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A Capital Theory of School Effectiveness and Improvement [1]

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ABSTRACT *A new theory of school effectiveness and improvement is outlined, based on the master concepts of intellectual capital, social capital and leverage, linked with the conventional concept of institutional outputs. Each master concept is defined in terms of two subsidiary concepts. Twelve specifically educational concepts are set within this framework to provide the theory. It is proposed that, through a simplified model, the range and fertility of the theory can be exemplified and tested in three specific cases—the changing nature of school effectiveness and improvement in knowledge economies, citizenship education and teacher effectiveness.*

Introduction: the Need for Better Theory

Since the publication in 1979 of *Fifteen Thousand Hours* by Michael Rutter and his associates, the fields of school effectiveness and, later, of school improvement, have been dominated, at least in Britain and much of the English-speaking world, by the model (rather than an explicit theory) on which this pioneering study relied. The book's fame depended in part on the prominence it gave to the concept of school ethos; though the research had not aimed to measure school ethos, the concept was invoked to make sense of the correlations between a number of school-related process variables and four educational outcome variables. These correlations formed the core of what became the conventional model, one with surprisingly little theoretical elaboration.

The accumulated results of this line of enquiry have been recently summarised (Sammons *et al.*, 1995) in terms of 11 characteristics of effective schools. Despite being attacked as platitudinous or tautological, the findings are reasonably robust. It may be fruitful to treat the model's limitations as desiderata for a better model, as follows.

- A model should derive from a theory: it must be more than a set of measured variables that correlate with measured outcomes. A useful theory contains a relatively small set of concepts in explicit relationships, and measured variables should be capable of being contained within the concepts. When integrated into a coherent whole, the

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concepts become a theory from which testable hypotheses can be derived to guide research.

- Concepts which are basic to educational discourse, such as curriculum, must find a place in the theory, since *what* is taught in school cannot be ignored. The curriculum cannot be divorced from the goals of schools and thus has a legitimate place in any theory of effectiveness. Reflecting such goals, educational outcomes need to be fully explicated. Since 1979, the outcomes that specify the effective school have been progressively narrowed and in many studies are reduced to test results of academic knowledge. These are important measures of schooling, but not the only outcome that matters. An educational theory with an excessive or exclusive focus on the cognitive is impoverished.
- It would be advantageous if a model could be derived from a common theoretical base for both school effectiveness and school improvement. A key idea for linking school effectiveness to school improvement is that of *capacity for improvement*, which is assumed to characterise a school that sustains its effectiveness by successfully managing change in a context of instability and reform. Attempts to define this capacity usually invoke additional variables—for example, a commitment to staff development or a culture of enquiry—rather than building capacity into the concepts which define effectiveness itself.

This short article attempts to deal with some limitations of the conventional model, whilst retaining some of the input–process–output features, by providing a theory of a limited yet integrated set of concepts from which a better working model can be derived. First, some clarification of basic concepts is in order.

An Outline of the Theory

The theory has four master concepts—outcomes, leverage, intellectual capital and social capital—only the first of which is central to the conventional model. The following definitional statements may be regarded as testable hypotheses.

The *outcomes* of a school represent both the extent to which its overt goals are achieved and any unintended consequences of the processes involved. Outcomes are assumed to be principally of two broad kinds: cognitive and moral, defined here in essentially Aristotelian ways. For Aristotle, the very purpose of the state—and thus of its institutions—is to enable its citizens to lead the good life. On his view, it is *eudaimonia*, the Greek word usually translated into English as *happiness*, but perhaps better rendered as *well-being*, which is the complete end or purpose of life. *Eudaimonia* is not a state of mind or set of feelings, but a quality of conduct or disposition to act in a certain way. Well-being consists in virtuous activity. Here we meet a second intractable problem of translation: the Greek *arete*, usually translated as *virtue*, is perhaps better rendered as *excellence*. In Artistotle's view, there are two kinds of excellence, namely *intellectual excellences*, such as science, art and practical wisdom; and *moral excellences*, such as courage, justice and self-control. (In today's terms, intellectual excellences include many forms of knowledge, skill and understanding; and moral excellences include many aspects of social and emotional life.) A person's excellences are not so much a matter of his or her capacities as how they have chosen to be and to act. The purpose of education is to initiate the young into these excellences, through which they acquire the disposition to make sound intellectual and moral judgements and choices. From their teachers' example and their own habits based on

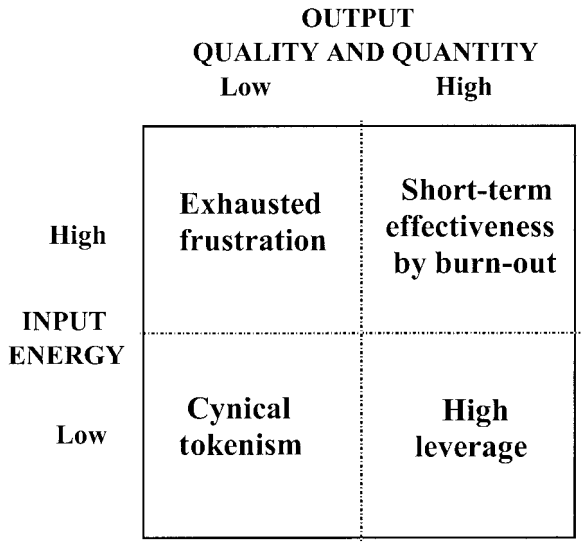

FIG. 1. Leverage.

practice, they learn how to make the right decisions in their lives and so achieve well-being (*eudaimonia*) and become good citizens. Human beings are naturally disposed to live together in society, and by participation in community as citizens they realise their natural dispositions. Only as citizens in particular relationships with one another do persons achieve full humanity and live the good life. The principal outcomes of schooling, both intended and unintended, are thus assumed to refer to the quality of the intellectual and moral life of students.

