science for the academically talented: Issues of age and competence', *Science Education*, Vol. 74, No. 6 (1990), 590.

Students of this age in Malta are normally in their third year of their secondary education. The chosen students (girls and boys) had taken a general science class during their first two years of secondary school and in the third year they all studied Physics. Considering students' performance on school tests through the third year and administering a short science/physics test was deemed suitable as a measure of discriminating the best from the average students studying Physics at this level.

The test was constructed keeping in mind the following points:

- qualities of scientists that help in identifying gifted young scientists, emphasizing close observation;<sup>17</sup>
- testing procedures used in the Brentwood experiment with gifted students in science focussing mainly on the 'child's ability to reason/grasp the essence of a problem and to observe';<sup>18</sup>
- scoring well beyond one's chronological age on a difficult test implies not just earlier development, but also higher levels of ability that 'presage long range, lasting differences in ultimate ability'.<sup>19</sup>

A short science test including 3 questions was prepared by the author. Question 1 was an easy question based on material which students had covered during their Physics class that year. This question aimed at putting the students at ease. Questions 2 and 3 were the crucial test questions. Question 2 required the understanding of the concept of refraction of light through a lens – a topic that had also been covered by these students. This question required the extension of ideas related to the focal point and how rays come to a focus within the focal plane of a convex lens, even when the oncoming rays are not parallel to the principal axis. Question 3 required careful observation of a given diagram showing an apparatus used to study how gas pressure changes with temperature. Students were asked to name any apparatus which was missing on the diagram and to explain why a specific piece of apparatus was important to use during the experiment. Questions 2 and 3 were questions which required a higher ability to answer correctly than that expected from a third-year student.

17 George.

18 S.G. Fisher, *Work with gifted children in science*, quoted in S.A. Bridges *Gifted Children and the Brentwood Experiment* (London, 1969), 113.

19 L.H. Fox, 'Identification of the academically gifted', *American Psychologist*, Vol. 36, No. 10 (1981), 1103.

### ***Methodology***

The science test was taken by 133 third-year students at secondary level and was administered at the end of the scholastic year. Participation in the study was on a voluntary basis. Students' examination marks for three school Physics tests, administered across the form through that scholastic year, were made available to the author by the school administration and were also considered. The average performance mark on the school tests for each student was computed, as was the overall placing and percentile.

Physics teachers' nominations of highly able students were also taken into consideration. A screening and nomination form<sup>20</sup> was made available to the teachers. Using the students' results and teachers' nominations, subjects were shortlisted for further participation in the study.

### ***The subjects shortlisted***

Table 1 indicates a shortlist of young subjects participating in the final study.

Subject Number	Chronological Age	Teacher Nomination (Yes/No)	Percentile Physics school tests	Science Test Mark (%)	Remarks
1	14yr 05mt	Yes	92.5	86	
2	14yr 02mt	Yes	89.5	80	
3	14yr 08mt	Yes	90.2	83	GS
4	14yr 09mt	Yes	94.0	80	
5	14yr 06mt	No	97.7	86	
6	13yr 08mt	No	97.7	87	
7	14yr 04mt	Yes	95.5	71	
8	14yr 05mt	Yes	98.5	69	TN
9	14yr 06mt	Yes	99.2	63	
10	14yr 04mt	Yes	95.5	63	
11	13yr 11mt	No	49.6	49	
12	14yr 03mt	No	49.6	43	
13	14yr 03mt	No	47.4	77	AS
14	14yr 00mt	No	47.4	51	
15	13yr 11mt	No	45.9	63	

Table 1: Students chosen for the study

<sup>20</sup> Whitmore, 428.



Subjects 1 to 6 were considered as gifted students (GS). Subjects 11 to 15 were the average students (AS), while subjects 7 to 10, who were teacher nominated (TN), were asked to participate in this study even though their science test mark was rather low.

Another shortlist of students (girls and boys) from a post-secondary college in Malta is shown in Table 2. These subjects, chosen from among 146 students, were judged gifted (GC) or average (AC) on the basis of their performance in an end-of-year Physics examination which they had all sat for, as well as through the author's personal acquaintance after having been their teacher for one year.

