

# The Cambridge Manufacturing Leaders' Programme

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## Abstract

*As with all Cambridge teaching, the Cambridge Manufacturing Leaders' Programme is based on one-to-one tutorial supervision, comprising guidance throughout a major strategic development project in the programme participant's company, interspersed with reflective study time spent in Cambridge. In this paper a description of the course is set in a wider philosophical context, looking at the role of work in a personal developmental sense, and the responsibility carried by manufacturing leaders for shaping and guiding that process. It is shown that the programme is rooted in and embodies important aspects of our European heritage regarding work as a learning process and the master/apprentice relationship as a way of giving educational guidance.*

**Key words:** *Manufacturing, Leaders' Programme, Strategic Development*

## 1. ENLIGHTENMENT

Before looking at the Cambridge Manufacturing Leaders' Programme, it is helpful to examine three words:

- educate
- enlighten
- lead.

The origin of words sometimes gives an insight into their meaning. The English verb "to educate" comes from the Latin verb *educare*, *educare* - "to lead forth, to bring out" (the Latin verb *duco* means "to lead"). Thus education involves leadership and leadership implies a responsibility for education. However, also implicit in "to lead forth, to bring out" is the understanding that what the leader takes responsibility for and brings into the light is not something he created or implanted, it is something that is already there, unrealised. This brings us to the middle word "to enlighten". Above all, a leader is a craftsman in the enlightenment process. He needs to both understand it and be a master of it.

Plato said "work is effort applied to difficulty. It always has internal and external results." Here, he is pointing at work as that enlightenment process. This definition instantly includes as 'work' the inner struggle involved in coming to understand something and sets this alongside the outer effort involved in making something, as being of equal value. Indeed it is of greater value, because the development of the understanding has to be complete before the outer product can be made, which becomes the embodiment of that understanding.

This is work being taught as an end in itself, as a way of life where the meaning of all things is seen in the context of the whole and thus each thing is done for its intrinsic value, a process in which craftsman and customer both express themselves, both listen, absorb and respond, and

both find themselves incrementally enlightened through their relationship. The Protestant work ethic honoured the process of work as a process of growth and said "everyone must have something meaningful to do".

There is a tension in the modern era between the process of growth through expressed relationship described above and the cold presentation of a product abstractly made. The latter is no substitute for the former but as the power of technology increases, it increasingly makes the relationship opaque, so the understanding which creates the product is not transferred to the customer along with the product (so the customer is merely served, not enlightened) and neither is the proper understanding of the customer's need articulated to the craftsman, so he too is paid, but not enlightened. Because the relationship is never truly formed there is no possibility for it to enlighten and a world full of material goods evolves devoid of meaningful human exchange.

The core task of the management of technology is not to make those goods. It is to make the relationship transparent. Human growth occurs when true need and true competence speak to each other.

As with many words, common use of the term *craftsman* has steadily robbed it of any depth of meaning. It pays to examine it more closely, and in particular to go beyond the term *craftsman* and understand what lies hidden in the further term *master craftsman*.

As the saying goes, "a bad workman blames his tools". The simple definition of a craftsman (or craftswoman) is that he (or she) does not do that. They have achieved fluent control of their tools, of all the tools that make up their environment, and they have established a fluent relationship with the materials, processes and products of their chosen field and are able to craft things.

A master craftsman is something more. A true master craftsman has progressed beyond this to a deep understanding of humanity itself so that they are able to see *what needs to be* crafted, and at the same time they deeply understand and can guide students through the process of struggle, learning and growth that yields maturity. They can grow future craftsmen and indeed future master craftsmen. The result of a craftsman's work is products. The result of a master craftsman's work is *people*.

It is with this sense of a leader needing a deep understanding of humanity, and of needing to find what manufacturing means to humanity, that we can begin to look at the Cambridge Manufacturing Leaders' Programme. It will be apparent from the above that we are concerned with the *Profession* of manufacturing. Whilst 'how' is continuously important for management, leadership has to be constantly concerned with 'what', and 'when', and 'where', and above all, *why*.

