

**SWP 8/96      OPERATIONS MANAGEMENT TEACHING ON  
EUROPEAN MBA PROGRAMMES**

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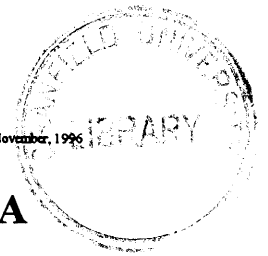
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**ISBN 1 85905 091 3**



# **Operations Management Teaching on European MBA Programmes**

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## **ABSTRACT**

This study investigates the teaching of operations management on MBA core courses at ten of Europe's leading business schools. A review of the operations management (OM) literature showed that no previous publication has focused on European teaching—consequently a survey was made of European schools. The results give a comprehensive picture of the topics covered, teaching materials used, pedagogy and how OM fits into the MBA curriculum. Interestingly, big differences exist in the amount of time allocated to OM at different schools—from 18 hours to over 70 hours. Despite the differences in time available, course content is surprisingly similar although course structures vary widely, this being partly determined by the MBA programme of which OM is part. Interviews with OM teachers showed that courses require constant revision, to keep up with current issues such as supply chain management, new technologies, etc. Teachers of OM identified a number of key challenges they face, particularly the need to develop a clearer definition of the subject and increase the recognition of the strategic importance of OM. This paper should be useful to all lecturers who teach OM as it is a source of data on both teaching strategies and the relevant literature. In addition, a number of topics for further research are identified.

## **INTRODUCTION**

How is operations management taught in European business schools? And what are the issues and trends in teaching this subject? These were the sort of the questions which prompted an investigation of operations management (OM) MBA “core course” teaching at ten of Europe's leading schools.

The author is a lecturer at a UK business school, having joined from industry in 1995. As a new member of the teaching faculty he has been attending the International Teachers Programme (ITP) organised by the International Schools of Business Management (ISBM). ITP is currently (1996/97) being hosted by London Business School and, as part of the Programme, participants are required to conduct a teaching project of their own choice. Since the author had recently, with colleagues, re-designed and then taught a MBA core course in OM, he decided to investigate both the literature on OM teaching and the approaches used by other European schools. The results will be of interest to all lecturers who teach OM and particularly those who are designing or re-designing courses and subsequently looking for new ideas.

## **AIMS OF THE PROJECT**

The aims of the project were:

- 1) To conduct a comprehensive review of the literature specific to teaching OM, in order to identify some of the key issues.
- 2) To investigate how OM is taught on full-time MBA courses at ten leading European business schools including:

- course content
- teaching strategies
- assessment methods

3) To determine what OM teachers think are the key trends in teaching their subject.

### **TEACHING OPERATIONS MANAGEMENT**

There is a substantial body of literature on the teaching of OM, covering undergraduate, postgraduate and executive teaching. Although the focus of this paper is MBA teaching, the whole literature was reviewed, in order to give a complete picture. Many of the papers on teaching originate from the US where the subject is normally referred to as production and operations management (POM). (In this paper both terms—OM and POM—will be used, with the latter being used to indicate courses at US institutions.) The topics covered in publications broadly fall into four categories:

- Philosophy of OM teaching
- Course content
- Teaching pedagogies
- Student and practitioner perceptions of OM courses

#### **1) Philosophy of OM Teaching**

Traditionally OM courses have been based around a number of tools and techniques such as inventory planning and control [Adler, 1989]. However, “there is a fundamental difference between the way operations is taught in business schools and the way it is practised in successful organizations” [Davies, 1996]. Consequently the real challenge for teachers is to teach OM in an interesting way and so that its strategic importance is clear [Ducharme, 1991; Willis and Bass, 1991; Bregman and Flores, 1991]. Only then will students correctly understand that operations strategy should be the driver which leads to the adoption of appropriate tools and techniques and not vice versa. In fact, the “strategic level view of operations [has become and] will remain the central core of the new POM paradigm” [Wood and Britney, 1989].

OM is an applied, rapidly changing subject and so there is a need to generate relevant, up-to-date material for teaching. In addition, the practice of OM is moving away from simple, serial solutions towards the implementation of complex, parallel solutions [Wood and Britney, 1989]. Consequently, “operations managers are scrambling... to keep up... Likewise and not surprisingly, POM academics are experiencing rapid changes in their roles” [Wood and Britney, 1989]. To teach OM “in a way which attempts to convey and illustrate the excitement, magnitude and complexity of the task”, it is essential that the results of research into current OM practices are fed back quickly and effectively into teaching [Hill, 1987].

The majority of the actions required to implement operations strategies involve people and therefore human resource management. Consequently, students need to learn leadership skills in the OM context and so this wider dimension should be reflected in POM teaching [Dreyfus, 1996]. They also need to learn “to take pride in the products and production process” [Bahl, 1989].

#### **2) Course Content**

The content of OM courses at both undergraduate and graduate (MBA) level has been the subject of some discussion, since there is wide variation in the topics selected by different schools for inclusion.

