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Acceleration, Enrichment, or Internal Differentiation – Consequences of Measures to Promote Gifted Students Anticipated by German Secondary School Teachers

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Abstract

Introduction. In the last decades numerous measures and programs to promote gifted students have been developed worldwide. But in spite of these enhanced scientific and public efforts to improve gifted education, there are still a lot of difficulties to implement some of these measures in the daily routine of schools. The presented study examines the consequences – for students as well as for teachers – which teachers from German upper secondary (“Gymnasium”) and secondary modern schools (Realschule) anticipate for measures to promote gifted students: acceleration, enrichment, internal differentiation and early placement at university.

Method. 175 teachers (111 Gymnasium teachers, 64 teachers from secondary modern schools) filled in a questionnaire with 4-step Likert-Items on possible outcomes of the four different types of promotion for gifted students. Data analysis was done by 2x2x4 ANOVA with repeated measurement, with type of school and experience with measures of promotion as between subject factors, type of measure as inner subject factor and mean values on items concerning anticipated consequences as dependent variable.

Results. Results show significant differences with respect to assessed outcomes between the four specified measures. Especially for early placement at university teachers feared negative consequences for students like work overload, social marginalization and lack of leisure time. For internal differentiation, the method with the most positive anticipated outcomes for students, strong negative consequences in form of work overload and organizational problems for teachers were anticipated.

Conclusion. To counteract teachers’ – mostly non-realistic – apprehensions and their possible negative consequences on the promotion of gifted students, it seems necessary to provide teachers with realistic information on the consequences of various measures of gifted education. In addition, methods of internal differentiation should be imparted in teacher training for secondary school teachers at universities as well as in advanced teacher training.

Keywords: Gifted education, teachers, teachers’ attitudes, enrichment, acceleration, internal differentiation.

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Resumen

Introducción. En las últimas décadas se han desarrollado en todo el mundo numerosas medidas y programas para promover a estudiantes dotados. Pero a pesar de estos esfuerzos científicos y públicos mejorados para mejorar la educación dotada, todavía hay muchas dificultades para implementar algunas de estas medidas en la rutina diaria de las escuelas. El estudio que se presenta examina las consecuencias - tanto para los estudiantes como para los profesores - de que los profesores de secundaria superior alemana ("Gymnasium") y las escuelas modernas secundarias (Realschule) prevean medidas para promover a los estudiantes superdotados: aceleración, enriquecimiento, diferenciación interna y temprana en la universidad.

Método. 175 profesores (111 profesores de Gimnasia, 64 maestros de escuelas secundarias modernas) rellenaron un cuestionario con Likert-Items de 4 pasos sobre posibles resultados de los cuatro diferentes tipos de promoción para estudiantes superdotados. El análisis de los datos se realizó mediante ANOVA 2x2x4 con medidas repetidas, con tipo de escuela y experiencia con medidas de promoción entre factores sujeto, tipo de medida como factor sujeto interno y valores medios en ítems referentes a consecuencias anticipadas como variable dependiente.

Resultados. Los resultados muestran diferencias significativas con respecto a los resultados evaluados entre las cuatro medidas especificadas. Especialmente para la colocación temprana en los profesores universitarios temía consecuencias negativas para los estudiantes como la sobrecarga de trabajo, la marginación social y la falta de tiempo libre. Para la diferenciación interna, se anticipó el método con los resultados esperados más positivos para los estudiantes, fuertes consecuencias negativas en forma de sobrecarga de trabajo y problemas de organización para los maestros.

Conclusión. Para contrarrestar las aprehensiones de los maestros -en su mayoría no realistas- y sus posibles consecuencias negativas en la promoción de los estudiantes dotados, parece necesario proporcionar a los maestros información realista sobre las consecuencias de las diversas medidas de educación de los superdotados. Además, deberían impartirse métodos de diferenciación interna en la formación de profesores de secundaria, en las universidades así como en la formación avanzada de maestros.

Palabras clave: Educación para dotados, maestros, actitudes de los maestros, enriquecimiento, aceleración, diferenciación interna.

