

Designing instruction to enhance achievement of all and reduce inequality

Pathways to adulthood: structure, agency and social change'

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1 Introduction

This paper presents a theoretical framework to assess the possibility to achieve the goals of enhancing achievement of all and reduce achievement inequality at the same time and argues that an option based on a mixed common/targeted model of provision of instruction has some advantages in respect to either a tracked or a comprehensive education systems in achieving those goals. These are among the commonly agreed core objectives or tasks of education in Western societies (Van de Werfhorst & Mijs 2010), yet it is not clear whether in current systems obtaining a desired effect on one of the objectives has undesirable effect on the other one; in other terms whether there is a trade-off between the two tasks or, by contrast, whether it is possible to gain in both objectives.

This paper argues that comprehensive and tracked educational systems are not designed to utilize the full academic potential across the ability spectrum and discusses how a mixed system that combines a comprehensive and targeted provision can use more extensively the academic potential across the entire students' population and achieve simultaneously the tasks of improving performance levels and reduce inequality in performance.

In tracked education systems, with different types of instruction provision, such as academic and vocational provision, in different types of dedicated institutions or classes, the underutilization of academic potential of the students in the in lesser track is the 'penalty' paid to match children and instruction in the attempt to achieve better aggregate results. The type of instruction provided is set (fixed) for each student, while students are expected to use the provided instruction to achieve given academic standards. In a comprehensive system every student is given the same type of provision with no possibility of personalisation, with the consequence of potentially causing both overutilization and underutilisation of the

academic potential across the students' population. The alternative which is discussed in this paper is based on a different option in which the education system can achieve the full utilization of academic potential by offering to every student personalised instruction (advanced or remedial) in addition to the comprehensive provision. The focus is shifted from finding the best way of dividing students in groups/streams to finding the best portfolio of common and targeted inputs per each student. This means that the types of instruction inputs vary depending the students' needs, so that the student who are in need to consolidate some aspects of the curriculum will attend as much as necessary of the remedial programmes; once the student will have sufficient command of the basic/common aspects of the curriculum, she/he can move to the advanced programmes.

The personalisation of education begs two important questions: do the personalised programmes (remedial or advanced) have a significant effect on the average achievement at all? Second, do students benefit equally from the personalised programmes or some students benefit more than others from the personalised programmes? In this respect, should the uneven effectiveness favour mostly the high achievers and the students from an advantaged background, this would mean that those programmes reinforce existing achievement gaps due prior achievement and socio-economic background. I will review the relevant extant research including my own research on out-of-school study programmes to answer those questions. In brief, the answer to the first question is positive provided that the programmes are well resourced and focussed and that there is a clear understanding of how to match students to types of instruction. In relation to the second question, my analysis of the existing evidence is more optimistic in relation to the possibility of obtaining generalised benefits without widening inequalities compared with the view that compensatory educational interventions in late adolescence are highly costly or ineffective, owing to a presumed low level of skill malleability among adolescents (Cunha and Heckman 2007, Heckman 2006). I will discuss results showing that even among 16 year old students it is possible, by investing moderate resources, to compensate partially for a disadvantageous home learning environment and previous low performance.

I will particularly focus on the English education system because it offers, in addition to the normal school instruction, extended school programmes, and programmes for the most gifted and talented students, which function effectively as forms of targeted and flexible provision. It should be noted that despite having a comprehensive system at the lower secondary level, the forms of regulation and governance is liberal and market-oriented (including private

schools) with school choice and diversity policies leading to a relatively high level of school diversity. In addition, the normal school time provision is organised on basis of streaming, i.e. splitting students on the basis of their abilities into different classes from age six within the same institution. Streaming is found to be more beneficial to the students placed in the top stream than to students placed in the ‘middle’ or ‘bottom’ streams, which implies that this type of provision might increase inequality in achievement levels (Parsons and Hallam 2014). The combination of school diversity and streaming implies that UK students might receive different types of education depending on level or achievement, which influences the stream where the students is placed to, and socio-economic background, which determine whether the students’ family can afford to buy a house in the premises of the good schools. It is in this diversified context that the OST programmes have to be considered.

First, I describe the mixed system, then I will discuss the issues relating to the implementation and effectiveness of the mixed system. In discussing the implications of a mixed system, I will draw on the results of my own research on out-of-school-time programmes in English schools and on the review of the literature on programmes for the gifted and talented.