Leverage is about the relation between teacher input and educational output, and may be defined as the quality and quantity of effected change on students' intellectual and moral state as a function of the level of teachers' invested energy. There are four possible relationships (see Fig. 1). Teachers often put considerable effort into making changes with relatively little impact on students, so teachers become frustrated and exhausted. At other times, a high input produces a high level of positive change, but the improvement is liable to be short term since the high input cannot be sustained for long. A low input yielding a low output may be a rational response of teachers to mandated change of which teachers disapprove. These three relations between input and output became familiar to British teachers during the hectic reforms of the 1990s. *High leverage*, the desirable relation between input and output, leads to a large impact on effectiveness or improvement from relatively low levels of teacher effort. The highest leverage occurs when single high leverage strategies are combined. Teachers in effective schools share and regularly apply combinations of high leverage strategies and avoid low leverage strategies: they respond to demands for change by working smarter, not harder. Outstanding schools discover how to combine high leverage strategies and to sequence their implementation over time so that the quality and quantity of their outcomes are unusually high in relation to the investment of energy. Understanding school effectiveness involves discovering how high leverage works.

An improving school learns how to identify and apply effective, efficient and ethically justifiable leverage points to enhance the intellectual and moral excellences as outcomes. Many schools do not know how to increase their leverage, that is, to learn how to work

smarter. Understanding school improvement means discovering how schools can learn to implement, that is, combine and sequence, the high leverage strategies of effective schools. Here is a real challenge for Britain, since many teachers interpret recent and current reform initiatives as, at least implicitly, a requirement that they work harder. This is because many British teachers lack a culture of collaborative professional learning by which they might work smarter: they lack both a language and a professional mode of working to analyse and improve leverage strategies. The process of school improvement in a climate of external pressure to raise standards is thus severely impaired.

Mastery of the art and science of leverage requires an understanding of, and a professional ability to apply, the evidence for 'what works' on the basis of research or personal experience, and a capacity to innovate and experiment in novel situations and where evidence is lacking. Many forms of high leverage are actively discovered by individual teachers through their practice rather than derived from research evidence or planned, collective innovation within school-based research and development. Indeed, this is the pre-eminent mode of improving professional practice among British teachers, because the concept of leverage is not part of their professional repertoire, nor has it been a major concern of educational researchers, even those who are committed to the improvement of teachers' practices.

The two forms of *capital* central to the theory, intellectual and social, are among other forms of capital, of which the best known are physical and financial—the value of a firm's property or money in the bank. Human capital is usually measured by the level of education and skill of a firm's staff. *Intellectual capital* was originally defined as the organised knowledge that can be used to produce wealth, the sum of everything everybody in a company knows to give it competitive edge. Here it is defined as the sum of the knowledge and experience [2] of the school's stakeholders that they could deploy to achieve the school's goals. Intellectual capital grows by two important processes: the *creation* of new knowledge and the capacity to *transfer* knowledge between situations and people.

Social capital is here defined in terms of its cultural and structural components. The cultural part is mainly the level of *trust* between people and the generation of norms of reciprocity (mutual favours) and collaboration. The structural aspect is the *networks* in which the people are embedded by strong ties [3]. In a school rich in social capital, the high levels of trust generate strong networks and collaborative relations among its members and stakeholders. High levels of social capital in a school strengthen its intellectual capital.

The four master concepts, each with two subsidiary concepts, may be represented diagrammatically, in a simplified model form (Fig. 2). In most models, *school effectiveness* is concerned with the organisation's structures and culture and how these are expressed in its policies and practices, and specifically how they relate to and promote the overall goals of the school and teacher effectiveness at classroom level. *School improvement* is concerned with enhancing and realising the organisation's capacity to achieve its goals and to promote teacher effectiveness at classroom level. Such definitions are reformulated in the present theory as follows.

- An *effective* school mobilises its intellectual capital (especially its capacity to create and transfer knowledge) and its social capital (especially its capacity to generate trust and sustain networks) to achieve the desired [4] educational outcomes of intellectual and moral excellences, through the successful use of high leverage strategies grounded in evidence-informed and innovative professional practice.

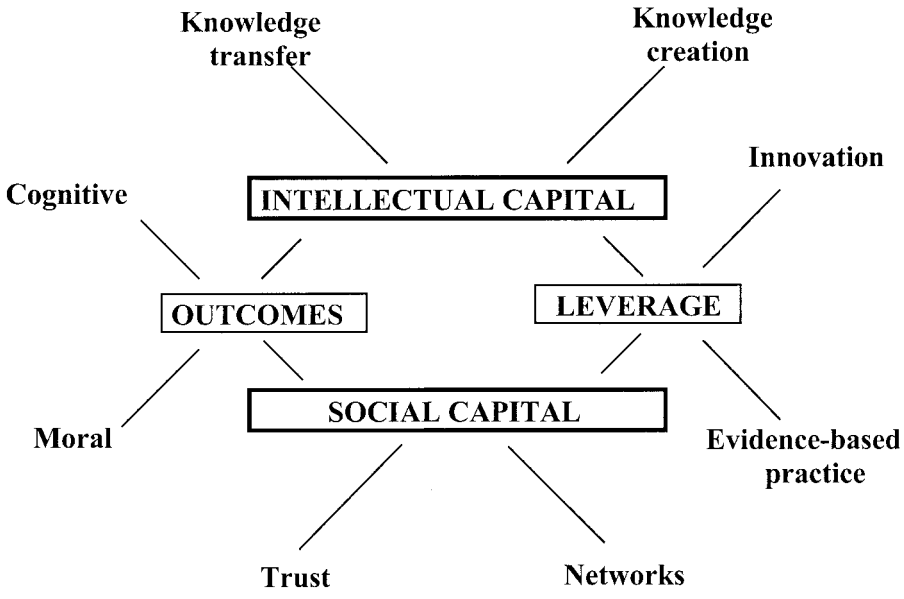

FIG. 2. The master concepts and subsidiary concepts.