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Introduction

In spite of enhanced scientific and public efforts to improve gifted education in the last decades - numerous measures and programs to promote gifted students have been developed and documented worldwide since the 1980s (Heller & Perleth, 2007; Olszewski-Kubilius, 2003; Preckel & Vock, 2013; Shavinina, 2009) - there evidently are still a lot of difficulties to implement some of these measures in the daily routine of German schools. Even the intensified discussion on inclusion recently led in German educational policy mostly ignores gifted children and efforts to implement inclusion in German classrooms are mostly restricted to children with handicaps or learning disabilities (Boban & Hinz, 2013; Heimlich & Kahlert, 2014; see also Vogt & Krenig, 2014).

Teachers play a crucial part in identifying gifted students, implementing and realizing measures of promotion and recommending students for these measures. Therefore, it seems reasonable to assume that possible causes for these difficulties might lie in reservations teachers hold against certain methods applied in gifted education. A first inspection of empirical results on teachers' attitudes towards specific possibilities of gifted education indeed reveals some evidence for this assumption.

Many of the successful programs in gifted education that have been developed in the last years combine elements of acceleration and enrichment, the two basic principles of differentiation frequently applied in programs for gifted students as well as in measures for individualized differentiation (Olszewski-Kubilius, 2003). Acceleration means that students pass the normal curriculum faster than their peers. Individualized forms of acceleration in schools are grade skipping and/or early admission to certain levels of schooling e.g. primary school, college or university. In spite of the fact that the effects of acceleration for students' achievement and self-esteem found in empirical studies seem to be quite positive (Rogers, 1991; Lautrey, 2004), acceleration is still not very popular amongst parents and teachers. There is obviously a lot of fear of adverse effects on the children's social and emotional adjustment, and parents as well as teachers assume that accelerated students may have problems later (for a discussion see Heinbokel, 2008; 2012).

Enrichment extends, supplements, and sometimes even replaces aspects of the normal curriculum. One objective of adopting enrichment measures generally is to keep children with their same aged peers and at the same time foster the development of higher cognitive and

affective processes (Coleman & Cross, 2005). Either the student works on problems or materials that are not part of the regular curriculum or regular subjects of the curriculum are extended. Enrichment may happen as part of the school programme in the regular class or during special courses in the afternoon. There are also a lot of enrichment measures for gifted children outside of school, as e.g. weekend courses or summer camps (see Endepohls-Ulpe, 2009). For parents there is empirical evidence that they favour enrichment measures over acceleration (Rost, 1993; Heinbokel, 2008). Parents and teachers disapprove measures that segregate gifted children, like special schools, and prefer the adoption of measures that make it possible to integrate gifted children in classes with their same aged peers (Sparfeldt, Schilling & Rost, 2004). For schools, enrichment measures can be time-consuming and expensive if they try to organize and offer extra programmes themselves (e.g. the Schoolwide Enrichment Programme by Renzulli and colleagues (Renzulli & Reis (1994))), circumstances which, in the eyes of teachers, might be disadvantages of enrichment.

Actually acceleration and enrichment are complementary, since saving time by acceleration provides learning time to meet the students' individual abilities and interests. Early placement at university" - in German "Frühstudium" - is such a combination of acceleration and enrichment, which was established for secondary school students at numerous German universities in the last decade (Halbritter, 2004). The main principle of "Frühstudium" is that students of grammar schools, or, in exceptional cases, of secondary modern schools (in German "Realschule"), who are highly motivated and interested and, in addition, performing very well, get the chance to participate in university courses. Evaluations of German early placement measures (Solzbacher, 2008; Endepohls-Ulpe, 2011a, b) on the one hand show that they are highly accepted by the students. On the other hand, though, these studies unfortunately also reveal that a great number of schools and teachers do not seem to be very supportive to their students concerning the measure. A study on teachers' attitudes with respect to positive or negative outcomes of the measure (Endepohls-Ulpe, 2012) points out that teachers' main fears concerning early placement at university correspond to fears connected with measures of acceleration in general: excessive intellectual and emotional demands for the students.

A controversial issue in gifted education is the question whether or not gifted children should be instructed in homogenous groups with gifted peers or in heterogeneous groups together with children of all levels of cognitive abilities (Kulik and Kulik, 1992). Measures of homogenous grouping are very popular, such as special schools for gifted children, after-school clubs, study groups or pull-out programs. And, in spite of empirical results that group-

ing does not have a positive effect on achievement in general, teachers seem to prefer teaching homogeneous groups to teaching heterogeneous classes (for an overview see Ullrich & Strunck, 2008; Vock et. al, 2007).