A 1989 survey of 431 teachers at US business schools investigated POM undergraduate courses. The results showed a wide diversity of approaches across schools and “although there are advantages to diversity, too much of it in an academic discipline can lead to a lack of focus and potential for confusion” [Raiszadeh and Ettkin, 1989]. A survey of 31 major US business schools looked at the POM topics covered on MBA courses. POM topics were categorised into nine areas and it was found that only two topics (Operations Strategy and Management Technology) are covered at the majority of schools. None of the remaining seven topics are taught by more than one-third of schools. This led to the conclusion: “there seems to be considerable disagreement as to what should be taught in a POM option” [Bahl, 1989].

In addition to the discussion on the variation of topics contained in OM courses, a number of other issues are identified in the literature.

### OM Course Descriptions

Several descriptions of core MBA courses at US schools have been provided at conferences [see for instance Donahue [1996], Bowen [1996] and Chand [1996]]. It is noteworthy that no detailed descriptions of European core MBA courses have been published. (A description of a European undergraduate course and an MBA elective are, however, given in Armistead et al [1986]).

### Practitioners' Views on OM Courses

One potentially useful way of deciding which topics should be included in OM teaching is to poll practitioners' views. Several authors have done this [see Berry, 1989, White et al 1988, Frazer 1996] and this will be discussed in detail in a later section.

### Strategic / Tactical Emphasis

As mentioned in the previous section on teaching philosophy, it is important to stress the strategic value of OM. “Significant emphasis needs to be given towards the area's strategic dimension” and consequently it is recommended that 40% of postgraduate sessions should be allocated to strategy [Hill, 1996].

### Manufacturing / Service Emphasis

OM has its origins in manufacturing industry. However, due to the shift in many Western economies towards the service sector, there is increasing pressure from students for service to be more comprehensively addressed in core programmes. The best way to achieve effective coverage of service operations issues is to choose suitable teaching materials (cases, examples, etc.) and include a project based on the service industry—such as analysing a fast food outlet. This approach should show “that all operations management techniques and approaches can be applied in the service environment” [Armistead et al, 1986]. Concentrating on service operations can widen the scope of operations teaching away from its “manufacturing bound” origins and lead to students understanding OM better [Killeya and Armistead, 1983]. None of the previous surveys of OM teaching have looked at how much emphasis is given to service operations in courses.

### New Areas to be Covered

Operations management has expanded to cover service industries but a number of other areas also need to be included. However, the adoption of new areas into OM teaching may sometimes be too slow. Kaplan [1991] surveyed twenty leading schools

in the US in 1991 and found, surprisingly, that coverage of Total Quality Management (TQM) was inadequate on POM courses. The general conclusion of the study was “a major problem likely exists in the research and innovation activities of business schools”, although the validity of this conclusion can be questioned because it is based on the case of TQM alone.

Two other areas which need to be covered in OM courses are field service and international manufacturing. Field service of capital equipment is an essential service to customers and a key source of both revenue and competitive advantage—therefore it is a topic for inclusion in OM courses [Hull and Cox, 1994]. With the increasing internationalization of operations there is a need to include this aspect in OM courses “the issue of educating business managers in international manufacturing is a current ‘hot topic’” [Klassen and Whybark, 1994].

### **3) Teaching Pedagogies**

Teaching is normally based on lectures and case studies but several other methods are commonly mentioned in the literature. The main ones are:

- Lectures and case studies
- Using videos of operations
- Taking students on factory visits
- Inviting practitioners as guest speakers
- Using games and simulations
- Use of other technologies in teaching OM.

Despite the range of approaches available, a survey of US undergraduate teaching found “the methodologies used to teach the basic POM course have remained very traditional—the lecture approach” [Raizadeh and Ettkin, 1989].

### **Videos**

Some institutions use videos of factories or service operations to bring realism into the classroom—a survey showed that approximately 10% of undergraduate courses use them [Raizadeh and Ettkin, 1989]. Videos can bring realism to the classroom [Nicholson, 1996], however, there does not appear to have been a catalogue published of suitable videos for OM teaching. A variation on the video theme is the use of popular film clips which illustrate operations management concepts—for instance Charlie Chaplin’s Modern Times includes a sequence which illustrates balance problems on a production line [Schvaneveldt, 1996].

### **Factory Visits**

Visits to factories or service operations can be very useful learning experiences for students [Raizadeh and Ettkin, 1989]. If visits are linked to an assignment based on the organisation visited this can bring significant benefits, not only to the students but also to the organisation visited—through the provision of free “consulting” as students “use their knowledge to solve [actual] problems” Helms [1989].

### **Practitioners as Guest Speakers**

Guest speakers can also bring the “real world” into the classroom and are another way of increasing students’ interest in OM [Desai and Inman, 1994].

### Games and Simulations—Paper-Based

Operations management is a subject which lends itself to the use of games and simulations which can bring clarity, realism and fun into the classroom. A large number of games and simulations have been developed over the years, some of which are “high-tech” and require computing power whereas others are simple paper-based games.