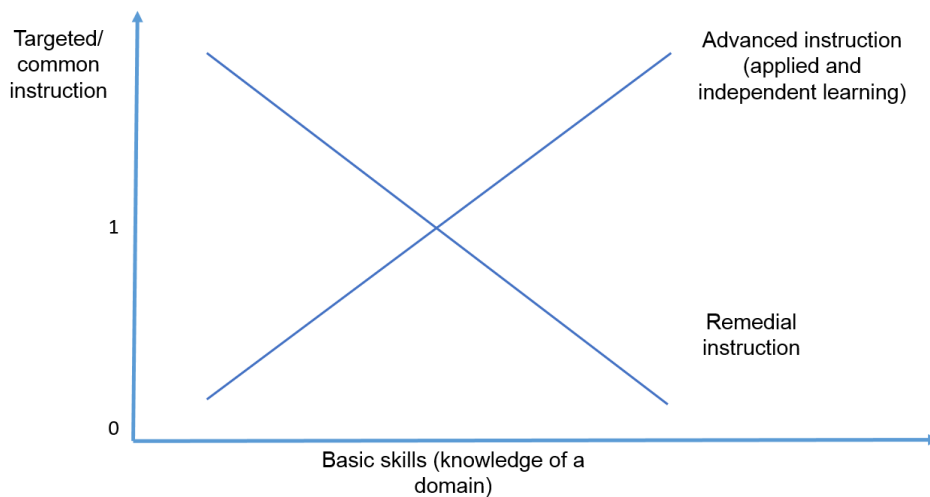
2 A mixed, common/targeted system of instruction

To describe the mixed system in a simple fashion let’s assume that there are two kinds of skills – basic, which refer the understanding of a domain or subject and advanced, which refer to the independent use of the knowledge of the domain¹. Three kinds of instruction are provided: common or baseline instruction, which covers the basic skills and two kinds of targeted instruction: remedial instruction, which compensates for delays and learning difficulties in the formation of basic skills; and advanced instruction, for higher-order learning goals, which are pursued once the basic skills are acquired. In figure 3 the horizontal axis represents the growth in basic skills, the vertical axis represents the ratio of the ratio of common to targeted instruction as a function of the basic skills. Low levels of basic skills

¹ The distinction between basic and advanced skills is only one of the possible distinction. Other categories might be considered, including the one distinguishing between traditional and child-centred instruction. In this paper I will refer to the distinction between basic and advanced instruction inputs.

indicate that the student has not been able yet to achieve the targeted proficiency levels in the basic curriculum. In this situation, the portfolio of instruction will consist mainly of remedial instruction and little advanced instruction. As the child progresses and acquires higher levels of basic skills, the portfolio of inputs will be shifted towards more advanced inputs.²

Figure 3 – Ratio of common to targeted instruction as a function of basic skills



The level of inequality in achievement distribution is influenced by the achievement standards set by the education system. The lowest level of skill inequality is realized when the standards required by the education system coincide with those of the basic instruction.

² The functioning of the varying and personalised programmes is similar to a buffer stock schema, which in economics refers to the use of commodity storage for price stabilization. Specifically, commodities are bought and stored when there is a surplus in the economy and they are sold from these stores when there are shortages in the economy. The stock of commodities stored acts as a buffer against price volatility. During periods when a large groups of students struggle at acquiring the knowledge at the targeted level (for example due to particularly adverse circumstances outside the school setting which hinder their academic performance), the participation in the remedial programmes will increase to compensate for low achievement. By contrast, when the circumstances are more favourable across the students' population, attendance to remedial programme will drop and attendance to the advanced programme will increase. The expansion of the personalised instruction inputs depending on the students' needs prevents the academic performance to drop during unfavourable periods – guarantying as much stability in academic performance as possible – and to improve overall academic performance during periods in which the out-of-school socio-economic circumstances tend to improve the overall academic performance.

In this case, the common instruction covers all the targeted learning goals and those who fail to achieve those standards receive additional remedial inputs. A more advanced instruction is not necessary and the lack of a distinction within the targeted inputs between basic and higher-order inputs prevents the system from creating the conditions of widening the achievement gap by differentiating instruction. However, the low inequality setting does not exploit the potential generalized growth in achievement that, although with potentially different paces for different students, a more targeted instruction yields.

