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Promoting thinking skills in education

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How children are guided in the development of their thinking is now crucial in the twenty-first century. Over the past decades special thinking skills programmes have been developed to enhance thinking but these programmes have so far been unable to produce clear evidence to support their effectiveness. This article argues that due to the complex nature of thinking some fundamental changes in education must be tackled if all children are to be encouraged to develop and enhance their own particular ways of thinking.

Introduction

The twentieth century witnessed the creation of a number of teaching programmes and approaches dedicated to the enhancement of thinking. These approaches such as Reuven Feuerstein's instrumental enrichment (1980), Martin Lipman's philosophy for children (1977) and Edward De Bono's Cognitive Research Trust (CoRT) (1991) were developed to teach children general thinking skills. Interests in these programmes have grown over recent decades as their originators and followers continue to promote the significance of their programmes in improving general thinking.

Present day technological advances and the need to stay competitive in these changing times is driving many of the educational reforms around the world, and for a number of national Governments the enhancement of thinking is at the heart of their policies to raise the educational standards of their school children. In England for example, teaching thinking has become an explicit part of the curriculum and school teachers are expected to address these skills in their teaching (QCA, 1999).

The widespread belief in the potential power of thinking skills to transform how children learn and achieve has resulted in the subjection of these programmes and approaches to thorough scrutiny in order to ascertain their efficacy as claimed by their creators and followers. The difficulties in finding clear evidence to substantiate

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the effectiveness of general thinking skills has led to a long standing debate on thinking and its teaching as a subject.

This article briefly outlines the on-going debate and argues that the obscure nature of thinking is inadequately accounted for by thinking skills programmes. This view is further examined by exploring some of the possible contexts and adjustments required to create favourable settings for promoting thinking.

The debate on teaching thinking skills

The history of viewing the mind as consisting of a set of faculties operating on some content to produce knowledge or understanding can be traced back to the early empiricists such as John Locke. However, the desire to teach thinking where this is viewed as a generalizable process received its clearest articulation in the work of John Dewey (1933). The present day programmes for teaching thinking draw inspiration from Dewey in seeking to teach thinking skills as a process that can be generalized.

Over the past decades the notion of teaching thinking skills has generated divergent views, and these fall broadly into two groups, which will be referred to as the generalist and the non-generalist views. The generalists maintain to varying degrees that there are generalizable thinking skills that can be taught without reference to any particular context. This view is at the core of the assumptions underpinning the various thinking skills programmes mentioned earlier. The non-generalist position championed by John McPeck (1981) maintains that thinking can only occur with reference to some specific context. As a consequence, this position renders the idea of teaching thinking skills as a generalizable process highly problematic.

In an attempt to illuminate our understanding of thinking skills Smith (2002) highlighted some of the shortcomings in the arguments made by both the generalist and non-generalist and concluded that the debate has been insufficiently informed by evidence of real thinking practices. Smith broadly identifies with the generalist by claiming that opponents of general thinking skills have not explored expert thinking sufficiently to recognize the self-evident general thinking skills and practices. However in spite of his analysis, Smith merely provides more examples of possible instances where skills in thinking may be viewed as generalizable. As a result it is not clear how we are to understand his analysis.

In his final analysis Smith acknowledges the importance of the dispositions in thinking and proposes that courses promoting thinking must address the inculcation of virtues such as 'concern for depth' and 'clarity of thought'. What Smith fails to address is how these dispositions or virtues are to be inculcated in students. Many of the arguments presented by Smith and other well known writers such as Lipman *et al.* (1977) and De Bono (1991) in support of thinking skills as a generalizable process are problematic due to the difficulties in providing unambiguous evidence. Consequently, proponents appeal passionately to our feelings on the basis that since we are capable of applying our thinking when doing a variety of different tasks, this implies that there are generalizable thinking skills. One credible reason why proponents of general thinking skills are yet to provide adequate support for their claims

may be linked to thinking being an obscure and complex phenomenon and as such it escapes explanation in any straightforward way.