However, adopting methods of instruction to promote gifted children in heterogeneous classes seems to be indispensable, because special measures for gifted students are not always available due to financial and organizational limitations. A study on attitudes of German primary school teachers towards several methods of internal differentiation (Endepohls-Ulpe & Thömmes, 2014) demonstrated that teachers in general have positive attitudes towards measures of internal differentiation as means of promoting gifted children at school. But nevertheless, they also see difficulties in adopting some very effective methods of differentiation. They are apparently in conflict between their knowledge of how instruction should be in the best case and anticipated work load when implementing their knowledge in their classes. If even primary school teachers, who teach in the last stage of schooling in Germany where children of all levels of abilities are instructed in one classroom, have reservations against methods of internal differentiation, it seems to be an educated guess that German secondary school teachers, who teach in a tracking system where pupils are gathered in homogeneous learning groups, have even more reservations.

Objectives

Up to the moment there is still not enough information available on the causes of difficulties German teachers seem to have to support or implement measures of promoting gifted students. Especially about secondary school teachers' attitudes towards basic principles of gifted education like acceleration, enrichment and differentiation little is known. There is some evidence that anticipated consequences from two main areas might play a role for teachers: positive or negative impact on students' achievement and well-being as well as the assessed work load for teachers (Endepohls-Ulpe, 2012). Hence, objective of the presented study was to analyze positive and negative aspects of secondary school teachers' attitudes against some of the most important measures of promoting gifted students.

Method

Participants

The sample consisted of 175 teachers (76 male, 99 female; mean age 37, min 20, max 65). 111 teachers came from randomly chosen German grammar schools, the type of secondary schools which provide the highest level of school graduation in the German school system. 64 teachers came from secondary modern schools, a school type which is an intermediate type between upper and compulsory level. Students from this type of school who finish with good results can change to a Grammar school and after three years acquire the “Abitur”, the certificate which permits studying at university. The schools were all situated in the federal states of North-Rhine-Westphalia and Rhineland-Palatinate. Headmasters of the schools were contacted and after having inspected the questionnaire, they gave their permission to distribute the questionnaires in their schools. Teachers’ participation in the study was voluntary. From the 64 teachers from secondary modern schools, 36 were students who already worked part time as supply teachers. This circumstance explains the low mean age of the sample. The mean age of the subsample of Grammar school teachers was 42 (min 24, max 64), of the secondary modern school teachers 28 (min 20, max 51).

Measuring instrument

To measure teachers’ attitudes a questionnaire was used, which contained some questions concerning personal data, two general questions about personal experience with measures to promote gifted students and a part on the anticipated consequences of 4 measures of gifted education - acceleration, enrichment, internal differentiation and early placement at university. The measures each had to be assessed on 8 4-step Likert-items with respect to possible consequences for students and teachers (see table 1). These items were taken from a questionnaire that was originally developed for the assessment of the consequences of early placement at university (Endepohls-Ulpe, 2012). The four scales of this questionnaire were constructed by factor analysis, three of them showing acceptable scale reliabilities (Factor I “Positive effects for students”: $\alpha = .87$; Factor II “Negative effects for students”: $\alpha = .79$; Factor III “Organizational and social problems”: $\alpha = .73$). In spite of low reliability ($\alpha = .49$) Factor IV “Additional work for teachers” was still taken for further analysis as the two constituting items logically fitted well together. Only items which could be applied to all of the four measures were taken from each of the four scales of this questionnaire. As a consequence of the reduced item number and the fact that the four measures apparently were assessed very differently, the factor structure of the original questionnaire could not be replicated in this

study. Thus, further analyses were done on the base of single items representing the four factors (see table 1).

Table 1. *Questionnaire items*

<i>Item</i>	<i>Factor</i>
The measure counteracts a lack of challenge.	I
Students get motivated to participate in class again.	I
The arising work load is too heavy for the student.	II
The measure bears the risk of excessive demands for the students.	II
Students run the risk to get ostracized in their class groups.	III
The whole thing is difficult to realize for organizational reasons.	III
The student's leisure time will be excessively shortened by this measure.	III
The arising work load for the teacher is too high.	IV

Procedure

To make sure that teachers, who were not informed about measures of promoting gifted students could answer the questions, the questionnaire started both with a short introduction to the objective of the study (examining teachers' attitudes towards several methods of promoting gifted students) and with a short explanation of each of the four measures that had to be assessed.