- An *improving* school increases its intellectual capital (especially its capacity to create and transfer knowledge) and its social capital (especially its capacity to generate trust and sustain networks) to achieve the educational outcomes of intellectual and moral excellences, by learning successfully to use higher leverage strategies based on evidence of 'what works' and/or innovative professional practice.

In the light of these definitions, a more elaborate definition of some of the purported characteristics of effective schools becomes possible. As one example, the leadership of the school's headteacher is commonly cited simply as 'purposeful'. This is worryingly bland. It is not *any* purpose that matters: the nature and perceived legitimacy of the goals involved is critical to the purposefulness that a leader demonstrates. Moreover, leadership is concerned with the means of realising the goals, both their efficiency and morality, not only the goals themselves. The conventional model lacks sufficient theory to specify the goals or means of effective school leadership; whereas, derived from the foregoing definitions, it is evident that, in the present theory, the leader of an effective or improving school:

- is committed to achieving high levels of intellectual and moral excellences in students as main institutional outcomes;
- is able to achieve commitment to such outcomes in the school community [5]; and
- knows how to mobilise the community's intellectual and social capital and apply the principle of high leverage to those ends.

Many characteristics of effective schools may in a similar way be reformulated in terms of the concepts of the present theory. Both a 'failing' school and a school which does not improve despite efforts to do so can be characterised, and rendered explicable, through these concepts.

The rest of the article presents a more detailed outline of the theory to show how the master and subsidiary concepts relate to one another and to a range of further

concepts, and for lack of space neglects the task of subsuming other models within the present one [6].

The Theory Elaborated

Relationships between the four master concepts are complex—which explains why there are no simplistic and potentially misleading arrows in the figures (see Fig. 3). These are now set out as potential propositions and hypotheses. The relationship between social capital and intellectual capital is fundamental, for there are severe limits to the extent to which a school's intellectual capital can be mobilised if social capital is low. High social capital entails high levels of trust among the stakeholders—between headteacher and staff, among the teachers, between teachers and students, between teachers and parents, and among the students. There are thus strong networks with norms of reciprocity and mutual aid. In these circumstances, people readily share their knowledge, both intellectual and moral. The sharing is of different kinds—as examples, teachers share their knowledge of what works professionally in classrooms and students are willing to collaborate on schoolwork. Social capital is an important lubricant of knowledge transfer on which the mobilisation of an organisation's intellectual capital depends.

School effectiveness and improvement do not simply have two aspects, cognitive (or intellectual) and social (or moral), which are independent of one another or inherently in conflict. Rather, the moral domain needs to be cultivated to provide the conditions of successful knowledge transfer needed to sustain the optimum mobilisation of intellectual capital [7]. An effective school might be one in which all the teachers have individually developed the knowledge and skill of teaching effectively; but it will be more effective, and certainly have greater capacity to improve, if there is sufficient social capital for the teachers to share that professional knowledge and to create more of it as new demands are made. Low social capital among teachers entails lack of trust and networking among

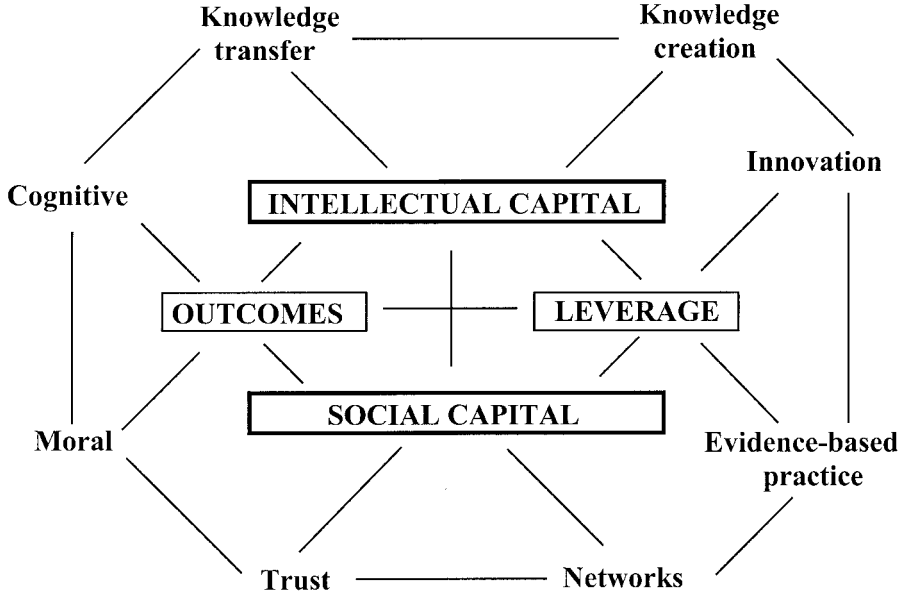

FIG. 3. Relationships between master and subsidiary concepts.

colleagues, who thus fail to share their pedagogic knowledge and skills, derived from research evidence or personal experience. To neglect the social and moral aspects of school life as a potential distraction from the cognitive and intellectual threatens the quality of the students' outcomes in the moral excellences; equally important, failure to recognise that social capital supports the knowledge transfer essential to the maximal mobilisation of intellectual capital damages the school's capacity for *any* kind of improvement.