Morgan [1989] discusses the use of a semester-long simulation of a manufacturing plant where small groups of (undergraduate) students make operations decisions based on, for example, factory layout and product mix. The advantage of this approach is “the end results are that students are better able to understand the impact of POM on the other parts of the organization (and vice-versa) and to view POM techniques in their relation to each other rather than as a set of unrelated technical tools”.

Another example of a paper-based game is the “In-tray Exercise” where, adopting the role of a newly appointed manufacturing manager, students must assess the performance data and mail in their in-tray. Class discussions help students to realise the broad array of issues that are typically faced by a manufacturing manager, including shipment targets, plant layout and statistical process control [Sohal and Oakland, 1990; Oakland et al 1986].

A number of other games and simulations can be identified in the literature [see, for instance, Levenburg [1996], Pariseau [1996] or Julien[1996]]. Excellent descriptions of over twenty simple (largely paper-based) games are given by Heineke and Meile [1995].

### Games and Simulations—Computer-Based

Computer simulations have a relatively long history in OM teaching. A mainframe computer simulation from 1981 [Harms and Huff, 1981] “stresses the *linkage* of... interrelated subjects and supplements the regular classroom presentations dealing with them”.

Smith [1989] presents a computer simulation for demonstrating issues of plant layout and operations planning and control and says “simulation remains a powerful tool for the teacher of operations management”. However, another author warns of the difficulties of producing computer-based training for OM saying, “the operations management teacher must be clear about teaching and learning objectives before designing a microcomputer-based simulation” [Batley, 1990]. Topics where computers simulations could be used range from teaching materials control through to statistical quality control [ibid].

### Assessing the Effectiveness of Technology

Other technologies have been investigated for use in POM teaching. Tunc and Gupta [1995] investigated the use of interactive television for offering introductory POM courses to students off-campus. It is encouraging that they found no reduction in the standards achieved by the students who had only received off-campus teaching and found some advantages to using interactive TV.

Empirical work with 108 students [Coye and Stonebraker, 1994] looked at the impact of personal computers (PCs). However it failed to show that the use of PCs leads to more effective learning, concluding “although some of the findings are suggestive, there is no statistical evidence that this use of the PC contributed more to the learning of operations management”. On the other hand, a study by Moffit [1994]

“indicates that expert systems can provide a valuable enhancement to learning in the introductory POM class”.

The boom in multi-media is likely to have an impact on the teaching of OM. The first textbooks with accompanying CD-ROM teaching packages have already appeared [e.g. Krajewski and Ritzman, 1996]. How effective they will be and whether they will become popular remains to be seen—currently no OM researcher has investigated this field.

### **3) Perceptions of OM Teaching**

Several authors have chosen to investigate perceptions of OM teaching, including: students' bias against OM; students' views on OM courses; and practitioners' views on OM courses.

#### **Students' Bias against OM**

Is OM an appealing subject for students? A survey conducted with both undergraduate and postgraduate students at a US business school checked whether students are biased against POM courses and manufacturing in general [Desai and Inman, 1994]. Although the survey was only conducted at one school, the results are interesting. Student bias against POM resulted from the low image of the subject (it was seen by many students to be linked to manufacturing, and therefore removed from the “real action”), plus careers in operations were seen as less attractive (due to lower salaries and limited chances of promotion). Anxiety at the quantitative nature of POM courses was also an issue. The authors of the study think that business schools place too little emphasis on POM; to rectify this the professional image of the subject needs to be raised by making it more interesting and applicable [ibid]. Ala [1987] also claims to have detected student bias against POM whereas Ducharme [1991] found that US manufacturers preferred to hire engineers rather than business graduates who had majored in OM.

#### **Students' Views on OM Courses**

Most schools survey their students' views on all courses, including OM. The results are typically used to decide how to improve courses but they are not normally published. However, there are a number of exceptions and three will be discussed, all of which are from US schools.

In a survey of alumni [Haugen, 1996], areas for improvement in POM teaching were identified. This led to the introduction of more case studies, group and computer work into a core POM course. The perceived benefits of studying POM were studied at another institution using a sample of five academic classes, including undergraduates and graduates [Ala, 1987]. The perceived benefits included: an exposure to manufacturing technologies (such as automation); an understanding of the terminology and; the development of skills necessary to become a general manager. Ala also concluded that students are biased against OM but his conclusion is flawed because of an ambiguous question. Students were asked “What is your reason for taking this course?” Because the course was compulsory, most students responded indicating they took the course (only) because it was a requirement. In this case the answers cannot be taken as an indication of bias, students were probably responding in a factual manner and not (necessarily) showing bias against the subject.

In probably the most comprehensive study, 366 students were surveyed in an investigation of the ratings achieved by POM teachers. This research raised the

problem that surveying students to monitor the effectiveness of teachers may itself be ineffective. "Ratings do not reflect an instructor's ability to help students learn and are not valid measuring devices in terms of faculty ability to enhance performance" [Biggs, Campion and Gosenpud, 1991]. A better method is required to identify and measure the links between cause (the teacher's ability) and effect (students' learning).

