

**PRODUCTION AND OPERATIONS MANAGEMENT
CORE COURSE TEACHING AT THE TOP
20 MBA PROGRAMMES IN THE USA**

by

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PRODUCTION AND OPERATIONS MANAGEMENT CORE COURSE
TEACHING AT THE TOP 20 MBA PROGRAMMES IN THE USA

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Abstract

This paper deals with core course teaching in Production and Operations Management (POM) at the Top 20 Business Schools in the USA (as ranked by *Business Week* in 1996). We concentrate on course content (course objectives, split between strategy and tactics, manufacturing and services, and attention paid to new topic areas) as well as on course delivery (lectures, case studies, factory visits, videos, guest speakers, games and simulations, and other technologies used in teaching POM). Whereas at the end of the 1980s some US authors argued that POM teaching suffered from a positioning problem, our results indicate that there now appears to be more agreement on what constitutes POM. We also compare our results with the situation in Europe and show that there are many similarities but also some striking differences.

1. Introduction

This paper deals with core Production and Operations Management (POM) courses in top US business schools. Apparently, POM teaching is of current interest. For instance, the Production and Operations Management Society (POMS) recently devoted a two day conference to the subject³. A recent literature review is given by Goffin (1996) in his paper on POM teaching in *European* MBA programmes. An analysis of this, and other literature, reveals that there is quite a lot of diversity:

- some papers deal with teaching POM at the undergraduate level, e.g., Hahn et al. (1984), Hillman and Bass (1989), Levenburg (1996), and Raiszadeh and Etkin (1989)
- some papers describe the situation at the end of the 1980's (or even earlier), e.g., Bahl (1989), Bregman and Flores (1990), Wood and Britney (1990)
- some papers are relevant for MBA teaching but focus on one subject (e.g., Quality (Kaplan, 1991)) or one specific delivery method, (e.g., Tunc and Gupta (1995)).

Only a few papers deal explicitly with the course content of core POM-MBA courses. As Goffin (1996) observes:

'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

³ *Conference on teaching POM: visions, topics and pedagogies*. POMS and the Krannert Graduate School of Management, Purdue University, April 1-2, 1996.

courses have been published. (A description of a European core MBA course and an MBA elective are, however, given in Armistead et al. [1986]).’

Goffin’s paper investigates course contents in 10 European business schools⁴. The current paper, however, addresses POM core course teaching at *US* business schools. We decided to concentrate on the top 20 business schools as ranked by *Business Week* in October 1996. This ranking is given in Table 1.

In May 1997, POM professors of these 20 schools were asked to provide us with a detailed course outline (*syllabus*) of their core POM course in the regular 1996-1997 MBA program⁵. After some reminders, we managed to obtain materials from all 20 schools. In some cases, additional, explanatory information was requested by E-mail. In a few cases we failed to secure *all the particular details* of a course. In other cases, however, all information could be simply downloaded from the Internet Web.

Our ‘methodology’ of examining syllabi has potential weaknesses. Syllabi obviously do not perfectly reflect classroom reality. Some element may actually be present in the course but not mentioned as such in the syllabus. For instance, some schools explicitly schedule guest speakers in their course outlines; others may have more or less ‘impromptu’ guest speaker sessions depending on whether or not the targeted practitioner happens to be available at the right time. Similarly, the use of videos in the classroom is not always reflected in the course syllabus. Besides, the syllabi

⁴ These schools have been listed in Appendix 1.

⁵ We also sent the POM professors a questionnaire. The results will be published in a separate paper.

sometimes required (subjective) interpretation. Take, for instance, the balance between 'manufacturing' and 'services' in a course. We took great care to determine the relative amount of classroom time devoted to services as opposed to manufacturing but the distinctions are not always clearcut. In addition, it is of course possible that service aspects are discussed in seemingly manufacturing sessions (e.g., in order to emphasize the differences). However, notwithstanding the obvious potential weaknesses to our approach, it must be noted that the information in the course outlines is by and large representative and perhaps more reliable than information obtained by conducting interviews.