In highly effective or improving schools, there is substantial investment in social capital among teachers because this supports the transfer of high leverage teaching strategies among them, which enhances student achievement. Teachers look outside their own school and trust in research evidence or the experience of other teachers in the same specialism as potential sources of ideas and practices for boosting leverage, and such knowledge feeds back through internal staff networks, which support knowledge transfer through coaching and mentoring. Such a culture also promotes internal innovation or knowledge creation of many kinds, not just about designing better means of promoting the excellences in students but also about enriching the quality of the professional lives of the teachers themselves, and their intellectual and moral excellences.

Note, however, that knowledge creation and innovation are focused on student outcomes—and so on the intellectual and social capital that sustain them and how both of these link to high leverage strategies for better teaching. It is not innovation for its own sake, but disciplined by, and directed to, the cultivation of the excellences among students.

In the conventional model of effectiveness and improvement—and current public policy—the impact of the moral excellences and the underpinning social capital on the optimisation of intellectual capital remain badly neglected. In the interests of this argument, the interactions between the two forms of capital, leverage and student outcomes, as in Fig. 3, now require more detailed study, as suggested in Fig. 4, in which each of the four master concepts is linked to a set of subordinate but explicitly

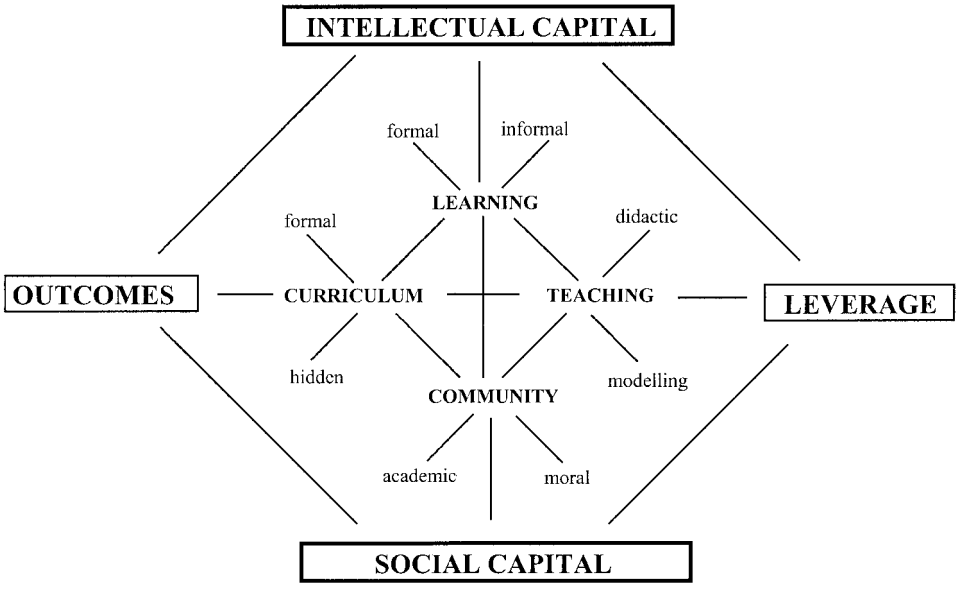

FIG. 4. Master concepts and their subordinate educational concepts.

educational concepts. The curriculum is linked to outcomes; learning to intellectual capital; teaching to leverage; and social capital to the school as a community.

Curriculum can be divided into its formal and hidden aspects. The formal curriculum is primarily the knowledge, skills and understanding that teachers intend students to acquire. Much of this consists of disciplinary bodies of knowledge but also of ways of thinking and behaving. Although the formal curriculum deals predominantly in the intellectual excellences, the moral excellences also play a part. The hidden curriculum consists of what students learn from their participation in school but which is not planned as the official curriculum. This curriculum also has an elaborate content—the art of pleasing teacher, the skill of coping with the constraints of institutional life, the ability to control relationships with peers, and so on, some of which is not necessarily educationally desirable. The hidden curriculum exercises a profound influence on students and continues to be overlooked by most teachers, which is unfortunate since the hidden curriculum can be a vehicle for achieving desirable ends.

Learning is divided (for convenience in the model) into formal and informal. Formal learning is that which is intended to take place in classrooms and other settings where students deal with the formal curriculum. Informal learning is that by which the hidden curriculum is acquired but also includes learning that is indeed intended by the teachers but which is unrelated to formal teaching. The extra-curricular life of the school is certainly intended, but much of this learning is informal, not a direct result of teaching. All students learn is, of course, affected by predispositions and preferences they bring to school.

Teaching is (again for convenience) divided into two major forms. Formal, or didactic, teaching consists of explicit and verbal interactions between teacher and student directed to student learning of the intended curriculum. Modelling is concerned with the student learning that is patterned on teacher conduct, for example, by imitation, whether conscious or not. Modelling may be intended, as when teachers expect to be exemplary in their conduct in the presence of students, but much is unintended, non-verbal and unnoticed.

The school as a *community* has two main aspects which reflect its major outcomes. It is an academic community aiming to inculcate intellectual excellences and also a moral community seeking to promote moral excellences. These elements are linked in particular combinations. Intellectual capital is mainly (but not exclusively) linked to particular patterns of the elements (as suggested in Fig. 5). Similarly, the dominant pattern of the components of social capital is outlined in Fig. 6. Because in this case the outcomes tend to be less valued, the concept of social capital is less well understood, and the processes involved frequently fall outside teachers' purposes and escape their attention. In consequence, less is understood about leverage in this domain than in that of intellectual capital and intellectual excellence.

Citizenship Education: a First Test of the Theory

The most significant new arrival on the National Curriculum in England is citizenship, following the Crick Report (1998). How citizenship is interpreted and introduced into schools is treated as a test of the theory in two senses: first, the theory should predict the circumstances in a school under which citizenship education will be effective; and secondly, it should predict the conditions under which a school will successfully improve its citizenship education when implementing the revised National Curriculum. Significantly, the conventional model lacks the capacity to make any predictions here.