The obscure nature of thinking

The notion of generalizable thinking skills is not conceptually flawed but the idea that there exist uncomplicated ways of enhancing the typical student's standard of thinking contributes to the ongoing confusion surrounding the teaching of such skills.

Thinking is complex in nature precisely because it is multifaceted. There are different types of thinking such as reasoning, contemplating and imaginativeness. Furthermore, the notion that thinking is possible in the absence of language is a type of pre-verbal thinking known as sign-cognition (Price, 1969). This kind of thinking, for instance, occurs when we hear angry voices and think of disagreement or we see a smiling face and think of contentment. In other words, when we see or feel x and expect y to follow. Although these types of thinking mentioned above are different in very subtle ways this does not, in any way, suggest that thinking can only occur as one of these types. To think in any manner involves various combinations of these different types of thinking. Trying to solve a problem involves reasoning but this can be in combination with imaginativeness to produce the desired result. For example, sending a rocket into space requires a concentrated effort in reasoning but the success of the mission also depends on the imaginativeness of those involved in the project. Similarly, the football player may depend on sign-cognition to score goals but needs reasoning to be at the right spot for the ball. The contemplation of the philosopher may well depend on being able to reason and suppose. These examples indicate the very close connections between the various types of thinking.

Thinking is difficult to formulate because it is rooted in the assorted aspects of our lives. It is central in our endeavour to find solutions to the vast number of problems that we encounter and it is equally fundamental to our amazement of the world. The kind of thinking that will be involved in contemplation is likely to be different in some way from that involved in solving problems. These examples highlight the many sides of thinking. Thinking is multifaceted because it is the means by which we experience the world in all its diversity and these experiences differ in ways that require different formulations of thinking. For example, playing cricket is a very different activity from reading a book but both involve thinking.

In view of the diverse ways in which the manifestations of thinking can occur is it possible to explain it in any general way? What seems certain is that in whatever way we choose to explain thinking references will have to be made to particular contexts for its full description. If thinking is best accounted for by references to particular instances then this raises questions about how it can be generally taught as a subject. To teach and successfully learn a subject requires the acquisition of some specific skill(s) important in learning that subject. For example, the acquisition of mathematical skills involves knowing how to work with mathematical symbols. At

the fundamental level a skill can be regarded as the performance of a particular task whereby such a performance can be repeated and improved upon through training and practice. Speed typing, swimming or riding a bicycle are all examples of the applications of skills, that is, knowing how to do something through training and practice. On the other hand yawning is not a skill, as this is not acquired through training and practice. As Barrow (1987) pointed out skills differ from one context to another context because what is involved in knowing how to do something differs in different contexts. Clearly having the appropriate mathematical skills, for instance, is important for solving mathematical problems. However, it is possible that one can have such skills but not be able to think effectively in solving mathematical problems. What this indicates is that skills are important in thinking but that the two are not necessarily the same.

Thinking can be revealed in the performance of a skill as pointed out by Ryle (1990) and Price (1969), but in addition to skills the ability to think effectively involves other factors such as hope, perseverance, fortitude, dedication, patience and courage, and these factors are in the main dispositional. Dispositions are essential to our characterization of the world (Armstrong *et al.*, 1996). They describe the properties that we attribute to people and things, for instance, we protect things that are fragile, we are cautious with inflammable things and we value people for their courage, perseverance and honesty. If thinking involves dispositions then it is not clear how it can be taught purely as a skill.

There are many human dispositions. Siegel (1999) highlighted 'thinking dispositions' that are particularly connected to thinking. As observed by Siegel, these dispositions have direct implications for education. For Siegel a thinking disposition is the proclivity to think in particular ways under certain circumstances. Mathematicians, such as Polya (1957) and Poincaré (1952) for instance have long acknowledged the importance of perseverance in pursuing and solving challenging mathematical problems. Thinking effectively in most cases involves facing up to difficult or complex situations and finding successful ways to overcome or understand such difficulties or complexities. Students are expected to apply themselves effectively to their school work and in such situations having the right kinds of dispositions does play an important factor in how they approach their work.