### Practitioners' Views on OM Courses

Since practising operations managers are the group with day-to-day experience of the issues in OM, their views on teaching are valuable and have been sought in several studies, four of which will be discussed. Berry [1989] says "Although it could possibly be argued that practitioners are not the best judge of what should be covered in a given course in a contemporary business school curriculum, there are several reasons why the data collected from practitioners should be given some merit and consideration in structuring the introductory POM course". A survey [ibid] of operations managers in US companies produced 181 responses. From these it was established that practitioners thought studying concepts was more important than too much detail on techniques. The three topics perceived as most important were Labor-Human/Monetary Aspects, Capital Budgeting and Capacity Planning.

A survey of 100 production control supervisors at Fortune 500 companies looked at the educational requirements of the production control function [White, et al 1988]. The conclusion was that the most important areas to be included in courses are Forecasting, Inventory Control and Manufacturing Cost Analysis.

Another survey of practitioners' views on POM was reported by Frazer [1996]. Responses from operations managers at 52 regional firms were used as basis for re-designing a core course. One limitation of this approach is that if the regional firms were not representative of the needs of industry, then the core course may have been too closely tied to regional requirements.

It appears that, to date, the focus on surveying practitioners has been on manufacturing industry. Furthermore, it has focused exclusively on US managers. Consequently, there is a real need to identify which areas of OM teaching are most beneficial to managers working in service operations and, similarly, a survey needs to be made of international managers' (practitioners') views.

### Key Points from the Literature

The points from the literature which are particularly relevant are:

- A wide variation exists in the topics covered on POM courses in the US
- There has been no previous investigation of European core OM teaching
- A variety of teaching methods can be used to teach OM
- There is some controversy about OM teaching; it needs to be more than a collection of tools and techniques—students should be presented with a subject that is interesting, relevant and which is clearly of strategic importance to all future managers.

### RESEARCH METHOD

The research project was comparatively simple—it largely collected descriptive data—and so the methodology itself was uncomplicated.

- 1) In May 1996 respondents were sent a request by post for an outline of their OM core course. The letter explained the aims of the project and promised respondents a copy of the results.



- 2) Follow-up telephone calls were made two weeks later to “remind” respondents to send details of their courses and further explain the project.
- 3) Core course outlines were reviewed and relevant details entered on the questionnaire.
- 4) Telephone interviews were made with respondents to collect more details and ask their opinions on future trends. The telephone interviews were made in June-August 1996. The questions were kept fairly simple but the interviews still took on average 25 minutes.

### **Questionnaire Development**

The questionnaire was developed from the review of the literature, which showed a rich variety of issues in OM teaching. It was obvious that not every issue could or should be investigated in a survey of European teaching. Therefore, to focus on some of the key areas of interest, informal discussions were held with six OM lecturers from three schools. These talks showed that the main areas of interest were course content, teaching methods, assessment methods, integration with other subjects and views on trends.

### **Sample**

The goal was to determine how the OM core course is taught at ten of Europe’s leading schools. The sample was chosen from the Association of MBAs “Guide to Business Schools 1995/96” listing of recognized schools [AMBA, 1996]. The choice of schools was not random; instead, a purposive sample was selected according to two criteria. Firstly, rather than selecting a large number of UK schools (34 from the 47 in the AMBA list are UK schools), a number of schools in continental Europe were chosen. Secondly, there was a bias towards the schools which are “particularly well-known” and which normally receive very high ratings for their courses from the popular press. (Obviously some of the less well-known schools might be particularly innovative in OM teaching—this was not investigated.)

To allow for possible non-response, it was decided to contact twelve schools. In the event, this caution proved appropriate as two schools are currently re-designing their core courses and (understandably) declined to share information about unfinished and untried designs. In addition, although they had agreed to participate, one school failed to send details of their course, despite numerous reminders. Since details of the OM core course at the author’s school were easily available, these raised the total number of courses covered to ten.

## **RESULTS**

### **Overview of Courses**

Table I<sup>1</sup> shows an overview of the OM courses at the ten schools. The first thing to note is that the duration and structure of the MBA courses themselves vary—most are one year courses but SDA Bocconi and London Business School are longer; 16 and 21 months respectively. The second thing to note is that only eight schools have a compulsory OM “core” course as such. Ashridge’s MBA is based on a modular structure (rather than core and elective subjects) but the OM course is compulsory. At Lancaster the introductory OM course is not compulsory, although the elective is chosen by approximately 50% of students.

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<sup>1</sup> Note: Table I is at the end of this working paper.

The time allocated to courses varies enormously, from 18 hours (Groupe ESC Lyon) to 76 hours (Bocconi). Partly, this can be accounted for by the different length of the MBA courses at these schools (12 and 16 months respectively). However, the main explanation is that Groupe ESC Lyon has a background in commerce and so operations has not traditionally been the main focus. Bocconi, on the other hand, has strong contacts with the manufacturing sector and consequently allocates a significant amount of time to operations. The average time allocated to OM core teaching across the sample is 34 hours.

For reference, all the course objectives from the schools are given in Table I. As might be expected, the objectives are by and large equivalent; core courses try to show the important role that operations can play in business management, plus cover some of the key concepts, tools and techniques.