## 2. THE CAMBRIDGE MANUFACTURING LEADERS' PROGRAMME

Perhaps the most striking feature of all Cambridge teaching is that it is rooted in relationships. No teaching is ever abstract. This is visible in the one-to-one tuition on real problems, in context, in their companies, which is at the core of the Manufacturing Leaders' Programme (MLP), but it is also visible in two important aspects of the programme which make it different from a typical MBA programme, with which it might be compared.

Firstly, as one wit said, "the MLP is an MBA without the engineering taken out." It is not possible to be a leader in manufacturing without maintaining a leading edge understanding of the technology by continuous engagement with it. This is thus one essential relationship which is maintained within the course and it immediately leads to the other, which is that, while there is much understanding in manufacturing that is common across fields and can be translated from one area to another, it is also true that each application is unique, and sustained engagement with that application in that location is essential to really develop a deep understanding.

Thus the MLP does the opposite to what most MBA programmes do. Many MBA programmes represent a personal career path in which an individual breaks all ties with their existing company, spends a year removed from industry and then moves elsewhere for a far higher salary. In contrast, you cannot apply personally to join the Cambridge Manufacturing Leaders' Programme. A company, however, recognising that it has someone typically in their early thirties who is of a calibre such that by their early forties they will clearly be carrying serious leadership responsibilities, may apply for a place on the course and will pay that person's fees, wishing to broaden that person's outlook.

The programme is then spread over two years and the person engages with it in addition to, and without a break from, continuing to carry the responsibilities they

already carry in the company. Indeed as a major part of the programme, they will initiate and follow through a major strategic development project within their company, and will be assessed on the quality of their approach to that project and its relevance to the company's development and its success, as well as being assessed on their learning about the leadership process in that live engagement.

The programme moves through four stages, each beginning with a three week intensive module in Cambridge, involving study of the experience of others, including contact with exponents of world best practice but also involving much peer group time with their programme colleagues (a group of ten to twenty people a year). Each module is then followed by several months of project effort in their company with their company colleagues. This first involves auditing the current state of manufacturing processes to define strategic development needs, secondly developing a plan and thirdly implementing that plan. (Cambridge considers manufacturing to include everything from perceiving a market need and developing a market position, through research, design and development of both the products and the manufacturing processes, to full production and following support, including at all stages full understanding of the human issues involved and all the financial aspects etc.)

The reports required at each stage, plus the periods back in Cambridge, provide reflective time absorbing and internalising the understanding that emerges from the engagement in the process, the aim being to develop what Schön (1983,1987) calls "a reflective practitioner". Each year group is already an international mix and the study periods in Cambridge include international visits and the consideration of manufacturing internationally, so that the programme participants, while never disengaging from their own company's needs, are stretched to consider manufacturing world-wide. The final thesis is then a reflective review of what they have understood about the process of leadership themselves, through their two years of guided engagement and study.

What might be evident from this description is that the programme not only honours and preserves but actually points to the programme member's existing relationship in his company with the people he is responsible for, and makes it the central feature of his programme. His (or her) tutor doesn't simply give guidance from afar but spends time in the company. Guidance in leadership is thus effectively given as an extended master class *to both the leader and his team, in their own context*.

This approach has been at the core of Cambridge's teaching of manufacturing for thirty years. Sensitivity to the detail of circumstance has to be combined with the observations of others captured from their experience and passed on as advice. Out of the struggle of this combination process comes enlightenment - real understanding - the real ability to make a difference. In all this the experience is primary, as much of what the tutor is passing on can only be passed on in context.

Competence cannot be developed in abstract. It cannot be taught in a 'handing over information in a classroom' sense, because it is not abstract information. It is a set of dynamic skills, alert sensitivity and well honed responses to circumstances, that has to be developed in guided practice, just as a football team acquires its skills by practising them under the eye of a coach. It has to be demonstrated by a competent practitioner. In other words it requires proper professional mentoring. Schön (1987, p.93) captures the process very effectively in his description of the master class approach to passing on the skill of design in architecture:

*It is as though the studio master had said to him, "I can tell you there is something you need to know, and with my help you may be able to learn it. But I cannot tell you what it is in a way you can now understand. I can only arrange for you to have the right sorts of experience for yourself. You must be willing, therefore, to have these experiences. Then you will be able to make an informed choice about whether you wish to continue. If you are unwilling to step into this new experience without knowing ahead of time what it will be like, I cannot help you. You must trust me."*

Some aspects of the assessment process for the Manufacturing Leaders' Programme may help bring the aim of the course into focus. All the course participants have the following guidance, which emphasises in several places the importance of engagement, of openness and of reflection.