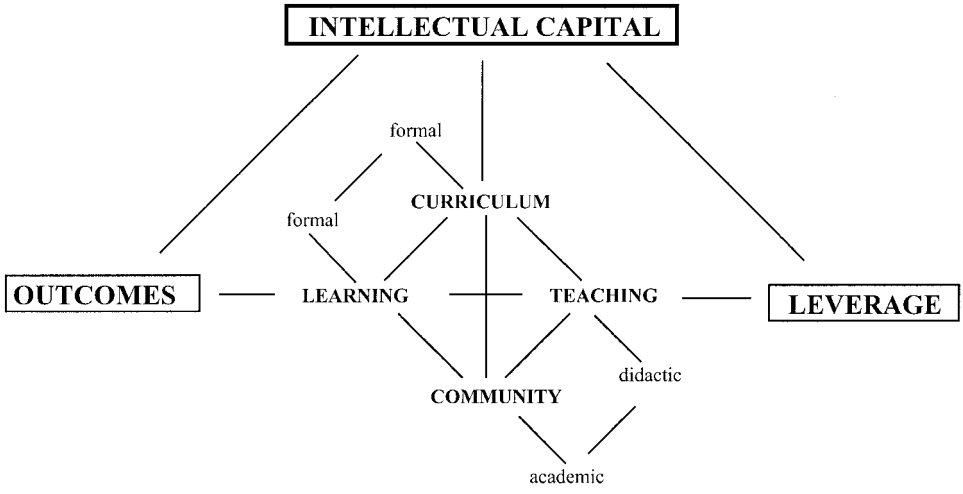

FIG. 5. The main educational components of intellectual capital.

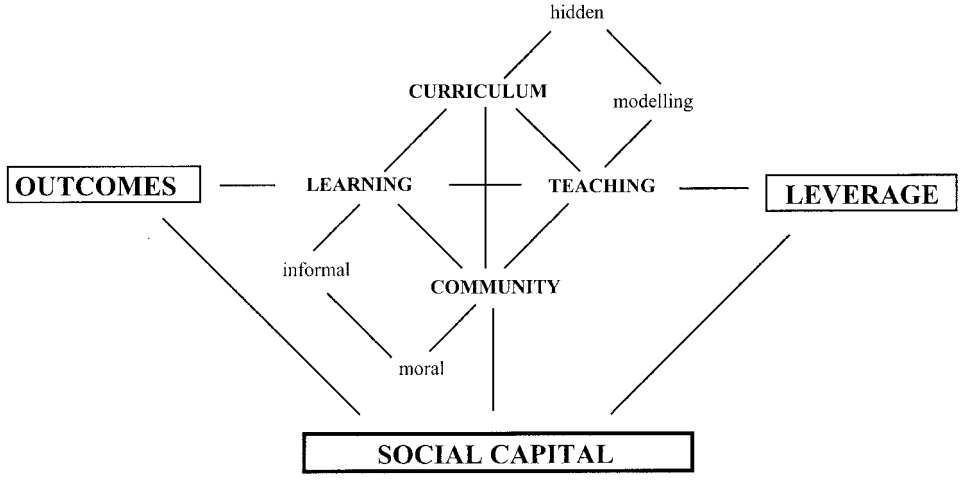

FIG. 6. The main educational components of social capital.

According to the Crick Report, citizenship education means three things that contribute to an explicit set of learning outcomes: a cognitive aspect, concerned with knowledge, skill and understanding, such as political literacy (example: Britain's parliamentary political and legal systems, including how they function and change); a moral aspect, concerned with values, dispositions and habits (example: judging and acting by a moral code); and a social aspect, concerning involvement in the community (example: commitment to voluntary service).

It is on the 'successful integration' of these different aspects that the Crick Report insists. This is achieved in part by curriculum time explicitly devoted to citizenship education as well as through teaching and learning elsewhere in the formal curriculum. Most schools can readily provide for the intellectual excellences involved in citizenship through the concepts outlined earlier (Fig. 5). Much of the Crick report, however, goes beyond this and depends on other concepts and processes (Fig. 6). Effective citizenship

education will depend on a high level of social capital already in the school: it is in the school with existing strength as a moral community committed to the moral excellences that the social and moral aspects of citizenship education will most readily flourish. At the same time, better citizenship education should contribute to and enrich the social capital on which it necessarily feeds. In turn, as proposed earlier, high levels of social capital support intellectual capital. The conditions are thus right for the 'successful integration' demanded.

It is important to devise high leverage strategies relating to citizenship education. The response of many headteachers and teachers to the imposition of citizenship education has been not to oppose it on principle, but to adduce *practical* objections, such as the ubiquitous complaint of lack of time, or the rhetorical demand that something be removed from the National Curriculum to make space for it, or the meretricious argument that citizenship education will be a distraction in Key Stage 4 from preparation for public examinations. Such schools fail to recognise that citizenship education can enrich the school's own intellectual and social capital or that, by clever use of the school's existing intellectual and social capital, new forms of leverage can be devised to achieve the learning outcomes on particular intellectual and moral excellences. For such schools, citizenship education will not be welcomed as an opportunity to create a better balance between the intellectual and moral educational outcomes, which ironically has been a common claim from teachers during the reforms to 'raise standards'.