As the standards set by the education system become more advanced than the common instruction provision, the targeted inputs become more important and this might generate higher levels of achievement inequality, depending on the pace of learnings of progresses of the students in the remedial and advanced groups. The performance of the system depends on the participation and effectiveness of the targeted provision and on the matching of students and instruction. These topics are described in the next sections.

The analysis of the implications in terms of skill inequality of a mixed provision with varying weights of targeted inputs shows that there might be a trade-off between efficiency and equity for different levels of self-productivity. If low-performance does not restrict later performance, the implementation of a mixed provision will generate gains in achievement for every child and narrower achievement gaps due to social origins. In this case there will be no trade-off between equality and efficiency in outcomes, or even a gain in both equality and efficiency. If by contrast low-performance restrict later educational attainment, the implementation of a mixed provision is less effective in reducing inequality due to social origins and might even increase inequality. Hence larger achievement gains at the aggregate level (efficiency) are attained at the expense of more inequality of opportunities in outcomes (less equity) and vice versa. I will review the literature on the topic in the next section.

3 How does diversification impact skill formation across groups?

The combination of common and targeted provision implies that different students receive different combinations of inputs depending on the level of knowledge of the curriculum that they have acquired. As any between-student differentiation of instruction, the targeted provision raises the issue of generating higher inequality in achievement levels in the attempt

to match students to instruction. This might occur because of for two mechanisms, which are treated by two distinct strands of literature: the first the detrimental effect of selectiveness on inequality; the second one is more focused on individual effects and relates to the potential widening of the skill gap between high and low achieving students which results from the diversification of instruction inputs.

Tracking versus comprehensiveness. The controversy around tracking versus comprehensiveness instruction has generated a wide debate whose main positions – selectiveness (either by tracking, streaming or grouping students by ability) and comprehensiveness – seem to be diametrically opposites. Proponents of comprehensiveness argue that selection does not increase performance overall, yet it widens inequalities. This occurs because selection is beneficial to high achieving students, but is harmful to the rest of the students, who experience lower quality education and low teachers' expectations. It has also often resulted in unequal learning opportunities, at the detriment of students from disadvantaged backgrounds (Gamoran 2011). Advocates of selectiveness argue that comprehensiveness underutilizes the academic potential of the students at the upper end of skill distribution. It also generates an excess of academic failure among those who fail to meet the targeted academic standards given the common inputs (Gamoran & Hannigan 2000), but who have the potential of achieving those standards given additional inputs.

A major limitation for the progression of the debate is the lack of knowledge on how instruction can be matched to children's starting points in a way that maximizes the achievement of all. As a result it has been difficult to implement ability grouping without widening the achievement gap between high- and low-performing children. Recent research by Connor and colleagues is an attempt to overcome these limitations by using a children-instruction-interaction framework as an optimal way to match instruction to students' idiosyncratic needs (Connor et al. 2004, 2007, 2009). The researchers modelled the achievement growth as a function of different types and different combination of types of instruction and found that the effectiveness of the different types of instruction vary according the student's starting point. Children with initial low ability, achieved larger gains in settings with more time spent in teacher-managed explicit activities, but with increasing amounts of child-managed implicit instruction as the school year progressed. By contrast, children with high initial ability achieved greater growth in settings with more time spent in child-managed implicit activities (Connor et al. 2004). Building on these insights and in particular on the finding that the optimal instruction for low-achieving students can be a

combination of inputs over the school year – from less complex to more complex inputs – it can be concluded that a targeted provision does not necessarily lead to greater achievement inequality and can even lead to more equality.

Skill formation. The effect of the diversification interacts with the process of skill formation to determine the level of inequality in achievement and opportunity. The level of inequality will depend on the balance between two mechanisms: the complementarity of inputs at the upper end of the skill distribution and the effectiveness of compensatory inputs at the bottom end of skill distribution (Cuna & Heckman 2007; Heckman 2006). Complementarity means that newer inputs build on previous ones in generating more advanced learning outcomes among the highly skilled and is linked to the idea that the skills acquired in one period persist into and influence the next learning phase (self-productivity of skill formation).