### 3. THE ASSESSMENT PROCESS

#### **AIM**

*The core of any learning activity is the reflective process of taking the experience and understanding of others, relating it to one's own experience and understanding, and developing a deeper understanding, soundly embedded so that it becomes an automatic part of one's way of working. The dialogue of assessment and examination provides an audit of this process.*

#### **PROCESS**

##### **Coursework**

*The habit of filing reference information in a structured way, and also of working on it to extract and record, also for reference, the essential information, observation or piece of personal understanding, is an important habit. These two steps occur between presented information and an extracted overview, between jotted notes in a lecture and the extracted understanding, or, in a work context, between the jottings of many meetings and conversations, including phone conversations, and the extracted understandings, decisions and commitments. Always, both halves of the habit are of value, including keeping one's rough notebook.*

*Within the course the Director of Studies will ask to see the student's file of presented lecture material and matching extracted overview, and will expect the weekly progress review sheets to capture in outline the learning of the week.*

##### **Project diary**

*During each case study, the student will be expected to keep a project diary and, in parallel with the submission of the case study report for the assessment of the examiners, the student will be asked to submit to the Director of Studies a brief reflective analysis of the learning experience of the project, as evidenced by the project diary.*

#### **Written work**

*Case studies and theses will generally require study of background material concerning a set of observed principles or a line of approach, and study of the actual dynamics of a live situation. A project will fail if the student visibly fails to engage with both of these, i.e. the evidence of that engagement is absent from the written report.*

*It is possible to study the background material and to extract key words or phrases from it, but to fail to penetrate through to the meaning - the essential lived experience - to which the key words and phrases point, and to make it one's own. A report presented at this level has the feel of work-in-progress, in that it has a not-yet-fully-engaged feel to it. It would be deemed acceptable (subject to circumstances), but not entirely a success.*

*A successful project is usually characterised by the understanding pointed at by the key words or phrases having been entirely absorbed into the reality of the live context of the student's project and given life there, so that understanding reappears in the student's own words, and own live observations, and in the dynamic activities of the company team of which the student has been part.*

*Because live activities always contain the interplay of personalities as well as principles, and involve company culture, the report may well include brief vignettes of personalities (including both strengths and weaknesses), and descriptions of the positive development of personal interactions, and the positive development of company culture. As management and leadership are always integrative processes, a case study or thesis should always be considered as an open report, i.e. as both a learning and a teaching document, and will be assessed for the insight, clarity and resilient diplomacy of the guidance it gives.*

### 3. SERVICE

Throughout the above we have focused on work as an enlightenment process and leadership as a service. As much of the rhetoric of business is currently about competition, it is worth looking more deeply at the philosophical roots of the European view of work and leadership, and at the view of work and leadership in Japan, which is similar, and at the view in America, which is, in part at least, seriously different. The difference is to do with a view about relationship, which fundamentally affects the view of what service, in a civic sense, might be.

The important difference is in the internal outcome of work, not the external outcome, to use Plato's distinction - not "does some work result in a product or some service which can be viewed as a product", but "does the work as a process genuinely add meaning to the lives of the people involved". Saying that people only work for money is simultaneously a way of demeaning their work (literally, taking meaning out of it - denuding it of any possible meaningful relationships and responsibilities), and establishing limited liability for the company towards having any responsibility to do anything about it. Down this road, company ownership is about control, not leadership.