Subject Number	Chronological Age	Test Mark (out of 70)	Percentile in Physics exam	Remarks
16	17yr 06mt	57	97.9	
17	17yr 07mt	57	97.9	
18	16yr 11mt	63	99.3	GC
19	17yr 04mt	57	97.9	
20	17yr 03mt	62	98.6	
21	17yr 00mt	53	92.5	
22	17yr 02mt	38	45.9	
23	17yr 03mt	38	45.9	
24	17yr 00mt	37	43.8	AC
25	18yr 02mt	36	41.8	
26	17yr 00mt	37	43.8	
27	17yr 07mt	38	45.9	

Table 2: College students chosen for the study

### ***The instruments used***

Once the subjects were shortlisted, they were given the following tests of logical thinking (Piagetian experiments) to complete on an individual basis:

- (a) the flexibility experiment;
- (b) the pendulum experiment;
- (c) combination of colourless liquids.

The author acted as researcher and all that was said was recorded and transcribed. These experiments were adapted from Piaget's original

experiments.<sup>21</sup> Using the experiments and the results suggested, the author was able to judge the cognitive level of the students.

### **The results and their interpretation**

Subjects' responses as they worked individually on the three Piagetian experiments were first categorized separately and the level of development on each task was decided (see Key to stages of development below). The latter was given a numerical value<sup>22</sup> and from the results of the three tasks, an average level of cognitive development per subject, over the three experiments was obtained. Fig. 3 shows the results.

Key to stages of development:

- PO — pre-operational
- PO – EC — pre-operational to early concrete
- EC — early concrete
- C — Concrete
- LC — late concrete
- LC – EF — late concrete to early formal
- EF — early formal
- F — Formal

21 B. Inhelder and J. Piaget, *The Growth of Logical Thinking from Childhood to Adolescence*, 2<sup>nd</sup> edn. (UK, 1966).

22 D.P. Keating, 'A Piagetian approach to intellectual precocity', 90, in D.P. Keating (ed.) *Intellectual Talent: Research and Development* (Baltimore and London, 1976).

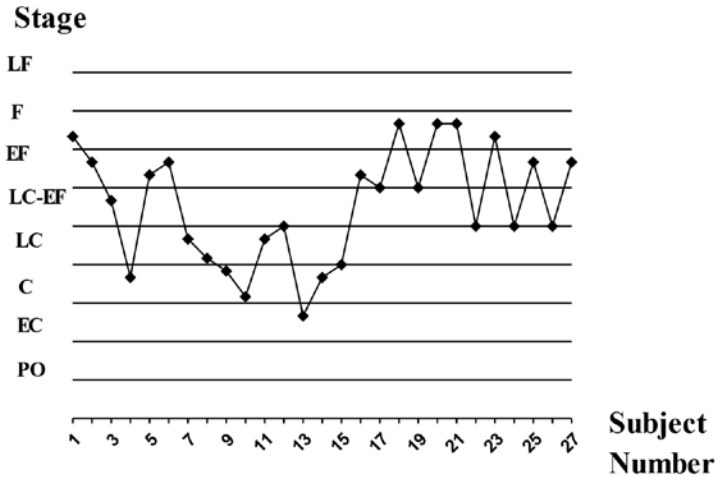


Fig. 3: Average level of cognitive development per subject over three tasks

Fig. 3 shows how four out of six (GS) subjects have resulted at a level very comparable with the GC and some of the AC subjects who were, in fact, some 3 years older and who certainly had a much wider overall experience by comparison. The TN subjects (chosen to validate teacher nomination and academic performance as a means of identification) are at the same overall level of cognitive development as the AS group, an indication that teacher nominations and performance grades alone need not always be enough to identify the ‘gifted’ students – teachers certainly need their fair share of training in this area.

**Per cent passing (reaching LC–EF and beyond)**

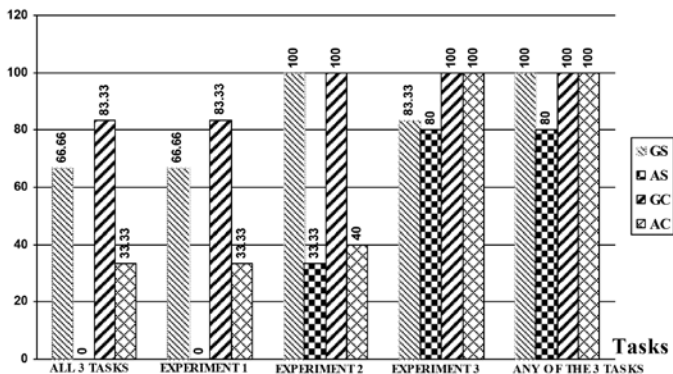


Fig. 4: Per cent showing formal operations on three tasks

For the purpose of the above graph, TN subjects were not considered and levels of cognitive development from LC – EF and above, were considered ‘formal operational’.