When the level of self-productivity is high previous skills are key for determining future learning implying that the high achievers will learn more easily compared to the least skilled and will benefit more from additional inputs (complementarity). When the level of self-productivity is low the previous learning delays do not restrain the formation of future skills and can be relatively easily ameliorated. A larger proportion of targeted inputs will foster achievement of both low-performing and high-performing students and compensation of the negative effects of poverty and low quality of family environment is possible. Low-performing and disadvantaged children might catch up using relatively few additional inputs. Such a situation is considered to be typical of early childhood, when the skills are not yet stabilized. Indeed, later interventions are considered to be more costly and less effective at reducing those differentials. Therefore, the targeted inputs would give the least advantaged students the possibility to participate in remedial/advanced programmes that otherwise they could not access but that the advantaged students receive in the form of private tuition, parental guidance, and in general high-quality out-of-school time hours. The productivity of targeted instruction will be higher for disadvantaged children at young ages.

The traditional argument for older children is that self-productivity in skill formation will play a greater role and a larger proportion of targeted inputs might exacerbate prior disparities in skill. While high-performing children will gain high returns to advanced inputs, compensation of low skills and disadvantage through remedial activities will be less effective than for younger children. In a situation where more weight is given to targeted and differentiated inputs, the varying learning trajectories of children with varying levels of

ability might result in a lesser reduction of social class achievement gaps or even larger achievement gaps, although achievement gains can be generalized.

Evidence shows that early childhood educational programmes can be a way of enhancing the academic performance of disadvantaged children. Research shows that early educational interventions can partly offset the harmful effects of poverty and inadequate learning environment and have substantive short- and smaller long-term effects on cognition, social-emotional development and school progress (See the Abecedarian (Campbell et al. 2002), Perry Preschool (Schweinhart et al. 2005; Heckman et al. 2010), and Chicago Child-Parent Center (Reynolds et al. 2011)).

The programmes run during the periods from late childhood to late adolescence seem less effective at compensating for previous disadvantage. That occurs because the highly skilled learn more and faster than low skilled children. In this situation, educational inputs cannot easily compensate for previous inadequate levels of education, and additional inputs are regarded to be complementary in respect to previous inputs rather than substitutes. In other terms they reinforce the existing conditions of advantage and disadvantage. Research shows that programmes designed to keep adolescents in school and provide learning opportunities, such as remedial programmes, are the most effective at improving skills (see the discussion of the Ohio's Learning, Earning, and Parenting (LEAP) program and the Teenage Parent Demonstration (TPD) in Heckman 2000 and Lochner 2000). Mentoring contributes to educational success as well, while the effectiveness of programmes which provide only job training and not classroom education are less effective (Carneiro and Heckman 2003). In the next paragraph I will discuss the conclusions from my research on OST programmes in secondary schools, which provides relatively robust evidence on the effectiveness of school based inputs targeted to adolescents.

4 Targeted programmes in the UK: Out-of-school time programmes and programmes for talented students

4.1 OST study programmes and GCSE attainment at age 16

A proxy for the targeted and remedial instruction is provided by the OST programmes in the UK. The analysis of its characteristics, take-up and effectiveness can be used to understand the extent to which a targeted, flexible provision would impact academic achievement and

achievements gaps between students from differing backgrounds. OST programmes are activities in which the students are involved outside lessons but within the school settings. I focus on programmes that are linked to the academic curriculum because previous research in the US has suggested these are the most beneficial for academic achievement. Students in UK OST study programmes work together to prepare for examinations and to do/review homework within the school premises. In teacher-led programmes, the role of the teacher involves a combination of supervision and instruction, while in self-directed study clubs (also called drop-in sessions) the students work together without the teacher. Compared to the core hours of compulsory education which are largely teacher-directed, the OST programmes are voluntary, learner-centred, favour a greater sense of control for both teachers and students, and are characterized by a more relaxed and informal relationship between teachers and students.

Research on OST programmes in the US indicates that participation improves academic performance as intended, with low to moderate gains in mathematics and reading (Durlak et al. 2010, Apsler 2009, Lauer et al. 2006, Eccles and Barber 1999). The finding is encouraging because students who participated in OST programmes in the studies were at risk of school failure (Miller 2003) and because, as supplements to regular school learning, the programmes come at a low cost relative to most intensive interventions offering a broader curriculum/scope and targeting also the parents, such as the US Abecedarian project.