A negative starting point from which to understand this is to take Frederick Taylor's development of Scientific Management (1911), in which he famously defined the kind of person he wanted as an employee:

*"Now one of the very first requirements for a man who is fit to handle pig iron as a regular occupation is that he shall be so stupid and so phlegmatic that he more nearly resembles in his mental make-up the ox than any other type."*

The account in Frederick Taylor's biography (Kanigel, 1997, p.460) of how his followers manipulated witnesses at the House of Representatives Special Committee hearings concerning the scientific management process, to 'prove' that the foreman representing the interests of the men was stupid and could never have understood the principles involved, and that the understanding was theirs alone, makes chilling reading. Asked in that enquiry how he viewed a man, Herbert Stimpson said:

*"As a little portable power plant... a mighty delicate and complicated machine... The physical body of the man is constructed on the same mechanical principles as the machine is, except that it is a very much higher development. Take the human arm; look at the flexibility of motion there..."*

#### 4. AUSTRIAN SCHOOL OF ECONOMICS

Taylor separates the inner aspect from the outer aspect of work and claims ownership of the inner aspect, and in so doing demeans and enslaves those who are then dependent on that guidance. This is not enlightenment. The Austrian school of economic thinking emphasises this difference.

Neo-classical economics has taken a machine metaphor in order to explain how markets operate, and took a naïve view of the role of knowledge within a static, perfectly balanced system. Authors such as Hayek and Schumpeter concentrated on the role of knowledge in markets, and instead explored the tentative and unfolding nature of continuous economic change. The normal state of markets is disequilibrium, not equilibrium. In this continuously evolving state, markets signal much more than simply prices - they are dynamic signalling systems of values and context-specific knowledge.

In a dynamic, continuously evolving economy, entrepreneurship becomes an important concept. The very unpredictability and chaotic state of affairs which is hidden away in the neo-classical world now becomes the means by which mainstream market processes are established. Entrepreneurship involves grasping an opportunity, through alertness and noticing, to reveal unvalued resources or unsuspected value. At this point, the opportunity exists, and simultaneously a framework of goals, values and expectations is created. Thus competition is the process through which knowledge in its widest sense is discovered.

Pulling a quote from the professional development literature, Eraut (1994, p.104) remarks:

*"The 'act of attention' brings experiences, which would otherwise simply be lived through, into the area of conscious thought; where treatment may vary from actual comprehending to merely noting or hardly noticing."*

In the Austrian school, the act of noticing suddenly becomes central to economics. Without actually being noticed, markets would not exist. Human conduct is considered to be intrinsically meaningful, and must be understood in a way which has no counterpart in nature, certainly not in mathematical laws. Economics suddenly must be seen in the context of the historical development of a culture as a whole. Significantly, knowledge is now viewed in a human, context-specific sense, and does not objectively float around in a market.

#### 5. PROCEDURAL JUSTICE

Procedural justice can be defined as the extent to which the dynamics of a decision are judged to be fair by the participants in that decision. Following the seminal work of Thibaut and Walker (1975), it has been studied in a number of work, social, legal and political settings. Its relevance to the subject here is that knowledge sharing and a commitment to learn are essentially voluntary activities in which individuals choose to participate. As Hayek (1945, p.521-2) comments:

*"... practically every individual has some advantage over all others in that he possesses unique information of which beneficial use might be made, but of which use can only be made if the decisions depending on it are... made with his active co-operation."*

Kim and Mauborgne (1997) summarise much of the literature and suggest that in business, three criteria, consistently applied, will lead to procedural justice.

*Engagement* - The opportunity for individuals to input into a decision, and allowing them to refute the merits of one another's ideas and assumptions.

*Clarity of* - There is a shared understanding amongst the involved group of each expectation others' responsibilities and what is individually expected of them.

*Explanation* - Everyone involved should ultimately understand why a certain decision has been taken.