From the foregoing discussion, it is possible to specify the conditions under which current 'best (and worst) practice' in citizenship education might be identified in schools, as well as the conditions under which one would expect schools to improve (or not) their citizenship education over coming years, irrespective of the quality of current provision. Within this theory, a test of the value of any innovation, pedagogic or curricular, is the extent to which it contributes not only to student outcomes in terms of the excellencies, but also to the school's capacity by enhancing intellectual capital, social capital and high leverage. When the theory is expressed in the form of (an inevitably simplified) model, as in Fig. 7, any innovation will have its major impact at one or more points. The power of the innovation will be measured by the strength of the flow from the points of impact to other components, and its overall effectiveness or improvement value will be a function of the extent to which it enhances the four major elements—outcomes, social capital, intellectual capital and leverage—not just cognitive outcomes. If citizenship education can be shown to have such power, it will abundantly justify its place in the revised National Curriculum. Other potential innovations, such as the introduction of 'thinking skills' into the curriculum, could be set a similar rigorous test.

School Effectiveness and Improvement in the Knowledge Economy: a second test of the model

In February 1998, the New Labour Government published *The Learning Age: a renaissance for a new Britain*, a statement of its educational vision. The creation of a new *culture of learning*, it argued, would mean not merely better opportunities and fulfilment for individuals, but also building the intellectual capital of businesses to make them more productive and successful, an investment in people that would help to generate ideas, research and innovation. It would contribute to social cohesion and foster a sense of belonging, responsibility and identity in communities. At national level, it would help to create a strong economy and an inclusive society. As Charles Leadbeater (1999) puts it:

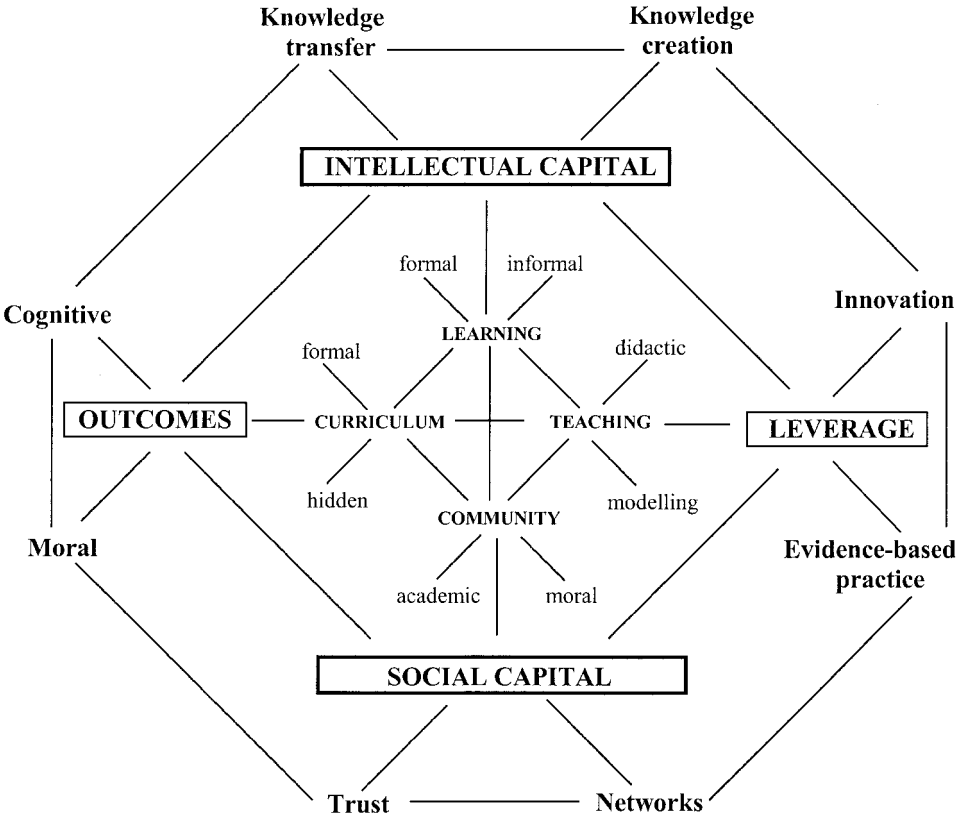

FIG. 7. The theory expressed in the form of a simplified model.

> The generation, application and exploitation of knowledge is driving modern economic growth ... The modern economy's most impressive feature is its ability to create streams of new products and services ... [so] we need to redesign our economies to release potential for creating and spreading knowledge throughout our populations.

Aspirations for economic growth are combined among politicians with a deep concern about the decline in community and active citizenship, the loss of social cohesion, and a growing cynicism among the young about politics and political participation. A successful knowledge economy is not antithetical to, and should promote, a more inclusive society.

The conventional model of school effectiveness and improvement is weakly related to issues arising from the nation's entry into a knowledge economy and the role of education therein; arguably, the model is relatively narrow and parochial, legitimising a highly limited view of the outcomes and processes of schooling. If politicians now set their ambitions within schemes of national renaissance, then educational models must also be directly compatible with analyses of the current state and future direction of society and its institutions and organisations, briefly sketched as follows.

The nature of work changes in a knowledge economy and this is reflected in organisational changes in how companies manage and exploit the intellectual assets of the workforce. Knowledge management, which includes the creation, use and transfer of

knowledge, has radical implications for how firms achieve success. Nonaka & Takeuchi's pioneering *The Knowledge Creating Company* (1995) stimulated a rapidly growing literature on knowledge management [8], the educational implications of which are slowly being analysed (*Organisation for Economic Cooperation and Development* [OECD], 2000). In a knowledge economy, the knowledge and skills that schools seek to develop in students must include creativity and innovation, not as a substitute for traditional knowledge and skills, such as literacy and numeracy, but as an addition to them. A second implication is that schools, like businesses, must find new ways in which to manage and exploit their intellectual assets, especially of the teachers. Since teachers have a weak knowledge base on how to develop the new knowledge and skills required by pupils, they must learn how to create this professional working knowledge and then transfer it rapidly and effectively through the teaching force. This will require new ways of engaging in research and development work for teachers as well as new forms of collaboration with professional researchers (Hargreaves, 1998). A theory of school improvement needs concepts of knowledge creation, innovation and transfer for teachers to generate new forms of high leverage for better teaching (upper right of Fig. 7) and to promote knowledge creation and transfer as new forms of intellectual excellence as outcomes for students (upper left of Fig. 7) to prepare them for the innovativeness they need for successful lives in a knowledge economy.