The focus of OM teaching varies and so an attempt was made to measure this semi-quantitatively. Course details were reviewed with the teachers, who were asked to give percentage estimates of the balance of emphasis between, for example, manufacturing and service. Table I shows that much more emphasis is placed on manufacturing as opposed to service operations in many courses—on average 66.5% of course content focuses on manufacturing (with a range from 50 to 90%). For instance, Bocconi, with its contacts to manufacturing focuses 90% of the time on production (but is rapidly introducing more focus on service), whereas LBS has an approximately equal mix of service and manufacturing. Most teachers said they aimed to place a higher emphasis on service operations in the future, in some cases talking about the need for equal emphasis, in terms of examples, cases used, etc. Several stated that their present courses were “still too manufacturing based” and one of the reasons for this, mentioned by respondents, is the shortage of case studies based on service operations which illustrate operations concepts effectively.

The mix of strategic and tactical issues is, on average, 30% for strategic issues and 70% on tactical tools and techniques (with a range from 15 to 50%). Since one of the goals of every course is to show the strategic importance of operations, it could be questioned why certain courses place less emphasis on the strategic value of OM. However, when the length of the courses is taken into consideration, the amount of time allocated to strategic issues averages 9 hours—which should, arguably, be enough time to get the key messages across.

The textbook used will have an influence on course content. Six schools use either a single or two recommended textbooks (three schools use the recently published Slack, et al, 1995). Four schools have decided not to recommend textbooks and instead use readings from several books or journal articles (Harvard Business Review articles are commonly used). Appendix 1 gives full details of the textbooks used.

### **Teaching Methods**

The teaching methods used on different courses are similar. All schools use lectures, videos and case studies in their teaching. The case studies come from a range of sources. There is a heavy reliance on Harvard Business School cases at some schools but every school uses at least one case study which they have developed themselves. LBS, Warwick and IMD, all of whom have published a large number of cases, use much of their own material.

In addition to lectures, videos and case studies, nine schools use games or simulations to illustrate particular points. Some of these games have been published,

such as the “Sampson Tiles Game” on forecasting used by Bocconi and Cranfield [Leenders, 1973] and LBS’s “Discovery Electronics” [Nicholson, 1996b]]. Several schools use simple games that they developed themselves but not published; EAP Paris have a Just-in-Time game for instance. One respondent saw that games and simulations would be used more often in the future, as there is “a move towards action-oriented learning activities and away from lectures” at his school.

OM teachers reported that a large number of their students do not have manufacturing experience. For this reason, eight schools organize at least one factory visit. Three schools use guest speakers to add a “first-hand, up to date” view of OM (many of the other schools use the factory visit for this purpose).

Probably the most innovative approach to teaching—only used by IMD—is to formally have students with an OM background present operations concepts and discuss their own experiences at suitable points in the course. This requires significant preparation, with the teacher reviewing students’ c.v.s to determine which student(s) can best contribute on which topic(s). IMD are positive about the results saying that, “in fact, the comparison of experiences of different participants about the same issues is the richest learning environmental in operations” (excerpt from the IMD course outline). Although a number of other schools including Groupe ESC Lyon do encourage students to share their experience of managing operations, only IMD emphasize it to the extent that it can account for 40% of students’ marks.

### Assessments

How are students on OM courses assessed? All schools use at least two different types of assessment including:

- Examinations
- Written case assessments
- Project work
- Class participation

Examinations are used at every school and, on average 58% of the total OM marks are allocated to examinations (with a range 30 to 80%). Written assignments account for a significant amount of the marks on most courses. The types of assignment include case assessments (performed as either individual or group work); short projects, such as analyzing an operation and making recommendations for improvements (used by Warwick, LBS and Cranfield); and applying techniques and concepts to the participant’s own organization (Ashridge). Class participation is assessed at only three schools (Bocconi, IMD and INSEAD) with the range of marks allocated to this varying from 10 to 70% of marks. Another assessment method is to have participants with an operations background presenting their experiences (used by IMD, as explained earlier).

On a more general note, some OM teachers said that they thought it is very difficult to realistically assess students’ performance in OM, as it is such an applied subject.

### Course Content

Detailed course descriptions were collected from each school—far more information than could be presented here. With these descriptions (which included the case studies used, the time allocated to the topic, etc), it was possible to categorize the sessions of each of the courses into topics, even though the individual sessions in the various courses might have had different titles. This allowed a check to be made on whether

there is a wide variation in the topics taught at different schools. Table II shows the results; across all OM courses 14 major topics were identified, such as the role of OM, Total Quality Management (TQM), operations strategy, etc.