#### 6. ZEN LEARNING

This is echoed in the Japanese view. In his introduction to Herrigel's book *Zen in the Art of Archery* (1985) Suzuki says:

*"One of the most significant features we find in the practice of archery, and in fact of all the arts as they are studied in Japan and probably also in other Far Eastern countries, is that they are not intended for utilitarian purposes only or for purely aesthetic enjoyments, but are meant to train the mind; indeed, to bring it into contact with the ultimate reality. Archery is, therefore, not practised solely for hitting the target; the swordsman does not wield the sword just for the sake of outdoing his opponent; the dancer does not dance just to perform certain rhythmical movements of the body. The mind has first to be attuned to the unconscious."*

*If one really wishes to be master of an art, technical knowledge of it is not enough. One has to transcend technique so that the art becomes an 'artless art' growing out of the Unconscious."*

Looking further into Japan's view of life as a learning process of growth towards aware maturity, Zen learning (Digenti, 1996) emphasises the closeness and subtlety of the student/leader relationship and its longevity, through repeating cycles of action and reflection over thirty to fifty years, in a three-fold learning process traditionally known as *shu ha ri*.

The ancients describe *shu ha ri* as a learning process which goes from "shallow to deep to shallow," so that there is firstly a superficial understanding based upon learning rules by rote; the second stage involves expanding the learning to various applications and situations, in order to deepen; and the final stage is shallow again, as "upon reaching the final stage all bonds are broken and one is completely free. This freedom, however, is none other than to observe the rules." The final stage of mastery brings one back to the first steps of learning the rules, but now the rules can be understood from a perspective of freedom, in that they are applied not through slavish imitation but through an understanding of their inherent wisdom.

In this context, the responsibility carried by the leader for formative guidance - for care and respect for the person being guided - and the responsibility of the student to try to give life to the guidance of the leader - a reciprocal caring and respect - is tangible. In contrast the scientific management approach can be clearly seen as a formidable and deliberate limiting of liability - a resolute avoidance of any relationship.

In contrast to Frederick Taylor's demeaning approach, here is a British contemporary, Sir Robert Hadfield, in Sheffield, talking about his workmen (Tweeddale, 1994):

*"Until I introduced my scheme at our Works, the work people had to start at 6am and without breakfast. We first tried 52 hours and then in 1894... went straight to the 48 hours a week, the men coming in after having had their breakfasts at home. This too without any reduction in wages for the shorter time worked."*

He refused to reduce wages because he did

*"not believe the underdog should be cut down or asked to consider this unless in dire necessity."*

His empathic feelings for his men come through in his words.

Here is Max Weber's critique of the Taylorist approach, written in 1904 (1976, p.58):

*"Capitalistic acquisition as an adventure has been at home in all types of economic society which have known trade with the use of money and which have offered it opportunities, through commenda, farming of taxes, State loans, financing of wars, ducal courts and officeholders. Likewise the inner attitude of the adventurer, which laughs at all ethical limitations, has been universal. Absolute and conscious ruthlessness in acquisition has often stood in the closest connection with the strictest conformity to tradition. Moreover, with the breakdown of tradition and*

*the more or less complete extension of free economic enterprise, even to within the social group, the new thing has not generally been ethically justified and encouraged, but only tolerated as a fact. And this fact has been treated either as ethically indifferent or as reprehensible, but unfortunately unavoidable. This has not only been the normal attitude of all ethical teachings, but, what is more important, also that expressed in the practical action of the average man of pre-capitalistic times, pre-capitalistic in the sense that the rational utilisation of capital in a permanent enterprise and the rational capitalistic organisation of labour had not yet become dominant forces in the determination of economic activity. Now just this attitude was one of the strongest inner obstacles which the adaptation of man to the conditions of an ordered bourgeois-capitalistic economy has encountered everywhere."*

In contrast, in Victorian Britain, the book which captures the essence of the Protestant ethic above all others is Samuel Smiles' *Self Help*. Here is an extract from his introduction to the second edition, written in 1866 (1996):

*"In one respect the title of this book, which it is now too late to alter, has proved unfortunate, as it has lead some, who have judged it merely by the title, to suppose that it consists of a eulogy of selfishness: the very opposite of what it really is - or at least what the author intended it to be. Although its chief object unquestionably is to stimulate youths to apply themselves diligently to right pursuits - sparing neither labour, pains nor self-denial in prosecuting them - and to rely upon their own efforts in life, rather than depend upon the help or patronage of others, it will also be found, from the examples given of literary and scientific men, artists, inventors, educators, philanthropists, missionaries, and martyrs, that the duty of helping one's self in the highest sense involves the helping of one's neighbours.*