Since Goffin has recently reported on the situation in Europe, we decided to follow his approach in order to make a comparison with the USA meaningful. This implies that attention is given to the course contents (course descriptions, strategic/tactical emphasis, manufacturing/service emphasis, existing and new topics/areas to be discovered) and teaching pedagogies (lectures and case studies, factory visits, videos, guest speakers (practitioners), games and simulations, and other technologies in teaching POM). Goffin also collected the views of POM professors through telephone interviews. We will not deal with opinions in this paper.

It must be emphasized that the objective of this paper is not to assess who offers 'the best' core course in POM (though it would perhaps be wise to do so before journalists do it for us...). On the contrary, we are interested in the differences between the USA and Europe as well as in the differences between the US schools. Furthermore, we wish to compare our results with findings from the end of the 1980s. By doing so, it becomes possible to observe the progress made on questions

like the definition of POM, the use of new delivery methods, problems of focus, and related matters.

2. Overview of courses

From each course outline, the following information was derived:

- duration
- course objectives
- focus of the course
- textbooks.

Duration

A large variance can be observed in the US courses. The Virginia course has 40 sessions, followed by Harvard (36 sessions), UNC (31 sessions) and NYU and Texas (both 28 sessions). A relative small number of sessions was found at Chicago and Washington (both 11 sessions), Duke (12 sessions), Michigan (13 sessions) and Carnegie Mellon (14 sessions). On the average, a US POM core course consists of 21,4 sessions⁶. See Table 1 for a complete picture. The figures in this table should be interpreted carefully. They can only serve as an illustration of the variance of time allocation to POM courses and not as a measure of 'how heavy' the POM course is. This stems from the fact that session duration differs (within the courses and between courses). Furthermore, some schools combine POM courses with other courses in their curriculum in order to achieve some integration. At Harvard, for instance, the module *New Product Development* includes 6 joint sessions with the

⁶ We use the word 'session' because most schools do. However, some schools have 'classes' or 'lectures'.

First-Year Marketing Course. At Michigan, the 13 sessions are followed by a multidisciplinary project ('MAP') that combines Operations Management, Organizational Behaviour, Management Accounting and Information Systems. Still, the variance in time allocation can be considered to be large. This is also the case in Europe: the time allocated to European courses varies from 9 to 38 sessions, according to Goffin (1996).

At two schools, the POM core course is divided into two 'mini courses': Pennsylvania has 12 sessions on *Operations Management: Quality and Productivity* and 12 sessions on *Operations Management: Strategy and Technology*. At Washington, there is a 5 sessions course on *Operations Policy and Strategy* and a 6 sessions course on *Operations Analysis*.

Course objectives

Goffin (1996) found that the objectives of the European courses were 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.'

Our findings indicate that there is no real difference between Europe and the USA. It is, however, interesting to see that some course outlines do not contain explicitly formulated objectives whereas other outlines elaborate extensively on them. Take, for instance, UNC (Kenan-Flagler):

'At the end of the term, each student should be able to:

1. Describe the pervasiveness of operations and recognize key operations activities in his or her function, regardless of the organization within which it is found.

2. Perform the basic analysis required to understand the operations process, explain how it works, and perform the necessary calculations to determine capacities at the various stages of the process.
3. Map out and determine whether a process is appropriate to the needs of the organization and recommend steps or policies for implementation and improvement.
4. Assess the strategic role of operations for competitive advantage and the appropriate measures by which performance is gauged.
5. Assist in implementing a customer oriented approach to running the firm by understanding total quality management principles, establishing teams for improving operations, setting appropriate strategic directions for operations and recommending systems for controlling operations.'

Similar comprehensive course (or learning) objectives were found in the syllabi from Pennsylvania, Michigan, Kellogg, Harvard, Virginia, Columbia, Dartmouth, Duke, UCLA, California, Indiana, Carnegie Mellon, and Texas.

