

Effective strategies for implementing differentiated instruction

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Abstract

The need for modified curriculum provision for exceptional learners has long been recognised. This requires the differentiation of regular curriculum. For those exceptional learners who have learning difficulties, this differentiation is increasingly seen as the responsibility of classroom teachers. For those students who are gifted and talented, on the other hand, the differentiation has been implemented in alternative ways.

Experts in the provision of education for gifted and talented students attribute this lack of regular classroom teacher involvement to various reasons. One is the relevant professional

knowledge of the teacher. This includes an understanding of gifted knowledge and thinking and the ability to integrate this with modifications to the regular curriculum.

This paper on successful differentiation examines how the model of the gifted and talented learner as an expert knower and thinker can be used to differentiate the regular curriculum. It reviews the novice to expert knower transition in terms of its implications for teaching and uses the model to recommend strategies for identifying gifted and talented knowers in terms of their entry level understanding of a topic.

The model has helped teachers to infer how gifted and talented students might understand regular topics on the curriculum. This professional knowledge assists teachers in turn to identify various types of gifted interpretations, to evaluate these in terms of the assessment criteria for the regular curriculum.

Introduction

Differentiating instruction involves responding constructively to what students know. It means providing multiple learning pathways so that students can have access to the most appropriate learning opportunities commensurate with their capacity to learn. It involves matching students' approach to learning with the most appropriate pedagogy, curriculum goals and opportunities for displaying knowledge gained (Anderson, 2007; Ellis, Gable, Gregg, & Rock, 2008). This requires the differentiation of regular curriculum.

Differentiation is increasingly recognised as a means for meeting the individual needs of all students and particularly for those who have exceptional learning profiles. For those exceptional learners who have learning difficulties, this differentiation is increasingly seen as the responsibility of classroom teachers. One form of differentiation used to cater for literacy and numeracy underachievement is the *Response to Intervention* approach. This approach uses students' capacity to benefit from the instruction provided to infer their approach to learning and to differentiate subsequent teaching to take account of this (Vellutino, Scanlon, Small, & Fanuele, 2006). Three levels or tiers of teaching differentiations are usually implemented: modification to classroom-based teaching (Tier 1); focused small group interventions (Tier 2); and more intensive intervention comprising 1:1 tutoring (Tier 3) (Wanzek & Vaughn, 2011). The tier in which an exceptional student is located is determined by their knowledge, which includes their ways of thinking and learning.

Differentiation for gifted and talented learners

The need for modified curriculum provision for gifted and talented learners has long been acknowledged. For these students, however, the differentiation has been implemented in alternative ways that are more removed from the responsibility of the regular classroom teacher¹. Colangelo, Assouline and Gross (2004) exemplify this in their report *A Nation Deceived: How Schools Hold Back America's Brightest Students* (Volumes I and II). The report describes 18 main ways in which this can be done. For this paper these have been grouped as follows:

- 1 being located in the classes of chronologically older students, for example, through early entry to kindergarten, primary, secondary or tertiary education, grade-skipping, subject acceleration/partial acceleration
- 2 continuous progress at the gifted students rate of learning, both where this is controlled by the teacher and by the student (self-paced instruction)
- 3 curriculum compacting; the gifted students curriculum is modified, for example, to include less introductory activity, drill, and practice or bigger increments in learning compared to the curriculum
- 4 telescoping the curriculum; the gifted student is taught at a faster rate than peers and is placed in a higher grade
- 5 mentoring
- 6 extra-curricular programs and correspondence courses
- 7 advanced credit is provided; the gifted students' advanced knowledge is credentialed in various ways, for example, the subjects studied at one level receive credit for a corresponding subject at a higher level, the student studies subjects at an earlier age (advanced placement) or receives advanced credit by completing successfully the relevant assessment requirements such as examinations (credit by examination).

This set of options focuses on accelerating the gifted students through the curriculum, both through grade placement and curriculum modification as a prime means of providing access to differentiated learning experiences. They have been associated with higher achievement for gifted and talented learners (Colangelo, Assouline & Gross, 2004; Field, 2009; Gavin, Casa, Adelson, Carroll, Sheffield, & Spinelli, 2007; Gentry & Owen, 1999; Gubbins, Housand, Oliver, Schader & De Wet, 2007; Reis, Westberg, Kulikowich, & Purcell, 2007; Tieso, 2005).