**Table II: Course Content on Ten European “Core” MBA Courses.**

	Topic <sup>1</sup>	Details / Examples	Number of schools
1.	The Role of Operations Management	Introduction to the subject, the role of operations in services and manufacturing. Role of operations managers	10
2.	Total Quality Management (TQM)	Philosophy of TQM, quality tools, etc.	10
3.	Analyzing operations	Process design, process flow and volume/variety etc.	8
4.	Supply Chain Management	Make or buy decisions, buyer / supplier relationships	8
5.	Inventory Management	Types of inventory, control, Just-in-Time (JIT)	8
6.	Operations Strategy	How operations is essential in both influencing and implementing business strategy	7
7.	Capacity Management	Capacity: concept and strategies, bottleneck management, etc.	7
8.	Planning and Control	Types of demand, forecasting demand, etc.	6
9.	Business Process Re-engineering	Process analysis, measurement metrics, process redesign	4
10.	New Product / Process Development	Time-to-market, simultaneous engineering, Quality Function Deployment	3
11.	Project Management	Techniques	2
12.	Issues for International Operations	Facility location, aspects of international manufacturing and service operations.	2
13.	Time-Based Competition	Time as a competitive element, time issues in manufacturing and service operations. Estimating production costs, financial auditing of operations.	2
14.	Cost elements	Estimating production costs, financial auditing of operations.	2

Notes: 1 The topics in actual courses often had different titles but have been grouped into categories

2 Topics are only shown that are taught at least two schools

Table II shows the number of schools that teach the various topics on their courses and it can be seen that there is relatively close agreement between the courses. The first seven topics are taught by at least 70% of the ten schools surveyed. This contrasts strongly with the US, where there is much variation in the topics taught [Bahl, 1989]. Every European school includes an introduction to OM and quality management in its OM course; analyzing operations, inventory management and supply chain management are taught at eight schools. Surprisingly, considering the discussion in the literature about raising the perceived importance of OM as a strategically key subject, not every school has a separate session focusing on OM strategy—only seven do—although the other schools say they raise strategic aspects in many sessions.

Some topics are only taught at a few schools. For instance, new product development is only taught on three courses, whilst at other schools, it is often covered

in an elective. Only two schools cover the international aspects of operations in separate sessions. Time-based competition is taught in separate sessions at two schools, although arguably it is a form of Business Process Re-Engineering, which is covered on the OM course at four other schools. Project management techniques are discussed at two schools; in most other schools it is a separate course. Only two schools have a separate session on the cost elements of OM.

### **Integrating Operations Management**

Business schools need to “break down the barriers between academic disciplines that prevent many MBA graduates from understanding say, the link between manufacturing and marketing” [Anonymous, 1992]. This is a difficult task and one respondent saw it as the key challenge facing OM teachers.

Another teacher commenting on integration said, “That’s difficult, we don’t do it very well to be honest. With a very international faculty flying in and out, it is somewhat random but we do try and talk [across the disciplines]”. Another, commenting on how they approached integration said; “Not very well although, for instance, we know what marketing are doing in parallel. We will be working on more cross-functional approaches”.

Some schools try to solve the integration problem in an informal way. For instance by having students give short presentations about experiences which raise relevant cross-functional issues, or OM teachers discussing points from other disciplines in their sessions: “I address related subjects like marketing and finance [in the OM core course]”. At other schools, more formal solutions to the issue of integration come from MBA course structure themselves. For instance:

- One school already uses a significant amount of cross-functional team-teaching—in addition to the core OM course where cases are taught from an operations perspective, students have approximately 30% more cases where cross-functional team-teaching brings out a range of issues.
- Another school has an ambitious project to change its curriculum, so that half of the teaching will be fully integrative, with 2-3 teachers co-teaching complex cases. Suitable cases are currently being prepared by teams of cross-functional teachers.
- Several schools have cross-functional electives.
- Most schools stress that MBA projects should be approached in a cross-functional way.

Since integration seems to be an issue that most schools are working on, it could offer an opportunity for OM teachers to demonstrate the importance of their subject and the relevance of the tools and techniques. It is, in the author’s opinion, an opportunity to be grasped by, for example, OM teachers taking a leading role in developing suitable “cross-functional cases”.

### **Challenges in OM Teaching**

The respondents, all of whom regularly teach core courses, were asked their opinion on the challenges in OM teaching. The issues they raised can be grouped into three broad categories: concern at how best to demonstrate the importance of OM; difficulties with defining the scope of courses (and the subject itself) and; the complexity of teaching an inherently applied, constantly changing subject.

How can the broad relevance of OM be demonstrated and students convinced of its importance? Several respondents commented on the difficulties of this. One said, “I think the biggest challenge is to grow our subject area and the key is relevance.”

Teaching has to be highly relevant...” and continued to say that, in addition, OM teachers must “teach the magic of the area”. Another said “The biggest challenge is to be in touch with reality and know what it is relevant to teach (to managers who have come from industry and know what is important)”. The diverse audience is a problem mentioned by one school but probably shared by many others: “I think the biggest challenge is still the range of backgrounds of our students—from musicians to engineers, to lawyers—which makes it difficult not to lose their interest. Looking to the future, since students are increasingly convinced that operations is important, I think the tables are turning in our favour”. Some respondents said that the strategic side of OM must be strongly emphasized if students are to be convinced.