Like the literature on intellectual capital, that on social capital has grown exponentially in the last decade. Here I focus mainly [9] on the work of the American political scientist, Robert Putnam (2000), who treats social capital as close to civic virtue, both a private good that helps individuals succeed in life and a public good that builds communities. Social capital serves as a *bridge*, the 'connections' or networks that help folk get ahead; it serves as a *bond* that attaches people to groups. If groups are strong in social capital, they resolve collective problems more easily; the wheels of communal life turn more smoothly, and people become more tolerant and empathetic in their social relationships.

Putnam's book documents the power of social capital to make people 'healthy, wealthy and wise' and demonstrates in detail that social capital has a powerful positive impact, second only to poverty, on education and children's welfare. States with high social capital have measurably better educational outcomes. Putnam then marshals impressive evidence of a serious decline of social capital in late twentieth-century USA, with consequential social damage. However, renewing the stock of social capital is no simple task. Putnam's prescription for reversing the decline of social capital is thin, far less convincing than the analysis of the nature and causes of the decline. Putnam sees a role for the school, in the form of improved civics education, community service and richer extra-curricular activities, but the injunctions are vague and the understanding of the process of schooling is superficial. In the same way, he writes of the need to transform the workplace, but does not draw on the knowledge management literature which shows why workplaces need to change for other reasons and how enhanced social capital can support organisational change. By not acknowledging the potential power of social and intellectual capital to interact in mutually supportive ways, he underestimates the potential of schools and workplaces to be institutions that generate high levels of both forms of capital as private *and* public goods [10].

Financial capital is lost if it is given away: you cannot keep money and spend it. When intellectual capital is given away, it does not deteriorate, but becomes shared knowledge which, if done on a reciprocal basis, means mutual learning and gain. Social capital increases when it is given away: if I give you my trust, you are more likely to trust me

in return and our mutual trust grows progressively. In a situation of mutual trust, we will share our intellectual capital, which in turn confirms our relationship of trust. In schools, as trust and networking build social capital, it is easier for teachers to share professional practice and innovate (the lower right of Fig. 7) and thus to improve teaching. It also means that the community of teachers enhances the school as a moral as well as academic community and generates in students social capital as an educational outcome (the lower left of Fig. 7). The creation of the civic and social entrepreneurs which are essential to a successful knowledge economy depends on such a theory of schooling.

The Theory and its Impact on Effectiveness Research and Action for Improvement

The theory thus changes what should be measured in research on school effectiveness and what should be the target of school improvement projects. For example, it is not simply a matter of measuring moral outcomes, but of measuring them as a stock of social capital with added value. Moreover, social capital should be measured as a 'process variable'. Most urgently needed here are measures of trust, a central component of social capital, between head and teachers, teachers and students, teachers and parents, and among students themselves. From an Aristotelian point of view, friendship is the true root of community and politics, and measuring its existence among students [11] and teachers is relevant to assessing social capital. More structural aspects of social capital can also be measured, such as the extent and quality of extra-curricular provision and the nature and strength of networks among students and among staff. The rich literature on community [12] is a resource for ideas on what might be measured. When researchers measure these variables, they will illuminate the role of the moral in school effectiveness and improvement and persuade policy-makers to act on the findings, for example, by incorporating these aspects of education into schemes of student assessment.

Action to improve schools should now turn to neglected phenomena which are crucial to the model (and which could also be measured). For example, the theory emphasises informal and social learning, thus making mentoring and coaching, both intellectual and moral—among teachers, between teachers and students, and among students—vital mechanisms for sharing intellectual capital and building social capital. This entails rehabilitating apprenticeship theories of teaching and learning [13] in educational as well as workplace settings, and incorporating theories of situated learning [14] into the school effectiveness and improvement literature, from which their present absence is startling.

Teacher Effectiveness: a third test of the theory

School effectiveness research has recently emphasised teacher effectiveness at classroom level. However, there is still a lack of conceptual coherence in integrating these two levels of analysis and their associated literatures. In this final section, I examine the work of Stigler & Hiebert (1999) to show how the present theory incorporates some of the key features of teacher effectiveness.

The book is based on the Third International Mathematics and Science Study (TIMSS) video study, and a comparative analysis of eighth grade mathematics teaching in the USA, Japan and Germany [15]. What are German and Japanese teachers doing that results in students achieving at a higher level than in the USA? American students, it seems, are invited by teachers to memorise definitions and then practise procedures; they are shown what to do and then practise doing it on relatively simple problems by following rules. In Germany, teachers lead students through the development of procedures for solving problems; students participate directly in the development

of the procedures. In Japan, students are presented with problems and have to invent procedures for solving them; teachers provide the scaffolding which helps students devise methods for solving challenging problems. In particular, Japanese students do more of the mathematical work and spend more time inventing new procedures than do their peers in Germany or the USA. In Japan and Germany, the parts of mathematics lessons are carefully connected to create a smooth, narrative flow.

These (and other) findings are used to argue that teaching is a *system*, and that teaching systems vary from country to country and in the quality of their effectiveness. Teaching, argue Stigler & Hiebert:

> is not a loose mixture of individual features thrown together by the teacher. It works more like a machine, with the parts operating together and reinforcing one another, driving the vehicle forward … [This] means that individual features make sense only in terms of how they relate with others that surround them. It means that most individual features, by themselves, are not good or bad. Their value depends on how they connect with others and fit into the lesson.