¹ In the present context of gifted and talented learning, the regular classroom is the context in which the student is located with broadly same chronological aged peers.

Differentiation for gifted learners in the regular classroom

Evidence supporting enrichment in the regular classroom

The focus of differentiation in this paper is on appropriate teaching for gifted students in regular, heterogeneous, mixed ability classrooms. This can be implemented in various ways and has been shown to be effective (Rock, Gregg, Ellis, & Gable, 2008). The use of more challenging mathematics curriculum with gifted third to fifth graders was associated with gains in maths outcomes over a three-year period (Gavin et al., 2007). The use of advanced content across the content areas in intact classrooms was linked with higher outcomes by gifted students (VanTassel-Baska, Zuo, Avery, & Little, 2002). VanTassel-Baska and colleagues observed higher outcomes for the students using this content in language arts, critical reading, persuasive writing and scientific research design skills. Similar findings have been reported for high-ability primary level students learning social studies (Little, Feng, VanTassel-Baska, Rogers, & Avery, 2007).

Provision of enriched and accelerated reading instruction has been associated with higher reading comprehension and fluency outcomes (Reis, Eckert, McCoach, Jacobs, & Coyne, 2007; Reis, Eckert, McCoach, Jacobs, & Coyne, 2008) by gifted students. This extends to involvement in an online enrichment program (Field, 2009). Provision of differentiated instruction in parallel with a student grouping strategy that allows gifted students with like thinking peers flexible movement in and out of grouping patterns (instructional grouping) has been associated with increased achievement for gifted students (Gentry & Owen, 1999; Kulik, 1992; Kulik & Kulik, 1997; Tieso, 2005). Ability grouping without differentiation has little or no influence on student outcomes (Kulik, 1992; Tieso, 2005). Curriculum compacting, implemented by eliminating content already learnt by gifted and talented students followed by the enriched learning opportunities such as self-selected independent study resulted in higher or similar achievement scores (Reis et al., 1998).

Availability of information about differentiation

Teachers and schools also have access to information about how to implement differentiation procedures. Tomlinson and Strickland (2005), for example, note that teachers usually differentiate the teaching by modifying one or more of the following: what students learn (the content), how they will learn it (the process), and how they will show what they have learnt (the product). To do this, educators (e.g., Anderson, 2007; Rock et al., 2008; Tomlinson, 2000) recommend that teachers give consideration to the knowledge, interests and abilities students bring to a learning context, the key or essential ideas and skills of the content area, how the students will be grouped or organised for learning (flexible grouping according to common interests, topic or ability) and the important features of the assessment procedures used (these features often include ongoing and meaningful assessments that are integrated with the teaching). As well, teachers and schools are encouraged to

evaluate regularly the differentiated provision and make necessary modifications to the content, process and products.

The practice of differentiation in regular classrooms is infrequent

Given its reported success as a reasonable solution for accommodating the learning profiles of gifted and talented students, implementing appropriate teaching for gifted students in regular classrooms, the practice of differentiation in regular classrooms has, in practice, been largely unsuccessful (Hertberg-Davis, 2009). It should be noted at the outset that some educators equate this with enrichment and contrast it with acceleration as follows: enrichment refers to the increased depth of study of a particular topic, while acceleration refers to speeding up the instruction. As well, the quality of the learning experiences used for enrichment has been questioned. While some see enrichment and acceleration as mutually exclusive alternatives, others see them as complementary. It is obviously possible that a student involved in an enrichment activity could develop the same understanding of a topic as a student who had been accelerated to a higher grade level.