In the mathematics classroom, for example, teachers often ask students to be careful and attentive to detail when applying rules and concepts in seeking solutions to their mathematical problems. In the main what these teachers desire is to get their students to develop confidence in their mathematical skills. On the other hand, the building of students' self-confidence does not merely depend on them knowing appropriate rules and concepts. It also involves other important factors such as persistence, patience, courage and hopefulness with which they use the rules and concepts. What is clear is that thinking is a highly complex phenomenon and for that reason its promotion in education should not be approached from an unsophisticated perspective. The current drive to promote thinking skills in the classrooms seems to be based on an oversimplified nature of thinking which I will now discuss.

The oversimplification of thinking and its teaching

A major source of confusion in our understanding of thinking is in the way in which 'thinking' is so readily substituted for 'reasoning'. In the broad sense reason comprises a great variety of procedures hence much of what we do in our daily lives and in education involves reasoning. However, it is only one type of a number of different but inter-related types of thinking as indicated earlier. Consequently the oversimplification of the notion of thinking is likely to result in an unproductive attempt to enhance students' thinking. In order words, attempting to teach thinking skills simply in terms of the improvement of reasoning or the generating of ideas is very likely to fail in addressing the complex nature of thinking. The various types of thinking must be acknowledged in any attempt to develop or enhance students' thinking.

The connection between the various types of thinking means that in seeking to enhance students' thinking the various types of thinking together with the appropriate dispositions should not be overlooked. For example, the possession of intellectual courage among other dispositions is important in thinking effectively through difficult problems because the possession of knowledge will not necessarily result in its use at the right time and for the right reasons. However, the major problem with learning to be courageous is that it cannot be taught and learned as a pure skill. As a result, providing the right kinds of examples and guidance for thinking is important but by no means easy. What makes thinking difficult to engage in effectively and hence difficult to encourage is that it cannot be simply switched on whenever it is needed. If it occurs at all it involves the various relevant dispositional factors already mentioned. Current proposals to teach thinking do not adequately highlight the importance of dispositions nor do they attempt to state how these might be addressed. The simplistic assumptions underpinning the numerous thinking skills programmes contribute to their inability to provide clear evidence to back up their effectiveness. A recent review of the impact of the implementation of a large number of thinking skills programmes conducted by the Thinking Skills Review Group (Higgins *et al*., 2005a) failed to yield unambiguous results and to this we now turn.

Impact of thinking skills programmes

The aim of the Thinking Skills Review Group was to investigate the impact of thinking skills interventions on teaching and learning in classrooms. The investigation was based on the use of meta-analysis, a controversial method for comparing quantitative estimates of effects across different types of studies. The group's rationale for using meta-analysis was that this presented the best way to provide potential users of thinking skills approaches with an estimate of their relative impact by offering data to compare the influence of thinking skills interventions with other researched educational intervention.

The review involved a total of 29 studies from a range of countries around the world with about half of the set from the US and UK. The studies reviewed were broadly developed in both primary and secondary schools which covered the entire

ages of compulsory education. In spite of its encouragement for the use of thinking skills interventions in schools the review concluded that:

> However, as it is not clear to what extent the benefits are due to specific aspects of the content of the programmes and their implementation or the changes in teaching and learning which ensue, it is not possible to provide precise recommendations. (Higgins *et al.*, 2005a, p. 38)

Clearly the inability to provide any recommendation is an indication of the depth of the problem. While the review briefly states some of the limitations of thinking skills programmes these limitations are indeed fundamental. An important limitation was stated as follows:

> The review used a broad definition of thinking skills for its focus. As a result, there was considerable statistical heterogeneity in the results of the studies which indicates that caution is required in combining the effects and interpreting the findings. (Higgins *et al.*, 2005a, p. 37)

The use of a 'broad definition' was based on the group's view that 'the term is ambiguous and there is disagreement about how it relates more broadly to aspects of pedagogy.' Thus the group argued that:

> Our working definition for the purposes of this review is that thinking skills interventions are approaches or programmes which identify for learners translatable, mental processes and/or which require learners to plan, describe and evaluate their thinking and learning. These can therefore be characterised as approaches or programmes which:
> - require learners to articulate and evaluate specific learning approaches; and/or
> - identify specific cognitive (and related affective or conative processes) that are amenable to instruction. (Higgins *et al.*, 2005a, p. 7)