Focus of the course

We deal with two important issues here. First, the balance between manufacturing and services and second, the split between strategic and tactical/operational topics.

Goffin (1996) found that in many European courses much more emphasis is placed on manufacturing than on service operations. (Course details were reviewed with the teachers who were asked to give percentage estimates.) To be precise: on average 66.5% of course content focuses on manufacturing with a range from 50 to 90 %.

Instead of asking the teachers, we examined the course outlines in detail to determine how much time is actually devoted to services. Using this methodology, we found that the top 20 US business schools place less emphasis on services than top European schools. On average 89.25% of time is devoted to manufacturing, with a range from 75% to 100%. The differences may, of course, be caused by the

different methodology we used. Still, in connection with this, Goffin (1996) made the following observation:

'Most teachers say 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 the respondents, is the shortage of case studies based on service operations which illustrate operations concepts effectively.'

It may be concluded from the above statement that a majority of European POM teachers is at least not happy with the current balance between manufacturing and services in their courses. In our opinion, Goffin's methodology, asking teachers to estimate the balance, may have caused '*socially desirable responses*'. I.e., since it has been argued in the literature that more weight should be given to services, some teachers may have felt the need to slightly overestimate the attention they actually pay to services in their courses when interviewed on the matter. Therefore, the actual differences between Europe and the USA may be somewhat smaller than we found. However, irrespective of the precise percentages of attention paid to services in Europe and the US, it is fair to say that the numbers are frighteningly low. The only US schools where the syllabi clearly indicate that more than 15% of the time is spent on discussing service questions are Michigan, Columbia, MIT, UCLA, NYU, UNC, and Texas. Even their percentages do not, in any way, reflect the realities of the business world and the importance of services in our modern economies. We can only conclude that immediate action appears to be called for.

The second important focus issue is the balance between strategic and tactical/operational topics. Traditionally, POM courses were heavily biased towards the use of tools and techniques. Since the beginning of the 1990s, it has been argued that the strategic importance of POM should be underlined (Ducharme (1991), Willis and Bass (1991), Bregman and Flores (1991)). Hill (1996) recommends that 40% of graduate sessions should be allocated to strategy. In most US course objectives, the importance of (manufacturing) strategy is stressed. This is also the case in Europe. Goffin (1996) found, on average, 30% of time devoted to strategic issues and 70% to tactical tools and techniques, with a range from 15% to 50%. Again, Goffin obtained his data by asking the teachers whereas we examined the detailed course outlines. We found that, on average 12.25% of time is devoted to strategy, with a range from 0% to 25%. It goes without saying that the same problem of socially desirable responses may be present here. Nevertheless, it appears safe to conclude that US schools pay very little explicit attention to strategic issues (12.25%), while European schools (30%) seem to have moved further away from the classical tactical/operational and tools/techniques based POM core. Schools spending at least 15% of time on strategy are Pennsylvania, Harvard, Virginia, Dartmouth, Duke, UCLA, Indiana, and UNC. No school, however, meets the 40% time allocation recommended by Hill. Granted, this percentage may appear to be arbitrary, but lack of attention for the strategic issues in Operations invites other disciplines (Marketing, Organizational Behavior, Strategy, Accounting) to fill the gap. This bears the risk of marginalisation of Operations as a subject in business schools (a phenomenon known all-too-well by MS/OR).

Our findings are summarized in Table 1. In this Table, the ranking of the business schools is given (*Business Week*, October 1996) together with the number of sessions and the focus of the course (services and strategy). Schools that spend 15% or more of time on services or strategy are highlighted. Again, we want to emphasize that these figures are based on (partially subjective) interpretations of detailed course outlines and they should be viewed in that way. This is also why we preferred not to put percentages in the Table.