Statistical Analysis

Teachers had to assess each of the four measures of promoting gifted students on the same items. Thus, differences between the attitudes towards the four methods between teachers with and without experience and teachers of the two types of schools had to be tested by 2x2x4 ANOVA with repeated measurement (Bortz, 1999), with type of secondary school and experience with measures of promotion as between subject factors, type of measure as inner subject factor (repeated measurement) and mean values on items concerning anticipated consequences as dependent variables. Significance levels of paired tests between the four methods on each item were adapted by Bonferroni-correction (Bortz, 1999).

Results

Anticipated consequences - Positive effects for students

Counteracting lack of challenge. There was a significant inner subject effect for this item [$F(3,492) = 9.57, p < .001; \eta^2 = .05$]. For internal differentiation the assessed positive effect ($M = 3.3, SD = .59$) was significantly higher than for the three other measures (acceleration: $p < .01$; enrichment: $p < .05$; early placement: $p < .001$). Nevertheless, the anticipated positive effects with respect to counteract a lack of challenge for all four measures were high. No differences between teachers with and without experience or teachers from different school types could be shown.

Table 2. Means and SDs - Item: “Measure counteracts a lack of challenge.”

Measure	M^1	SD	N
Acceleration	3.08	.65	168
Enrichment	3.09	.56	168
Internal differentiation	3.28	.59	168
Early placement at university	2.95	.61	168

¹4=totally agree, 3=somewhat agree, 2=somewhat disagree, 1=totally disagree

Higher motivation to participate in classes. Assessed effects of the four measures differed significantly [$(F(3, 477) = 31.13, p < .001; \eta^2 = .18)$]. Paired tests showed that anticipated positive effects of internal differentiation and acceleration were the highest, followed by enrichment. The motivating effect assessed for early placement at university was rated significantly lower than for the other measures ($p < .001$). There was a significant interaction effect between measure and type of school [$F(3, 477) = 8.59, p < .001; \eta^2 = .05$]. Teachers from grammar schools rated positive effects of internal differentiation to be significantly lower than those of secondary modern schools, and the effects of early placement at university to be significantly higher.

Table 3. Means and SDs - Item: “Students get motivated to participate in classes again”

Measure	M^1	SD	N
Acceleration	2.9	.65	163
Enrichment	2.71	.79	163
Internal differentiation	3.05	.67	163
Early placement at university	2.28	.83	163

¹4=totally agree, 3=somewhat agree, 2=somewhat disagree, 1=totally disagree

Anticipated consequences - negative effects for students

Work load. For this item a significant inner subject effect [$F(3, 486) = 27.68, p < .001; \eta^2 = .14$] could be shown. Early placement at university was rated to be associated with a too heavy work load, higher than the other three measures (acceleration, internal differentiation: $p < .001$; enrichment: $p < .01$). Work load for enrichment measures was rated to be slightly too high, significantly differing from acceleration and internal differentiation ($p < .001$), for which the work load for students was rated as acceptable. No differences between teachers with and without experience and between teachers from different types of school could be found.

Table 4. Means and SDs - Item: "Work load is too heavy."

Measure	M^1	SD	N
Acceleration	2.14	.66	166
Enrichment	2.25	.66	166
Internal differentiation	1.91	.59	166
Early placement at university	2.46	.71	166

¹4=totally agree, 3=somewhat agree, 2=somewhat disagree, 1=totally disagree

Excessive demands. For the notion that the measure could cause overstrain for the students, there was a significant inner subject effect [$F(3, 480) = 34.99, p < .001; \eta^2 = .17$]. For early placement, overstrain was assessed as possible, whereas for the other three measures this was not the case ($p < .001$). For internal differentiation, excessive demands were rated to be not very likely, even less than for acceleration and enrichment (acceleration: $p < .01$; enrichment: $p < .05$). There was a significant interaction effect 'measure x type of school' [$F(3, 480) = 6.86, p < .001; \eta^2 = .04$]. Teachers from secondary modern schools had a significantly higher fear of excessive demands for students with respect to early placement at university as teachers from grammar schools had. No general differences between teachers of the two types of schools and teachers with and without experience could be found.