It is not clear how the working definition adopted by the group accounts for the ambiguousness of the term as it attempts to avoid this difficulty by reducing its scope to the two particular characteristics. Programmes with such characteristics will tend to promote a particular type of thinking such as reasoning rather than sign-cognition. Thinking, as already discussed earlier, is a highly complex phenomenon and to some extent is indicative of the limitations highlighted by the review. However, it emphasized the need for new research to clarify the particular cases where thinking skills programmes and approaches have most impact such as on different age groups and in different areas of the curriculum notably mathematics and science. Yet again, this call points to the oversimplification of the nature of thinking in terms of the range of these thinking skills programmes. The question that remains to be answered is how might the promotion of effective thinking in schools be approached? If we are interested in supporting all children to develop in their own particular ways then any worthwhile approach should incorporate a non-simplistic perspective.

In promoting thinking from a non-simplistic perspective the development of the various types of thinking together with the right dispositions may well offer the best possible opportunities for supporting students to learn to think effectively in the various situations that they may find themselves. In order for this to be addressed pupils must first of all be supported to acquire a thorough grounding in a variety of

disciplines that form the basis of a liberal education, since the kinds of knowledge that we learn to acquire is crucial in our search for solutions to our problems or to our understanding of the world that we live in. For example, in physical education the thinking involved in playing a rugby game depends on knowing how to play the game as well as knowing some facts about it. However, knowledge alone is not sufficient for successful transfer of skills within a domain or from theory to practice, as already indicated. The relevant dispositions are important in so far as the transferability of knowledge and skills are at the core of the desire to promote thinking skills.

If dispositions play a major role in effective thinking then this raises important questions regarding their promotion in education and the kinds of contexts required. How can teachers address hopefulness, courageousness, patience and carefulness in the classroom? How does the present educational milieu encourage thinking? Providing some answers to these questions will involve looking at potential settings for promoting thinking.

Contexts for promoting thinking

In England, progress is being made towards the improvement of the quality of formal education both in terms of teaching and the physical environment where school activities are carried out. A massive amount of resources worth about fifteen billion pounds (DfES, 2004) has been presently earmarked to transform school spaces over the next fifteen years as part of the overall Governmental initiative to improve the quality of learning. While the physical environment of the school can be shown to have discernable effects on teachers and students it is still possible to have effective learning taking place in merely adequate surroundings. The Design Council review (Higgins *et al.*, 2005b) included in its findings some research studies that have pointed out that student achievement does not necessarily improve with the provision of fashionable classrooms equipped with the latest facilities.

How teachers deliver their lessons and the culture within which they do so is of vital importance. Consequently, their role in promoting thinking in the classroom cannot be overstated. However, the constraints within which teachers perform their duties present some challenges. For example, the way schools are assessed together with the publication of league tables based largely on examination results play a significant role in shaping how teachers approach the delivery of their subject. In a recent review of the impact of assessment on motivation for learning a number of important findings emerged which included the following:

- When passing tests is high stakes, teachers adopt a teaching style which emphasises transmission teaching of knowledge, thereby favouring those students who prefer to learn in this way and disadvantaging and lowering the self-esteem of those who prefer more active and creative learning experiences.
- Tests can influence teachers' classroom assessment which may be interpreted by students as purely summative, regardless of the teacher's intentions, possibly as a result of teachers' over-concern with performance rather than process.

- High-stakes assessment can create a classroom climate in which transmission teaching and highly structured activities predominate and which favour only those students with certain learning dispositions.
- High-stakes tests can become the rationale for all that is done in classrooms, permeating teacher-initiated assessment interactions.
- An education system that puts great emphasis on evaluation produces students with strong extrinsic orientation towards grades and social status. (Harlen & Deakin Crick, 2002, p. 4)

The review underlines the impact of assessment on the motivations underpinning students' learning to apply their thinking in effective ways. In his fascinating book, *The child's mind,* White (2002) warns us about the danger in relying on purely instrumental motivation in children as it encourages authoritarian behaviour in them. It would be highly problematic if the aim of education is primarily to educate children to merely focus on passing their examinations and not to apply their thinking in effective ways beyond the confines of the classroom. Furthermore the findings highlight issues at odds with the principle of inclusion and support for every child to achieve their potential.