However, how much strategy should be covered in an OM course? It is difficult “trying to balance the strategic and the quantitative”. One respondent indicated that caution is advised in moving towards teaching more strategy saying “the big debate for us on the core programme is how much more strategy to introduce. I see a danger if all the tools and techniques are abandoned ... [the core course needs] a rich mixture of both strategic discussions and tools and techniques”. Another respondent thought that “the big issue is to help people understand the need to challenge accepted ways of doing things” and recognize that OM tools and techniques are useful in many situations.

If OM teaching is to effectively convince students—who will rapidly be returning to management positions—of the importance of the subject, then it is a major concern that some respondents identified problems with the subject area itself. Is OM a well-defined subject? Probably not, if experienced teachers make comments like, “I still think the biggest challenge is definition; I am far from satisfied that we actually know what operations is. The challenge is to define our subject from [the current] rat-bag of tools”. Another said it was a challenge “trying to give structure to a course consisting of lots of diverse tools and techniques.” So probably the fundamental challenge for OM teachers is to develop a clearer structure for the subject.

Teaching an applied subject like operations management, in a changing world is not easy. All respondents said their courses required constant revision to include the latest ideas: “we think that the challenges are covering supply chain integration; the virtual organisation; time-based competition and; out-sourcing but still covering JIT, TQM and other topics well”. One respondent said the biggest challenge was “keeping up with the changes in technology: scurrying around trying to keep up is the biggest frustration, as it takes some much time”.

## **DISCUSSIONS**

The results of the survey show strong agreement between schools on course contents but large variations in the emphasis given to manufacturing or service operations and variations in the strategic or tactical emphasis. Teachers at most of the schools recognized the need to introduce a greater emphasis on service operations, particularly as many students will not be working in manufacturing industry. However, is this enough? Perhaps, OM teachers “still seem to consider POM as the key user of these concepts and skills” [Gunawardane, 1991], whereas they need to demonstrate a wider relevance for the tools and techniques. As schools revise their MBA programmes and, in particular introduce integration, OM teachers must be active in promoting their subject and developing both more service and cross-functional cases.

Operations management is an applied subject and so to teach it effectively requires a good knowledge of current practice—therefore several areas for further

research were identified. For example, it would be very useful to identify which tools and concepts of OM are most useful to operations managers, working in both manufacturing and service industries. The effectiveness of OM teaching can only benefit from investigations of this kind. And, to be blunt, this type of research would probably contribute more to the knowledge of the subject than some of today's OM research, focusing on (too) theoretical models of manufacturing strategy.

Although the research described in this paper was a fairly simple exercise, the author hopes that the results will act as a catalyst for wider discussions on European OM teaching. Some fundamental questions were raised by OM teachers—about the definition of the subject and its relevance—and these urgently need to be addressed if the standing of OM is to be enhanced. When will we, OM teachers, commence this important task?

### **ACKNOWLEDGEMENTS**

The author would like to thank the teachers of operations management who responded to the survey: Stuart Chambers, Carlos Cordon, Alberto Grando, Terry Hill, Nick Middle, Anthony Mitchell, Mike Pidd, John Smith, Luk Van Wassenhove, Derek Waller and Enver Yucasan.

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The textbooks used on OM courses and referred to in Table I are:

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**Table I: Overview of the OM “Core Courses” Reviewed<sup>1</sup>**

#	School / Location / Type of MBA Course <sup>2</sup>	Set Course ?	Sessions / Duration	Course Objectives	Focus of Course <sup>3</sup> (approx.) / Main text <sup>4</sup>	Teaching Methods <sup>5</sup>	Assessment Method(s)	
1.	Ashridge Management College, UK / One year “Modular” MBA	Yes	12 sessions Total 51 hours	1. To understand the key issues in effective OM; 2. Develop an ability to analyse service /manufacturing operations; 3. To review the different approaches to planning and controlling of service /manufacturing operations; 4. Understand the contribution, philosophy and approaches to TQM implementation; 5. An awareness of how to implement new products, processes or technology	60% manufacturing 40% service  35% strategy 65% tactical issues  Text: various readings	• Lectures, cases & videos ----- • Factory visit • Games / simulations	Examination 33%; 2 written assignments, each 33% (applying selected frameworks to the participant’s organization; practice of problem solving techniques)	1
2.	SDA Bocconi, Milan, Italy / 16 month full-time MBA	Yes	38 sessions Total 76 hours	1. To investigate the role of OM in different manufacturing processes; 2. To provide tools for an integrated performance measurement system; 3. To develop an ability to analyze and solve typical OM problems: logistics, quality, production planning, stock control, purchasing, etc.	90% manufacturing 10% service  20% strategy 80% tactical issues  Text: Vollman [1998], Grando [1995]	• Lectures, cases & videos ----- • Factory visits • Games / simulations • Guest speakers	Examination 80%; Written case assess 10% Class participation 10%	2
3.	Cranfield School of Management, UK / One year full-time MBA	Yes	25 sessions of 1 hour Total 25 hours	1. To provide an understanding of the operations management task and the trade-offs involved 2. To develop skills in analyzing and improving product and service delivery systems 3. To develop an understanding of the impact of other functional areas on operations management	60% manufacturing 40% service  30% strategy 70% tactical issues  Text: Slack et al [1995]	• Lectures, cases & videos ----- • Guest speakers • Games / simulations	Examination 50%; Written (group) case assess 25%; Short project analyzing a service operation 25%	3
4.	EAP—Ecole Européenne des Affaires, Paris, France / One year full-time MBA	Yes	12 sessions of 3 hours Total 36 hours	1. To investigate and analyse the role of OM in an international context 2. To widen participants’ appreciation of the criteria of measuring operational performance 3. To expose participants to a range of international operational issues, problems and a	60-70% manufacturing <sup>6</sup> 40-30% service  20% strategy 80% tactical issues	• Lectures, cases & videos ----- • Factory visits • Games / simulations	Examination 70%; Assessment of cases and participation 30%	4