Table 5. Means and SDs - Item: "Risk of excessive demands"

Measure	M^1	SD	N
Acceleration	2.04	.53	164
Enrichment	1.87	.67	164
Internal differentiation	1.69	.56	164
Early placement at university	2.30	.68	164

¹4=totally agree, 3=somewhat agree, 2=somewhat disagree, 1=totally disagree

Organizational and social problems.

Students' leisure time. There was a significant inner subject effect for the fear that the measures could excessively shorten students' leisure time [$F(3, 486) = 43.37, p < .001; \eta^2 = .21$]. Teachers saw this effect clearly for early placement (significantly higher than for all other measures (acceleration, internal differentiation: $p < .001$; enrichment: $p < .01$)), whilst for acceleration and internal differentiation losses of leisure time were hardly anticipated. For enrichment, this effect was also rated to be significantly higher than for acceleration and internal differentiation ($p < .001$).

Table 6. Means and SDs - Item: "Students' leisure time will be excessively shortened"

Measure	M^1	SD	N
Acceleration	2.15	.71	166
Enrichment	2.62	.86	166
Internal differentiation	2.15	.97	166
Early placement at university	2.84	.83	166

¹4=totally agree, 3=somewhat agree, 2=somewhat disagree, 1=totally disagree

There was a significant interaction effect 'measure x type of school' [$F(3, 486) = 38.84, p < .001; \eta^2 = .19$]. Teachers from secondary modern schools rated the effects of acceleration, enrichment and early placement on the leisure time as worse than grammar school teachers did. But for internal differentiation, they did not see any negative effects ($M = 1.53$), whereas teachers from grammar schools clearly did ($M = 2.50$).

Significant between subject effects could be found for this item. Teachers who were experienced with measures of gifted education generally anticipated less losses of leisure time than teachers without experience [$F(1, 162) = 5.03, p < .05; \eta^2 = .02$]. Furthermore, teachers from grammar schools anticipated less losses than teachers from secondary modern schools [$F(1, 162) = 5.26, p < .05; \eta^2 = .02$].

Risk to get ostracized. For the anticipated risk of getting ostracized, a significant inner subject effect could be shown ($F(3, 483) = 21.16, p < .001; \eta^2 = .12$). Concerns for accelerated students were significantly higher (enrichment, internal differentiation: $p < .001$; early placement: $p < .01$) than for students promoted by other measures. For students in enrichment

measures, teachers did not fear any risk to get ostracized, significantly less than for the other three measures (acceleration, internal differentiation: $p < .001$; internal differentiation $p < .05$).

Table 7. Means and SDs - Item: "Students run the risk to get ostracized"

Measure	M^1	SD	N
Acceleration	2.64	.69	165
Enrichment	1.96	.77	165
Internal differentiation	2.19	.72	165
Early placement at university	2.30	.82	165

¹4=totally agree, 3=somewhat agree, 2=somewhat disagree, 1=totally disagree

Difficulties to organize the measure. There was a significant inner subject effect for this item [$F(3, 483) = 45.25, p < .001; \eta^2 = .21$]. No organisational difficulties were anticipated for acceleration, less than for all other measures ($p < .001$), whilst the most difficulties in organisation were anticipated for internal differentiation, more than for all other measures (acceleration, early placement: $p < .001$; internal differentiation: $p < .05$).

Table 8. Means and SDs - Item: "Measure is difficult to organize".

Measure	M^1	SD	N
Acceleration	1.86	.81	165
Enrichment	2.52	.73	165
Internal differentiation	2.78	.86	165
Early placement at university	2.37	.77	165

Anticipated consequences - negative consequences for teachers

Work load for teachers. For the anticipated work load for teachers, a significant inner subject effect could be shown [$F(3, 483) = 79.90, p < .001; \eta^2 = .33$]. The anticipated work load for internal differentiation was rated as clearly too high, significantly higher than for all other measures (acceleration, early placement: $p < .001$; enrichment: $p < .01$). The anticipated work load for enrichment also was rated as high, for early placement at university and acceleration work load was not rated as to be high.