If dispositions, as argued by Ryle (1972), cannot be taught explicitly in a formal setting but can only be acquired by students first imitating their role models and next practising by themselves, then it is difficult to comprehend how our present educational framework is fully contributing to the promotion of desirable dispositions essential for children learning to think effectively. Evidently, teachers are vital in acting as role models for providing good examples of the relevant dispositions for students. Thus the kind of training that teachers undergo is crucial. Pursuing an educational experience that promotes thinking beyond the classroom and public examinations will require some fundamental changes to the current educational structure and to this I now turn.

The need for a new approach

What demands will the pursuit of an educational approach that aims to promote children's effective thinking make on our current educational structure? What are the implications for schooling and its organization? Will the present method of assessment still prevail? Clearly, the need for a new approach to how children are educated is required if the promotion of effective thinking is to be taken seriously. In reality, the introduction of thinking as a subject to be taught in the British National Curriculum hugely amplifies this need.

In view of the fact that teaching thinking is a statutory requirement in the UK educational system and teachers are expected to teach their students such skills, the significant issue teachers now face is how they are to address them in their daily work. Resources for teaching thinking skills are now being produced leading to their subsequent dissemination to teachers (DfES, 2005). However, these resources are far from being unproblematic due to the fundamental ideas on which they are based.

The notion guiding the development of these resources is approached broadly from the position that thinking is an identifiable and transferable general skill that can be infused into the curriculum subjects, and to this end teachers are urged to adopt a particular model of teaching that involves cycles of three lessons based around particular thinking skills each taking place in three different subjects. The perceived value of doing so was stated in the DfES handbook for teachers as follows:

1. Pupils find it easier to recognize the connections between lessons because the shape of the lesson is familiar. This encourages them to transfer learning.
2. Pupils and teachers have the opportunity to see how important processes, such as classifying, summarising or making analogies, can develop pupils' thinking skills and are common to broad areas of teaching and learning. Learning in different subjects has more in common than we sometimes realize. Such an approach can highlight some of the most important similarities and differences between subjects. (DfES, 2005, p.10)

It is difficult to ascertain the reliability and validity of the use of the 'cycle of three lessons' as the foundation for teaching thinking. Nevertheless, what is undeniable is that even such an attempt insinuates a new approach to teaching and learning.

The conventional secondary school classroom is organized around particular subject disciplines and the fact that gaining good grades in these individual subjects at the end of compulsory education is paramount, making connections between these subjects does not automatically form part of the aim of learning them. This situation immediately presents difficulties in promoting serious collaborations between the subject areas since teachers will want to complete their set programmes first before engaging in any collaborative work. Consequently, teachers who want to pursue such collaborations are likely to face overwhelming difficulties. Organization of the school day presents another major problem due to the fact that schools, unlike conventional workplaces, do not operate all year round but have major breaks within the academic year, consequently collaborative work may have to be prematurely terminated. The preservation of order in the classroom which forms the cornerstone of compulsory education presents yet another source of difficulty as collaborative work may require a different approach to how students are currently managed in the classroom. These examples highlight some of the organizational difficulties that are in need of reconsideration if teaching thinking skills are to be seriously pursued.

As indicated earlier, teachers play a crucial role and as such they must be supported and trusted to lead and provide the right examples in order to promote effective thinking. This to some extent should involve teachers and their students engaged in solving real open-ended questions connecting the various curriculum subjects. Clearly, such exercises may range over days, weeks or possibly months depending on the kind of project and the depth of thinking that is involved. For instance, designing an economical and environmentally friendly packaging for a food product may take a number of days to complete; similarly producing a play on the abolition of slavery may go on for a number of weeks. Although some of

these projects do go on in schools they are presented as pseudo problem-solving exercises or merely as extra-curricular activities and do not seriously provide opportunities for promoting deep thinking beyond that particular exercise or project.