*....Failure is the best discipline of the true worker, by stimulating him to renewed efforts, evoking his best powers, and carrying him onward in self-culture, self-control, and growth in knowledge and wisdom. Viewed in this light, Failure, conquered by Perseverance, is always full of interest and instruction, and this we have endeavoured to illustrate by many examples.....*

*...At the same time success in a good cause is unquestionably better than failure. But it is not the result in any case that is to be regarded so much as the aim and the effort, the patience, the courage, and the endeavour with which desirable and worthy objects are pursued -*

*Tis not in mortals to command success;  
We will do more - deserve it.*

*The object of the book briefly is, to re-inculcate these old-fashioned but wholesome lessons which perhaps cannot be too often argued, that youth must work in order to enjoy, that nothing creditable can be accomplished without application and diligence, that the student must not be daunted by difficulties, but conquer them by patience and perseverance, and that, above all, he must seek elevation of character, without which capacity is worthless and worldly success is naught. If the author has not succeeded in illustrating these lessons, he can only say that he has failed in his object."*

At a later period (1934), in Germany, Oswald von Nell Breuning voiced a similar concern, focusing on the leadership aspect.

Here are his words (1936, p.116), surrounded by a recent comment from Michael Naughton (1994):

*"Munificence, like courage, strives "for what is arduous and difficult". Whereas courage may jeopardise one's life, munificence may jeopardise one's resources. Because the virtue of munificence directs resources toward the good of the community as well as profit, the munificent person acts courageously by incurring greater financial risk. Munificence is an expression of public co-operation, incorporating both market criteria and the good of society.*

*Oswald von Nell Breuning calls munificence "a genuine capitalistic virtue", that is, "a virtue for the entrepreneur". He explains that only the entrepreneur who "gives first thought to service and second thought to gain" practices the virtue of munificence. Nell Breuning explains that munificence is manifested in that person "who in his enterprise and in his means of production employs his working men for the creation of goods of true worth; who does not wrong them by demanding that they take part in the creation of futilities, or even harmful and evil things; who offers to the consumer nothing but useful goods and services rather than, taking advantage of the latter's inexperience or weakness, betrays him into spending his money for things he does not need, or that are not only useless but even injurious to him."*

*Products should not be produced only for the purpose of fulfilling market whims; the choice of products has an ethical and even a spiritual character that can never be reduced to simple economics."*

But going back to the beginning of the Victorian period in Britain, the root of that philosophy of service to mankind which is at the heart of the engineering profession is perhaps best captured by the words of Henry Robinson Palmer, spoken at the inaugural meeting of the Institution of Civil Engineers, the oldest professional engineering institution in the world, on 2 January 1818 (Watson, 1988, p.9). They named themselves *civil* engineers because they were *not* military engineers - it defined the moral sphere in which they worked. They were entirely aware that the processes they were using - the processes of learning to work together, to hear and meet each other's needs - were the processes of civilisation itself, and they mattered at least as much as the products they were developing to support those processes. Henry Robinson Palmer was 23, but he was already teaching one of the self-help groups in East London of the kind Samuel Smiles describes. Of the role of the engineer he said:

*"Engineering is a profession which requires not only knowledge of one leading branch of science but of many; not only of one art but of an infinite number*

*An engineer is a mediator between the philosopher and the working mechanic; and like an interpreter between two foreigners must understand the language of both."*

That responsibility never goes away and it perhaps helps us to properly distinguish the dimension in which *service* exists. It exists in the dimension of *intent* not in the dimension of *skill*, necessary though that is. McClelland (1961), looking at the origins of the industrial revolution, distinguished again between the outer and the inner, between outer success and inner achievement.

Frederick Taylor certainly had the first, but Samuel Smiles pointed to the second (*We will do more - deserve it.*) and McClelland describes those European Protestants as being permanently on their toes with an alert, learning sensitivity, not driven by self interest but by a deep concern to take the initiative to do what is right.

These people were not fools. They did not lack skill. But they had something else, and it is that something else that we must ever remember in our European heritage. It is not our skills, it is our *choices* that define us as human. *People matter.*

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