				number of current concepts and techniques	Text: Slack et al [1995]			
5.	IMD—International Institute for Management Development, Lausanne, Switzerland / One year full-time MBA	Yes	17 sessions of 1.3 hours Total 22 hours	1. To introduce the most important concepts of OM 2. To provide a general management perspective of those issues that a general manager is going to require to deal with	70% manufacturing 30% service  50% strategy 50% tactical issues  Text: various readings	• Lectures, cases & videos ----- • Games / simulations • Selected participants present <sup>7</sup>	Examination 30%; Class participation 30-70% <sup>7</sup> ; Selected participants' presentations 40%	5
6.	INSEAD—European Institute of Business Administration, Fontainbleau, France / One year full-time MBA	Yes	16 sessions of 1½ hours Total 24 hours	1. To improve understanding of operational problems and their strategic importance 2. To provide participants with some analytical tools (which can also be applied to problems outside operations)	80% manufacturing 20% service  30% strategic 70% tactical  Text: various readings	• Lectures, cases & videos ----- • Factory visits • Games / simulations	Examination 80%; Class participation 10%; Short written assessment of cases 10%	6
7.	Lancaster University—The Management School, UK / One year full-time MBA	No: elective course	9 sessions of 4 hours. Total 36 hours	1. To provide a general overview of the main ideas of contemporary OM as applied to both the service and manufacturing sectors 2. To provide a basis for further study and the MBA project work	65% manufacturing 35% service  35% strategy 65% tactical issues  Text: Schonberger & Knoll [1994]	• Lectures, cases & videos ----- • Factory visit • Guest speakers • Games / simulations	Examination 50%; Course work 50% (mainly case assessments)	7
8.	London Business School, London UK / 21 month full-time MBA	Yes	10 sessions Total 30 hours	To understand: 1. The scope and significance of OM in varied manufacturing and service contexts 2. How OM contributes to the way a firm competes in the market place and achieves commercial results 3. How to analyse an operation and improve its effectiveness 4. The role of certain techniques and approaches in operations, and the managerial issues	50% manufacturing 50% service  40% strategy 60% tactical issues  Text: various readings	• Lectures, cases & videos ----- • Factory visit • Guest speakers • Games / simulations	Examination 50%; Group project 30%; Group case assessments 20%	8

				surrounding them				
9.	Groupe ESC Lyon, France / One year full-time MBA	Yes	12 sessions of 1½ hours Total 18 hours	1. To illustrate the key elements in the OM environment 2. How elements must be considered as an integrated system 3. Operations impact on the strategy of the firm	70% manufacturing 30% service  15% strategy 85% tactical issues  Text: Render and Heizer [1994]	• Lectures, cases & videos ----- • Factory visits • Games / simulations	Examination 80%; Case assessment (written/aural) 20%	9
10.	Warwick Business School, Coventry UK / One year full-time MBA	Yes	10 sessions Total 28 hours	1. To enable you to appreciate the important strategic role of operations in today's manufacturing and service enterprises; 2. To help you understand and manage the critical interfaces between operations and other business functions; 3. To give you an understanding of, and limited analytical skills in using operations management tools and concepts; 4. To show you how some of these ideas could be applied in almost any function in businesses and not-for-profit organizations.	55% manufacturing 45% service  30% strategy 70% tactical issues  Text: Slack et al [1995]	• Lectures, cases & videos ----- • Factory visits • Games / simulations	Examination 60%; Group projects 40%	10
			Average= 34 hours					

Notes:

- 1 Some MBA courses are not designed as core and elective courses and so the term "core course" is used loosely.
- 2 Most schools offer one than one MBA programme and so the specific course surveyed is indicated. Some differences may exist in the OM courses taught on other MBA programmes at the same school.
- 3 The focus of the course between manufacturing and service, strategic and tactical issues are approximate percentages derived from reviewing course outlines and discussions with respondents.
- 4 Full references to the textbooks are given in Appendix A.
- 5 Note: all schools use lectures, cases and videos in their teaching. Supplementary methods are also shown.
- 6 EAP adjust the balance between manufacturing and service according to the interests of each class.
- 7 Selected IMD students with relevant OM experience present to classes and are assessed on this (40%). Students without OM experience are assessed more heavily on their class participation.

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