Here, in effect, is a neat description of the principle of leverage and how high leverage can be achieved [16]. These teaching patterns or *scripts* are deeply embedded in teachers. It is rightly contended that changing just one or two of the elements in the whole system is not likely to produce a marked improvement in quality, in part because the change is superficial, leaving most elements of the original script undisturbed. To improve teacher effectiveness, the whole script must be examined and improved. In the language of the proposed theory, high leverage is achieved only by devising powerful combinations of teachers' classroom practices, not by changing just one or two selected for closer attention.

How, then, is teacher effectiveness improved? According to Stigler & Hiebert, participation in school-based professional development groups is part of a teacher's job in Japan. These groups provide a context in which teachers are mentored; they also provide a laboratory for the development and testing of new teaching techniques. The teachers devise 'research lessons' which they take time to design, test out and improve—and then share and implement collectively. They observe one another at work and develop a language in which to talk about what they do. Because the outcome is owned collectively, the teachers can constructively criticise one another without causing offence. In the terms of the theory, teachers form a community with high social capital, in which mentoring is part of teachers' social learning, and collaboration to solve shared professional problems is common. This provides not only the basis for knowledge transfer of 'what works' but also the potential for knowledge creation and innovation. All this contributes to high leverage strategies of teaching that shape classroom teaching and ensure high cognitive outcomes. A school's capacity for improvement depends not on *general* provision of continuing professional development or spirit of enquiry, but on *specific* versions as built into the present theory.

In summary, the proposed theory incorporates the evidence about the effectiveness of Japanese teaching more adequately than does the conventional model. It has two other advantages. First, whilst it is unclear whether Japanese schools can at the same time use the relatively high social capital among teachers to create a moral community and appropriate processes to yield moral excellences as outcomes of schooling, the theory points to those processes which would repay investigation to test relevant hypotheses. Secondly, it indicates what action might need to be taken to increase school and teacher

effectiveness in a British (or American) context. Like the Japanese, but unlike the Americans, we have a national curriculum with the potential for devising effective lessons around that curriculum and then sharing them widely. Continuing professional development is currently under review in England and many aspects of educational research and development are being reconstructed. It is an opportunity to develop new methods for professional knowledge creation and transfer, ones closer to the Japanese way, in the interests of improving schools in which teachers teach more effectively. The present theory is designed to contribute to that intellectual and practical endeavour.

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NOTES

[1] Since the argument proposed in this article is of book-length proportion, here heavily condensed, I beg leave to provide minimal references to the work of others in the text and restrict myself to some principal sources at the end. I am grateful to several friends and coleagues for their criticisms and suggestions, including Tom Bentley, George Berwick, Tony Edwards, Michael Fielding, David Frost, Chris Gerry, Richard Harrison, Mary James, Chris Jones, John MacBeath, Kate Myers, Lousie Stoll, Lorna Unwin and an anonymous referee.

[2] I include cultural capital in the intellectual capital of both staff and students as well as the school's other partners. I have insufficient space to elaborate here.

[3] Weak ties can be as important as strong ties in certain circumstances. See Granovetter (1973), pp. 1360–1380) for the classic statement of this idea.

[4] There is an evident value loading here, since the goals are desired by the school's stakeholders. Since the stakeholders may not agree on which goals are desirable, conceptions of both effectiveness and improvement may vary within and between stakeholder groups. The value loading of both school goals and educational outcomes tends to be implicit in models of effectiveness and explicit in models of improvement.

[5] I think principally of both teachers and students here, but also include all the school's partners and stakeholders, who have much to contribute to the school's intellectual and social capital and thus to the intellectual and moral outcomes of students. For reasons of space, this aspect of the model is here underdeveloped.

[6] This is a substantial and important task beyond the scope of a short article. I believe, however, that much of the current theory, as reviewed in Teddlie & Reynolds (2000), can be subsumed within this model.

[7] It is possible for a school to emphasise social capital as a substitute for intellectual capital, as in a welfarist school culture where teachers adopt social pathology models of students whose social and moral needs take precedence over cognitive development, leading to underachievement in the intellectual excellences.

[8] See, for example, Stewart (1997); Davenport & Prusak (1998); Burton-Jones (1999); Lesser (2000).

[9] Lack of space prevents me from dealing with the important work of Fukuyama (1995, 1999) on social capital as well as a very small but growing number of researchers who are applying the concept to education.

[10] This is far better understood in the social analysis of Leadbeater (1999), the industrial analysis of Saxenian (1994) and the academic analysis of Nahapiet & Ghoshal (1998) or Fountain (1998).

[11] Social capital is not always positively directed from an educational point of view, as when peer group solidarity is directed against the school. It remains a form of social capital, however.

[12] See, for example, Taylor (1982) or Sergiovanni (1994), which build on a rich sociological literature. The debate about communitarianism is also relevant—see, for example, Mulhall & Swift (1992) and Bell (1993).

[13] See, for example, Sizer (1984); Gardner (1991); Ainley & Rainbird (1999).

[14] Lave & Wenger (1991); Wenger (1998).

[15] Further examples of outstanding comparative studies which could used in this way are Alexander

(2000), Broadfoot *et al.* (2000), and Boaler (1997). Alexander's work, in particular, reveals the difficulties of finding a shared, transcultural vocabulary to describe what goes on in classrooms. In his words, 'Educational ideas do not just migrate; in speaking to different cultural histories and conditions, they also change'. It will be some time before we can work through these difficulties to create sound transcultural models of school effectiveness and improvement.

[16] Other important studies speak in similar terms, without actually using the concept of leverage. Gray *et al.* (1999) emphasise how schools and teachers need to adopt strategic, not just tactical, approaches.

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