In the UK the provision of OST programme became widespread among secondary schools in the UK around the beginning of the 2000s (MORI 2004) and, as attendance is voluntary, potentially attracts students from different socio-economic backgrounds and abilities. The heterogeneity of participants to OST programmes can be exploited to evaluate the extent to which they can compensate for the social class investment gap in children's education, or in other terms whether the OST programmes are more beneficial for lower-achieving children and children with lower socio-economic origins. This is an important difference to the US context, where programmes have targeted low-achieving students.

Several researchers have suggested that OST programmes might have equalizing effects. In comparison with middle-income children, low-income children are more likely to benefit from OST programmes (Miller 2003, Cosden et al. 2001) and low-achieving students tend to benefit more than students who entered programmes with higher achievement (McComb and Scott-Little 2003). It is not clear however whether older children can benefit from this social

mobility function of OST. Given that OST programmes have mainly targeted children at risk of failure, it is also not possible to estimate whether OST programmes yields different outcomes across the skill distribution. In the UK they are offered by most secondary school and are attended by children across the achievement distribution.

A recent study by Pensiero and Green (2017) has looked at the effectiveness of OST programmes using data from the Longitudinal Study of Young People in England (LSYPE) – a longitudinal survey of young people, comprising a total sample of 15,800 pupils, who were surveyed for the first time when they were aged 13/14 in 2004. The survey covers participation in OST programmes (we used information from the year preceding GCSE examinations), as well as very rich information on social and individual characteristics. The study also uses the National Pupil Database (NPD) records which are linked to the survey data to provide cohort members’ educational outcomes and prior academic achievement, as well as the characteristics of their schools. Compared to several extant studies, including the only prior study for Britain, whose findings could be affected by heterogeneous participation in the programmes, our results derive from a rich data set with multiple controls for social background, personal motivation and school characteristics exploiting the rich data available from the Next Steps survey. The study used three models to check how robust the findings are. In addition to standard Ordinary Least Squares (OLS) regression, the analysis involved deriving a comparison group using Propensity Score Matching (PSM) to identify a group of students who are similar to those who attended the OST programmes³. The study also took into account the possibility that there was something about the schools providing the OST programmes which might have had an impact on children’s performance independently of the programmes. We included some observed school-level characteristics, drawn from the school census, in both the linear regression and the PSM analysis. As our third alternative model, aiming to remove bias arising from unobserved school-level characteristics, we also ran school-fixed effects regression models (SFE).

³ This is achieved using information which previous studies have shown to be major predictors of both the propensity to participate in the programmes and academic achievement. The factors we included were student social origins (parental education, social class, family income, deprivation of area), and individual factors (expectations, school engagement, frequency of homework), prior to attending an OST programme. The richness of this set of covariates makes PSM an attractive approach for evaluation where no experimental data are available. Matching on the propensity score constructs a control group which is very similar to the treatment group. We then use this control group to represent the hypothetical outcome that would have been realized had the student not participated in the OST programme.

Results from all three models, presented in Table 1, consistently show that OST programmes, when they are teacher-led, are moderately effective in improving academic performance at the end of lower secondary education as measured by the overall performance on GCSEs at age 16 (the measure caps the total number of included courses at 8 full GCSEs or equivalent). The improvement is equivalent to half a grade in one subject out of the eight best GCSE results used in the computation of the total GCSE score. By contrast, when children attend self-directed OST programmes, there is no significant effect (Table 1).

Table 1 – The effect of OST programmes at age 14/15 (year 10) on academic performance (GCSE scores, year 11)

	Teacher-led study group	N	Self-directed study club	N
OLS	3.6**	6,019	-0.03	6,019
PSM	3.2*	6,004	-1.64	6,004
SFE	2.7**	6,019	-0.19	6,019

Notes

*** p<0.01, ** p<0.05, * p<0.1,

OLS: Ordinary least squares (controls: KS3, Sex, Educational plans, School engagement, Homework, SEN status,

Two-parent family, Social class, Parental education, FSM, Urban/ London/rural, Ethnic origins,

multiple deprivation index, % FSM (school), % first language not English (school),

% students saying programme is available (school), % Lev 2 (school))

PSM uses radius matching, caliper: 0.2 of SD of PS, Bootstrap.