Table 9. Means and SDs - Item: "Work load for teachers is too high"

Measure	M^1	SD	N
Acceleration	1.97	.74	165
Enrichment	2.68	.79	165
Internal differentiation	2.97	.75	165
Early placement at university	1.82	.86	165

¹4=totally agree, 3=somewhat agree, 2=somewhat disagree, 1=totally disagree

There was a significant between subject effect for the type of school teachers came from [$F(1, 161) = 8.23, p < .01; \eta^2 = .04$]. Teachers from grammar schools in general rated the work load for all measures to be higher than teachers from secondary modern schools. Likewise a significant between subject effect for teachers with and without experience with measures of gifted education could be shown [$F(1, 161) = 5.7, p < .05; \eta^2 = .03$]. Teachers without experience anticipated more work load than those with experience but there was also a significant interaction effect 'type of school x experience' [$F(1, 161) = 13.27, p < .001; \eta^2 = .07$]. Teachers from grammar schools without experience saw significantly more work load than teachers from grammar schools with experience, whilst there were only small differences between teachers of secondary modern schools with or without experience with measures of gifted education.

Discussion and Conclusion

Looking at the positive and negative consequences teachers anticipated for the students regarding the four measures of promoting gifted students, internal differentiation was clearly rated to be not only the most effective one but also to be the one with hardly any negative consequences. Internal differentiation was seen as highly counteracting a lack of challenge and as motivating students to participate in classes again. There were no fears concerning too heavy workload or excessive demands for students, and fears concerning losses of leisure time or a decline of social integration were only small. The motivating effects of the other three measures were also seen as high, but not as high as for internal differentiation. Especially for early placement at university the effect for an enhanced participation in classes was rated as to be only moderate. But in contrast, the work load for acceleration, enrichment and notably for early placement at university was anticipated as probably too heavy. For acceleration and again to a high degree for early placement excessive demands for the students were foreseen. Especially for enrichment and early placement there were also fears that stu-

dents could have too heavy losses in leisure time and ostracism was anticipated to be very strong for acceleration and early placement at university.

The picture completely changes when we have a look at the anticipated consequences of the four measures for schools and teachers. In the eyes of secondary school teachers, internal differentiation apparently is very difficult to organize and the work load for teachers is rated as to be definitely too high. Enrichment and early placement at university are also rated as to be difficult to organize whereas acceleration seems to be no problem with respect to organisation. Interestingly, teachers do not anticipate too much work connected with students' acceleration or early placement at university, but for enrichment they also fear that their own work load could be too heavy.

Hence, looking at this general tendency of anticipating positive or negative consequences in certain fields for students or teachers, it gets a bit clearer why secondary school teachers are somewhat reluctant to implement measures of promoting gifted students. Measures for which they anticipate the most benefits and the least dangers for students - especially internal differentiation, but also enrichment - are at the same time assessed as causing heavy work load and organisational problems for themselves. And inversely teachers see no problems for themselves with respect to measures which they fear could have some very negative consequences for the students – especially early placement at university, but also acceleration.

Most differences between teachers of grammar schools and those of secondary modern schools can be explained by the fact that teachers of secondary modern schools - due to the circumstance that they teach pupils who are generally assumed to be only moderately achieving - are probably even further away from considering to implement methods of gifted education than teachers of grammar schools.

Altogether the results reveal a somewhat discouraging picture of German secondary school teachers' lack of skills and lack of information with respect to gifted education. It can be assumed that, like the German primary school teachers interviewed by Endepohls-Ulpe and Thömmes (2014), secondary school teachers probably know that methods of internal differentiation exist and are appropriate for promoting gifted students, but they just have not learned how to implement them in classes. Fears with respect to acceleration and early

placement like overstrain or ostracism can be interpreted as an expression of well-meant concern as to the well-being of their students, but, however, empirical results of studies on the consequences of these measures (see Heinbokel, 2012; Endepohls-Ulpe, 2011a,b; Solzbacher, 2008) show that in most cases these worries are not justified. And finally, the notion that there is no additional work for teachers when students skip a grade or participate in early university placement programs is a fatal error: students wish and need support when they skip a grade or miss lessons at school in spite of the fact that most of them in the end manage these challenges (Endepohls-Ulpe, 2011a).

Concluding it can be stated that German secondary school teachers seem to have some mostly non-realistic apprehensions on measures of gifted education which possibly have negative consequences on the promotion of gifted students. Thus, it seems both necessary to provide teachers with realistic information on the consequences of various measures of gifted education and to impart methods of internal differentiation also in teacher training at universities for secondary school teachers as well as in advanced teacher training.

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