If part of the educational aim is to produce effective thinkers beyond the school curriculum then the need to tackle the difficult issue regarding assessment cannot be ignored. As already indicated, the problem posed by the prevailing method of assessing students' achievements is that it produces students with the desire to merely pass examinations with the right grades. The kinds of decisions we make on these issues will clearly depend on how we want to encourage our children to think. In an uplifting vision of how we can renew our optimism in education at a time when teachers feel profoundly pessimistic about their work and the future of education, Halpin in *Hope and education* reminds us that:

> Every human society has its own shape, purpose and meanings or culture. Indeed, the making of society—reproducing and transforming it—is centrally to do with looking for and identifying common meanings and directions through active debate and amendment. Education, and schooling in particular, has a crucial part to play in this critical process, particularly at this point in time when society is undergoing such radical and rapid change, much of the direction of which is difficult to predict with certainty, and when the construction of personal identities that make sense to their owners is a more problematic project than at any other moment in human history. Accordingly, thinking through the implications of all this for the design of school curricula, including the forms of learning they should promote, is both a necessary and inevitably utopian exercise. (Halpin, 2003, pp. 120–121)

The need for a new approach to schooling is a necessary requirement if we are to deal with the promotion of effective thinking. We will need to make schools places that truly provide nurturing and inclusive settings where all students can develop their potentials in their own particular ways.

Teachers can begin to encourage their students by making sure that their lessons are at all times well researched and planned, and offering appropriate challenges for all students. The research could include seeking opportunities for links to other curriculum areas as well as the historical context relevant to the specific content of the lesson upon which the planning and delivery can be based. It is vital for teachers to gain in-depth knowledge and understanding of their students in order to provide more effective individual support. This can be done by teachers showing genuine care, interest and respect for their students and the qualities they bring to the classroom. By demonstrating and sharing their passion and care for the subjects they teach, as well as their love of learning and intellectual exploration in general, teachers can provide the basis for inspiring their students and helping them to develop the appropriate intellectual habits. One way in which they can do this is by striving to engage their students' interest in the general progress and growth of the subjects they teach. In order to sustain the quality of their lessons teachers will greatly benefit from working more collaboratively within their departmental teams and generally across departments. Heads of departments can

provide encouragement by creating a supportive environment by seeking and sharing good practice with all their team members and truly getting to know and understand their individual needs. Similarly, senior managers can provide crucial support for their heads of departments and teachers by creating real positive conditions for maximum interdepartmental communication and teamwork within their schools and searching for opportunities for engagement with their wider communities.

Conclusion

Education is now a multi-billion pounds enterprise and is unlikely to slow down in growth and at the heart of it is the transmission of knowledge. Coming to acquire knowledge involves thinking but the use to which this knowledge is applied once gained is predicated on the effectiveness of one's thinking. To promote thinking across the various curriculum subjects will inevitably require some changes to the prevailing organization of our current educational process. Are there compelling reasons why we should consider these changes? The case can be made for at least two reasons.

Firstly, the well-being, autonomy and responsibilities of the individual are at the core of the values embedded in the liberal democratic society. These values clearly highlight the importance of the promotion and enhancement of students' thinking skills among other things. We cannot aim to prepare all students for all the opportunities, responsibilities and experiences of life without bearing in mind how the various thinking skills come into it. For example, if we want students to develop a love of music as part of their spiritual well-being then there is the need for the promotion of creative thinking in this area. Similarly, if we are going to prepare students to become independent and considerate adults, we may need to promote such areas of thinking as reasoning and imagining in the appropriate domains. What is crucial is that since we do not know what kinds of thinking students might use in their lives, we must aim to support all children in the development of their individual thinking in order to provide equal opportunities for all to accomplish their potential.

Secondly, the huge technological advances and the rapid changes in social settings accompanying such advances require that individuals as well as communities are well prepared to adjust quickly to these changes. The challenges that the world faces require new solutions and our success in finding them will, in part, depend on the effectiveness of our thinking.

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