SFE: school-fixed effects

The sub-group analysis (shown in Table 2) suggested that OST programme can compensate for previous disadvantage and reduce the achievement gap between children from differing socio-economic groups. The analysis showed that children from parents who are unemployed or in a routine occupation benefit the most, by the equivalent of 10.7 in GCSE scores amounting to two grades higher for one GCSE (e.g., going from a D to B) or two grade improvements for two GCSEs e.g. two As instead of two Bs – substantially greater than the average effect reported above. Indeed, we found no evidence that children from higher classes benefit significantly from participating in OST programmes (Table 2).

Table 2 – The effect of teacher-led study groups at age 14/15 (year 10) on academic performance (GCSE scores, year 11) by social class: a PSM model for each group

Social class		N
Long term unemployed and Routine occupations	10.7*	759
Semi-routine and Lower supervisory occupations	-2.8	1,311
Small employers and intermediate occupations	-0.1	1,004
Lower managerial and lower managerial occupations	2.3	2,937

Notes: See Table 1

It is also relevant to this analysis to look at how the effectiveness of OST programmes varies according to previous academic performance (Figure 2). This would contribute to understand whether complementary inputs would be restrained by a high level of self-productivity of skill formation and therefore would lead to widened inequality in achievement. The results from the study confirm that OST programmes. The analysis of OST programme by subgroup of prior academic performance is conducted using quintiles of KS3 scores. The results show that attending the programme does not seem to reduce overall achievement gaps according to previous academic performance.

4.2 OST programmes and KS2 attainment at age 10

Another recent study looked at the effectiveness of OST activities among young children in primary schools using the Millennium cohort study. It found positive association between OST activities and attainment outcomes at age 11. They also found that for economically disadvantaged children defined as coming from a family whose income is below 60% of the median equivalised income, after school club emerged as the only organised activity linked to child's KS2 attainment and prosocial skills. The magnitude of the effect on KS2 attainment is substantial. By focusing on the economically disadvantaged the magnitude is two points, amounting to half a standard deviation of the distribution of KS2 total score and to 40% of

the attainment gap between economically disadvantaged and non-disadvantaged children. Those results strongly suggest that after school programmes are effective at compensating for social disadvantage.

4.3 Programmes for talented students

The above discussion shows that after school programmes, whose role is primarily to complement the learning occurring during the normal school time, can be effective at compensating for the delays and difficulties that children from lower socio-economic background experience because of the inadequacy of their home learning environment. The following part will focus on the other end of the spectrum of the targeted instruction – the programmes for the talented and gifted children. UK-based research on the topic is very limited as far as I am aware. The evidence I will be discussing comes from a single report, which analysed the effectiveness of those programmes, also in relation to their ability to reduce the achievement gap between advantaged and disadvantaged groups (Morris and Yeshanew 2005). The programme for talented students was evaluated in the framework of a broader initiative aiming to increase the participation of young people from disadvantaged backgrounds in higher education, called Aimhigher. The report draws on survey data linked to the NPD in Years 9 and 11 in 2001/02 and 2002/03. The young people were from schools predominantly located in metropolitan areas and, compared with all schools nationally, had higher proportions of pupils who were entitled to free school meals and spoke English as an additional language.

The results show that the inclusion in the talented and gifted programme was associated with roughly 3 GCSE total capped scores and with an increased likelihood of achieving five or more A* to C grades at GCSE. The participation in the programme within younger was similarly associated with higher educational attainment at KS3 (an additional 0.18 of a level, equivalent to approximately 6.48 months of progress). In terms of the ability of the programme to reduce the achievement gap between groups of students with different socio-economic background and with different prior achievement, the report shows that gifted and talented strand of within the Aimhigher programme was effective at reducing the achievement gap between African pupils and non-African pupils. African pupils in the cohort achieved 3.53 higher capped GCSE scores compared to 3.13 points of other pupils, although no test for the

significance of this difference is shown. The study also looked at the achievement gap in respect to prior achievement and found that at the lower end of the prior attainment distribution participating in the gifted and talented cohort increases the probability of achieving five or more A* to C grades from 11% to 34%. At the middle of the distribution the impact was even higher, while among highly achieving students the impact was marginal.

The discussed evidence on the effectiveness of the complementary programmes suggests that OST programmes effectively compensate for social disadvantage even among 16 year olds.

The talented and gifted programmes do not seem to widen the achievement gap between advantaged and highly achieving students and less advantaged and low achieving students.