Evidence of lack of differentiation for gifted and talented students in regular classrooms is readily available. Reis et al. (2004), for example, monitored the extent to which third- and seventh-grade talented readers (students reading at least two grades above their chronological grade placement with advanced language skills and advanced processing capabilities in reading) received differentiated reading curriculum and/or instructional strategies. They found that the talented readers in 75 per cent of the classrooms received no differentiated reading instruction. They were not exposed to appropriately challenging books or more challenging learning tasks. Reis and Renzulli(2010) commenting on gifted education provision in the United States of America, note that gifted and talented students have access to less rigorous curricula and are less likely to be challenged, especially in elementary and middle school.

Reasons for the lack of differentiation

VanTassel-Baska and Stambaugh (2005) identify a number of reasons for the lack of differentiation – teachers:

- 1 lack the content knowledge necessary to extend and differentiate the typical curriculum content areas to cater for gifted and talented students
- 2 lack the classroom management skills necessary to support differentiated teaching
- 3 lack the beliefs needed to implement differentiated teaching, such as the belief that students differ in how they learn, that students can acquire knowledge that is not understood by the teacher
- 4 do not know how to accommodate the approaches to learning by gifted students who are from different cultural groups (ethnic, social) or who are also underachievers

- 5 find it hard to locate and use effectively a range of resources that would facilitate teaching the gifted and talented students
- 6 do not have the planning time need to adjust the curriculum for the gifted and talented students
- 7 are not supported or encouraged by the school leadership to value and guide the implementation of differentiated strategies for gifted learners
- 8 lack the relevant pedagogical knowledge and teaching skills for gifted and talented students.

Underpinning these reasons is a lack of relevant professional knowledge in schools (Munro, 2011; 2012):

- 1 teachers knowledge of either or both gifted learning and the associated pedagogy and relevant curriculum
- 2 leadership knowledge about how to provide leadership in the effective provision of education for gifted and talented students.

The influence of insufficient professional knowledge for gifted education provision can be reduced to some extent if teachers use familiar curriculum pathways and tools for describing students content knowledge at any point and for planning their teaching (Munro, 2010). In this context it is easier for teachers to:

- 1 identify more cognitively complex knowledge and understanding in the broad topic areas with which the teachers are familiar and to generate and challenges and enquiry to stimulate students' knowledge; the teachers need only think about one topic at a time
- 2 observe gifted and talented learning and thinking as they observe these students learning the topics at a higher, more complex and sophisticated level on the knowledge pathway. The teachers have a familiar measuring stick for observing gifted students learning
- 3 generate challenges and enquiry to stimulate students' knowledge; the teachers need take account of only one topic at a time
- 4 see gifted learning and thinking; it will be more obvious that some students learn and understand topics at a higher, more complex and sophisticated level on the knowledge pathway.

In other words, the regular curriculum gives teachers a familiar measuring stick for observing gifted students' learning (Munro, 2010).

A strategy for building teacher knowledge about how to differentiate

The present paper describes an approach to differentiation that synthesises a knowledge of how gifted and talented students learn with the regular school curriculum.

Teachers can differentiate their teaching more effectively when they: (1) understand how these students learn and think; (2) know a range of teaching options for differentiating their teaching; (3) can apply the differentiated teaching to topics in their classroom; (4) have the appropriate motivation orientation; and (5) can read the culture and climate in their school and classroom in terms of this differentiation (Munro, 2010; 2011; 2012).

The expert knower as a guiding model

This paper used the model of the gifted and talented learner as an expert knower and thinker to differentiate the regular curriculum. Drawing on models of expert knowledge and performance (Ericsson & Lehmann, 1996; Ericsson, Patel, & Kintsch, 2000; Farrington-Darby & Wilson, 2006), various researchers including Ericsson and colleagues (Ericsson, Nandagopa & Roring, 2005, 2007; Shavinina, 2007; Sternberg, 2005) have proposed the use of the expert performance framework as a conceptual model for describing gifted knowing and thinking.

This perspective provides a means for unpacking and analysing how gifted and talented students know and learn (Munro, 2010). By identifying the thinking that underpins the knowledge transformation for the novice to expert knower transition, it is possible for teachers to infer how gifted and talented student might interpret and construct an understanding of regular curriculum topics.