Textbooks

In the USA, 30% of the top schools do not use a textbook but rather prefer to rely solely on a *course pack* (various readings). By far the most popular book is *The Goal* by Goldratt and Cox (1992) which is used by 40% of the schools. *Plant and Service Tours in Operations Management* by Schmenner (1994) is used at 15% of the schools and *The Memory Jogger* (1995) by Goal/QPC at 10%. Of course, none of these books are traditional textbooks but rather try to give students a better feel for the realities of operations. The other books mentioned in the course outlines were used at only one school. Six schools recommend books for further (optional) reading. Three books were mentioned more than once: *The Goal* (2 schools), *Plant and Service Tours in Operations Management* (2 schools), and *Production and Operations Management: Manufacturing and Services* by Chase and Aquilano (1995) (2 schools).

| 1996 rank | Name of the school (as in <i>Business Week</i>) | Duration (# sessions) | Focus on service | Focus on strategy |
|-----------|---|--------------------------|---------------------|----------------------|
| 1 | Pennsylvania (Wharton) Philadelphia | 24 | | X |
| 2 | Michigan Ann Arbor | 13 | X | |
| 3 | Northwestern (Kellogg) Evanston | 19 | | |
| 4 | Harvard Boston | 36 | | X |
| 5 | Virginia (Darden) Charlottesville | 40 | | X |
| 6 | Columbia New York | 24 | X | |
| 7 | Stanford Stanford | 19 | | |
| 8 | Chicago Chicago | 11 | | |
| 9 | MIT (Sloan) Cambridge | 17 | X | |
| 10 | Dartmouth (Tuck) Hanover | 22 | | X |
| 11 | Duke (Fuqua) Durham | 12 | | X |
| 12 | UCLA (Anderson) Los Angeles | 22 | X | X |
| 13 | California (Haas) Berkeley | 16 | | |
| 14 | NYU (Stern) New York | 28 | X | |
| 15 | Indiana Bloomington | 15 | | X |
| 16 | Washington U (Olin) St. Louis | 11 | | |
| 17 | Carnegie Mellon Pittsburgh | 14 | | |
| 18 | Cornell (Johnson) Ithaca | 26 | | |
| 19 | UNC (Kenan-Flagler) Chapell Hill | 31 | X | X |
| 20 | Texas Austin | 28 | X | |

Table 1. Top 20 Business Schools in the USA (ranked by *Business Week*, October 1996). *Focus*: schools are highlighted (by X) if they spend 15% or more of time on services or strategy)

Goffin (1996) found that in Europe 40% of the schools preferred to use a course pack. The other schools used one or two textbooks. *The Goal* was used at 40% of

the schools and *Operations Management* by Slack *et al.* (1995) was used at 30% of the schools. All other books were used at only one school.

It is really peculiar to note that *none* of the traditional textbooks used in Europe are used in the US, even though 30 % of the European schools use an US textbook. We were even more surprised by the huge popularity of *The Goal* in the US as well as in Europe (40% use it). Irrespective of the quality of *The Goal*, it should be noted that the book is rather old (the 1992 edition is a revision of the original from 1984).

Looking at the above findings, we may conclude the following. The variance of total time allocation is large in European courses and our findings strongly indicate that this is also the case in the USA. With respect to the course objectives, we found no indications that great differences exist between the US schools. Furthermore, we found that course objectives were for the greater part in line with the ones at the European schools. As to focus, we found that US and European POM core courses are still too much oriented towards manufacturing (instead of services) and the bulk of time is still devoted to tactical and operational problems as opposed to strategic issues. Although we cannot be sure because of differences in methodologies used, our results at least strongly indicate that these focus issues are more severe in the USA. In terms of textbooks, we found that the US preferences are completely different from the European tastes. Furthermore, the popularity of *The Goal* on both continents is quite amazing.