There is rather evidence of compensatory effects in respect to prior attainment and ethnic background the case of GCSE attainment.

5 Conclusions

This paper presents a theoretical framework to assess the possibility to achieve the goals of enhancing achievement of all and reduce achievement inequality at the same time and argues that an option based on a mixed common/targeted model of provision of instruction has some advantages in respect to either a tracked or comprehensive education systems in achieving those goals. The mixed provision shifts the focus from finding the best way of dividing students in groups/streams to finding the best portfolio of common and targeted inputs per each student. It combines per each student common and targeted inputs as a response to the challenge of enhancing achievement and reducing inequalities. This option is backed up by recent research on children-instruction interaction (Connor et al. 2009, 2007, 2004), and by evidence on OST programmes as well programmes for talented students.

The starting point is the recognition that comprehensive and tracked educational systems are not designed to utilize the full academic potential across the ability spectrum. In tracked education systems, the underutilization of academic potential of the students in the in lesser track is the penalty paid to match children and instruction in the attempt to achieve better aggregate results. In a comprehensive system every student is given the same type of provision with no possibility of personalisation, with the consequence of potentially causing both overutilization and underutilisation of the academic potential across the students' population. The alternative which is discussed in this paper is based on a different option in

which the education system offer varying programmes depending the students' needs, so that the student who are in need to consolidate some aspects of the curriculum will attend as much as necessary of the remedial programmes; once the student will have sufficient command of the basic/common aspects of the curriculum, she/he can move to the advanced programmes. The personalised instruction (advanced or remedial) in addition to the comprehensive provision is intended to achieve the full utilization of academic potential across the ability spectrum.

The targeted programmes have a twofold nature, advanced and remedial, and accommodate respectively higher order learning goals and delays and difficulties that children experience in acquiring the skills covered by the common part. The effectiveness of the targeted programmes will depend on the success of the matching of the targeted programmes to the students' needs. A major limitation in designing instruction and grouping student has been the lack of a knowledge on how to match instruction to students' characteristics. As a consequence the implementation of grouping has often led to the provision of low-quality instruction in the low-ability group and has hence resulted in widened achievement gaps (Gamoran 2011). Recent research by Connor and colleagues is an attempt to overcome these limitations using a student-instruction interaction. The researchers modelled the achievement growth of students with different levels of abilities as a function of specific inputs and combination of inputs and found that different inputs were differentially effective depending on the students' starting point.

An optimal matching prevents the stigmatization associated with the low-status assignment. As teachers see children progressing rapidly regardless of their group they have been assigned, the stigma associated with the low group assignment is prevented from arising and the quality of instruction will not be lowered by negative expectations. The incorporation of the children-instruction interaction framework into the mixed system of instruction contributes to combine the common and targeted inputs in a way that does not hold back the low achievers. The other reason why the mixed system prevents stigmatization is the flexibility and contingency of group assignment. The combination of inputs generates the lowest level of inequality when occurs at the school level rather than between-schools and when the assignment changes as the child progresses so that instruction is challenging for all the student.

The effectiveness of the mixed system is therefore backed up by research on children-instruction matching. It also find support from research on OST programmes and programmes for the talented students. Evidence on OST programmes including my own research show that targeted programmes can compensate for the learning delay caused by socio-economic disadvantage. The evidence seems to indicate well-designed educational compensatory/complementary programmes can have a social mobility function, even when the programmes' scope is limited to improve the academic performance on a specific examination. It also seems that the programmes for the talented students produce generalised achievement gains without widening the achievement gap between students with different achievements and socio-economic background. The evidence is relatively optimistic, compared with the view that compensatory educational interventions in late adolescence are highly costly or ineffective, owing to a presumed low level of skill malleability among adolescents (Cunha and Heckman 2007, Heckman 2006). Results from my own research suggest that, even among 16 year old students it is possible, by investing moderate resources, to compensate partially for a disadvantageous home learning environment and previous low performance.

Finally, it is important to note that the distinction between common and targeted instruction along the dimension of the complexity of the learning targets is only one of the ways in which instruction can be classified. The other important distinction from the pedagogical and sociological point of view is the one between traditional versus progressive education. This distinction reflects the tension existing in the learning process between acquiring the skills necessary to comply with the academic standards and developing problem-solving, creative and investigative skills which are not easily captured by standardized tests.

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