The approach taken in this paper identifies similarities between expert and gifted understanding. Both have more elaborated and differentiated conceptual networks than their non-gifted or non-expert peers (Munro, 2011, 2012). These allow them to interpret new information very rapidly and more broadly and deeply and look for and analyse big picture patterns and rules in information. Both experts and gifted knowers retain knowledge in which they are gifted/expert more efficiently in working memory. They can also use their conceptual networks more automatically. They can see more under the surface general relationships and principles than novices, infer more broadly when monitoring various effects and the implications of their decisions and actions. They can learn a topic by linking simultaneously several aspects at a time, rather than working on one aspect in a sequential way. This allows them to categorise and classify issues and problems more efficiently and completely.

The differences between novice and expert knowing were examined from a slightly different perspective by Bransford and colleagues (Bransford, Sherwood, Vye, & Rieser, 1986; Bransford & Stein, 1984). They asked the question: What are the characteristics of novice learners who are more likely to understand a topic in an expert way? They observed that the more skilled learners were more able to manage and direct their learning activity in a range of ways, for example, to use

learning strategies selectively according to specific learning demands at any time, that is a range of metacognitive skills.

The present approach also recognises limitations of the expert performance model for gifted learning. There are multiple ways in which individuals can be experts and with a range of individual difference among them, just as there are multiple types of gifted knowing and thinking, for example, school house and creative giftedness. The conceptualisation of expert knowledge and performance proposed by some researchers means that gifted learners are more likely than experts to impose their unique subjective patterns and order on information rather than use the taught patterns. Gifted thinkers are more likely to recognise or frame up intellectual challenges or questions in a broad-based way and to generate and use more complex and differentiated links between concepts to form more complex relationships. They are also more likely transfer and apply their knowledge across content area boundaries, and make unusual and far links and generate outcomes that are creative and novel. Their understanding of a topic often has the characteristics of an intuitive and personal semantic theory in the sense described by Schwitzgebel (1999).

Further, while gifted understanding may develop through the same phases as the trend from novice to expert knowing, the current approach proposes that gifted thinking allows individuals to achieve the transitions more rapidly and in a self-initiated and focused way. While non-gifted learners need substantial deliberate practice to achieve expert knowledge, it is proposed that by virtue of their broad-based thinking ability, the gifted learners need much less practice.

This leads to another difference. Some areas or domains of expertise require the use of automatised motor behaviour patterns that allow experts to do their knowledge, that is, they have the motor or action skills and tools to show their expertise. Gifted students may know or understand an idea but lack the skill to actually do it. They link ideas in expert-like knowledge forms that generate easily possibilities and questions but lack the technical skills and the ability to use them to generate expert outcomes.

A related difference is in the management of the learning towards expertise. Gifted learners are self-managing and direct in their pursuit of understanding; the future expert may be more likely to need external managing and directing. Gifted students often operate as intuitive philosophers because they see that their thinking and knowing is different from that of their non-gifted peers and they try to understand how they and others think and know. This leads them to infer how they think and learn. Hsueh (1997), for example, examined gifted children's theories of intelligence, goal orientation and responses to challenge in reading and mathematics. Gifted children believed strongly that their ability could change, were highly confident about their ability to learn, had strong learning goals, wanted good grades and teacher approval, had mixed responses to performance goal

tasks, preferred harder tasks in reading and mathematics, and showed persistence when completing difficult tasks.

In other words, this paper is proposing a modified expert knower model to describe gifted and talented learners, to account for the unique ways in which gifted and talented students learn and, for the multiple ways in which students can be gifted and talented. In particular, the conventional expert knower model is modified to add creativity and for transfer, self-initiated and motivated learning, with motivation more mastery focused and a focus on the gifted students being able to talk about their big picture understanding but not necessarily have the capacity to implement physically the expert understanding.

The version of the novice–expert knower model used here draws on work of Anderson and Schonborn (2008) and adds the type of knowledge described by Subotnik and Jarvin (2005) to the expert understanding.