The first set of columns in Fig. 4 shows the percentage of subjects in each group who evidenced formal operational thinking in all 3 tasks. This was, of course, *the most stringent criterion*, and by it the order of the groups is GC>GS>AC>AS. The same order is evidenced in experiment 1. In experiment 2, the order is GC=GS>AC>AS. In experiment 3, the percentage of AC is higher than that for GS and in the final set of columns, which was the most lenient criterion, the GS are at the same level as both the older groups.

The above analysis offers clear indications that the GS were beyond their average peers in cognitive development, as well as possibly being sometimes superior to, and at times at par with average older students attending college who were three years their seniors.

**Recommendations and conclusion**

The results presented above are similar to those in another study<sup>23</sup> conducted with 11-year-old gifted and average boys comparing them

23 Ibid., 95.

to average and gifted students two years their seniors. Further studies<sup>24</sup> have also shown that gifted children demonstrate earlier transition to successive stages. According to Piaget, cognitive development proceeds as an interaction of the organism and the environment. The brighter individual shows a tendency to make more interactions with the environment, with more effective use of it. This is described as ‘the self enriching the cognitively relevant environment’.<sup>25</sup>

Knowing more about the nature of giftedness and the mode of development of intelligence of the gifted, it must be said that educators need to make adequate educational opportunities to help able students develop to their full potential. These students must be identified early and a curriculum appropriate for their level of intelligence must be made available. School administrators should seek to secure appropriate resources for enrichment and extension activities in schools. Today, with the advances made in technology, it should be easier to plan school programmes which can help gifted learners work on their own when the need arises and communicate with others of the same interest and the same mental age when this is required. The motivation of the gifted to learn must not be dampened. Moreover, teachers of the gifted should be more aware of how to help these children. In-service and pre-service courses related to gifted education are necessary for this. The gifted need to be encouraged to participate in class discussions. High-quality teaching must be on offer. Moreover, the parents of these children also have an important role to play in educating their children. It is essential that parents recognize the difference between pushing and intellectual stimulation. Parents can help by sharing suitable experiences with their children, like travel, museum, and cultural visits and use of libraries. Other studies<sup>26</sup> have emphasized the importance of these issues. Joyce Van Tassel-Baska refers to such recommendations as ‘the nonnegotiables’ in gifted education.<sup>27</sup>

24 Carter and Ormrod, 110; Shields, 88.

25 Keating.

26 J. Borg Marks, ‘The International Programme Perspective: The Education of Gifted Children in Malta’, *Gifted and Talented International*, Vol. 16, No.1 (2001), 47; J. VanTassel-Baska, ‘Gifted Programs and Services: What are the Nonnegotiables’, *Theory into Practice*, Vol. 44, No. 2 (2005), 90.

27 J. VanTassel-Baska, ‘Excellence as a Standard for All Education’, *Roepers Review*, Vol. 20, No.1 (1997).

This author feels that excellence has to be looked at as a standard for education at all levels. It is easy to link the gifted with excellent performance because often it is the latter who *seem* to be the only ones who achieve high grades because of their high potential and disposition towards learning. However, it is important to appreciate that when we plan curricula and choose the best resources for teaching and use all our energy to try and motivate students, we do this for ALL students. What helps the gifted should also help any student to reach his full potential. This author thus believes wholeheartedly that excellence is ‘the process of working towards an ideal standard and attainment of a consistently high standard and performance in a socially valued endeavor’.<sup>28</sup> This definition applies for everyone and avoids the elitist view that some people may have with regard to the gifted and their education.

The gifted are a vulnerable group. They have their special needs. Refusing to ignore this is an injustice to highly able/gifted children and a social injustice in education especially when we boast that we are in the era which offers a quality education for all, hoping that no child is left behind.

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28 Ibid., 9.