When exposed to regular classroom instruction, it proposed that students can potentially form one of three broad interpretations of the teaching information that indicate their understanding of the topic (Munro, 2010, 2011, 2012):

- 1 a novice understanding that essentially represents the internalisation of the teaching information. The information is interpreted in a literal way. Students who form this understanding initially often use the new ideas in restricted ways, understand them in partial, separate and tentative ways and need to try them out to see how they fit. They show superficial recall of specific details. They need to be taught to link and relate the ideas.
- 2 a spontaneous patterned, more general understanding. Some students, without formal instruction, form an understanding that is more than the internalisation of the teaching information. They extend spontaneously the taught ideas and generate patterns from them. They form new concepts and relationships such as possible causal or consequential trends by asking. For example: How / why did the trend / pattern / change direction ? They question and speculate about the patterns and generate ideas and possibilities that were not mentioned in the teaching information; How did the patterns affect / contribute to ...?
In other words, these students form interpretations, without being instructed, that are more general. These may be in the form of patterns, rules or more abstract formulations.
- 3 a spontaneous, big picture understanding that is typical in some ways of an expert understanding. Their understanding is broader than that of the patterned understanding. They understand the topic in a big ideas way; they can think about two or more patterns, rules or general propositions at once. As well as formulating rules and principles, they often link moral / ethical issues with them and see possible moves and options.

They can apply their big ideas understanding to solve problems fluently and automatically. They make decisions that show they are thinking in terms of multiple patterns at once, for example, 'If this happens, then ..., but because of ... I would ... They can plan how they will use their new knowledge in creative, novel ways and use to solve problems and make decisions, manage and use their knowledge more efficiently, monitor how they use it and readily change direction or re-question what they know.

Their understanding frequently includes creative interpretations. They make links between ideas that are novel, functional and un-expected. Their understanding allows them to see possibilities and options that suggest a far transfer of the ideas. This aspect moves the knowledge from the traditional expert descriptions made by some models of the novice-expert knower to the beyond expertise understanding proposed by Subotnik and Jarvin (2005) and that encompasses Sternberg's concept of wisdom as part of the WICS model of gifted knowledge (Sternberg, 2005).

Differentiate the pedagogy from a learning–teaching perspective

The expert knower model described here has been used to guide classroom teachers to differentiate their teaching from a learning perspective to cater for gifted learners. The model helps teachers to infer how gifted and talented students might understand regular topics on the curriculum. This focus on teacher awareness of enhanced student understanding provides a basis for implementing the most appropriate pedagogy.

The model gives the development of professional knowledge of teachers to identify various types of gifted interpretations, to evaluate these in terms of the assessment criteria for the regular curriculum and to design and implement the most appropriate teaching. Teachers can use this sequence to differentiate any topic in terms of the teaching to be used.

The mechanics for doing this are discussed in depth in Munro (2012). This paper describes a framework for differentiating the pedagogy from a learning–teaching perspective and for synthesising enquiries gifted and talented students can pursue for a topic taught. Teachers have used the framework to describe gifted students' learning patterns, to cater for them in regular teaching, to audit teaching units for gifted students, to target the explicit teaching of thinking and to guide students to self-monitor and direct their learning.

The framework has also been used to assist, to extend and to stretch the scope of the curriculum, to provide a common language for professional dialogue about gifted learning and for describing learning and knowledge in familiar ways, to see students' areas of exceptional knowledge and thinking, to build teacher confidence in identifying and teaching these students and to identify gifted underachievers.

Conclusion

This paper began by identifying the issue of the lack of differentiation for gifted and talented students in regular classrooms. It proposed that this was in part due to the lack of professional knowledge in a school about gifted understanding learning and the associated pedagogy and relevant curriculum.

It described how this issue could be resolved in part by equipping teachers and schools with the conceptual tools for describing the understanding of gifted and talented learners. There are two aspects of this: using the familiar curriculum measuring stick to direct regular student learning and using the novice–expert knower continuum to differentiate topics on it.

Evidence supporting the model of the gifted learner as an expert knower has been supported (e.g., Ericsson, et al., 2005, 2000, 2007; Shavinina, 2007; Sternberg, 2005; Subotnik & Jarvin, 2005). The efficacy of the novice–expert transition as an approach to differentiation as described in this paper is readily testable empirically.

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