3. Course contents

By the end of the 1980s, some authors argued that POM had become an ill-defined discipline and that many courses were confusing because of poor positioning. The question was: what (new) topics are typically POM? Examples of topics that could fit under many disciplines are Total Quality Management, Continual Improvement, Time Based Competition, etc. Evidently, this positioning problem does not only apply to the core POM course in a regular MBA program, but is also relevant to undergraduate or elective courses. Raiszadeh and Ertkin (1989) observed much variation in the topics taught at US Business schools (undergraduate level). Looking at OM curricula in general, Bregman and Flores observed that 'the scope of the OM curriculum continues to grow by leaps and bounds' (Bregman and Flores (1989, p. 50). Similar remarks were made by Bahl (1989) who includes an analysis of the elective courses. Goffin (1996) also addresses this positioning problem. Analyzing detailed course descriptions enabled him to classify course sessions into topics and to identify differences between schools. Ignoring items taught at only one school, Goffin defined fourteen topics. These topics (with examples or details) are presented in Table 2.

Considering the situation in Europe, Goffin (1996) makes the following observation:

'Table 2 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.'

Our results show that the situation in the USA is quite similar to Europe. Apart from Supply Chain Management (65%), the first seven topics in Table 2 are also covered by at least 70% of the US schools. Our results therefore do not support the second part of Goffin's observation. Goffin based his statement on research done at the end of the 1980s. There is evidence that things have changed over the last 10 years. There is now 'relatively close agreement' on the important topics in the USA as well.

Though by looking at Table 2 the similarities between the US and Europe become obvious, it is also interesting to highlight differences of 10% or more. In the USA, the following topics are more popular:

- Analyzing Operations
- Inventory Management
- Business Process Redesign
- Project Management.

The following topics are more popular in Europe:

- Total Quality Management
- Supply Chain Management
- Planning and Control
- Costs Elements.

Admittedly, the differences are small but we feel that there is some pattern underlying them. Operations is not only a function, it is also embedded in an organization and in a competitive environment. It seems that US courses focus more narrowly on the operations function, albeit from a broad process management

perspective (Analyzing Operations, Inventory Management, BPR, Project Management), and less on the organization and its environment. European courses focus somewhat more on organizational aspects (TQM and Costs) and on the extended enterprise (Supply Chain Management and Planning and Control). Apparently, the European perspective on POM is somewhat broader and this is confirmed by the higher importance attached to strategic vs tactical/operational issues (section 2).

In terms of focus, more than ten topics were covered in the courses at Texas (in 28 sessions), UCLA (22 sessions), Pennsylvania (24 sessions), Harvard (36 sessions) and Columbia (24 sessions). Less than seven topics were covered at Michigan (13 sessions), Chicago (11 sessions), Duke (12 sessions), NYU (28 sessions), Washington (11 sessions) and Carnegie Mellon (14 sessions).

It will come as no surprise that there is a relationship between the number of topics and the number of sessions. Apart from counting subjects, we also looked for special topics or other particularities a course might have. It is interesting to see that Northwestern (Kellogg) pays attention to the Balanced Scorecard and emphasizes BPR. The latter is also popular at Columbia. Turning to Harvard, one notices the heavy emphasis on New Product Development. Virginia is remarkable for featuring Global Supply Chain Issues. Supply Chain Management is also a major topic at Stanford. Chicago and Dartmouth are above the average on decision making and analysis (risk, uncertainty). Berkeley has an interesting class on *SAP* and related information systems (with guest speakers).

| | Topic | Details/Examples | % of USA schools | % of European schools |
|-----|-------------------------------------|---|------------------|-----------------------|
| 1. | The role of Operations Management | Introduction to the subject, the role of operations in services and manufacturing. Role of operations managers. | 100% | 100% |
| 2. | Analyzing operations | Process design, process flow and volume/variety, etc. | 95% | 80% |
| 3. | Inventory Management | Types of inventory, control, Just-in-Time (JIT) | 90% | 80% |
| 4/5 | Total Quality Management | Philosophy of TQM, quality tools, etc. | 75% | 100% |
| 4/5 | Capacity Management | Capacity: concept and strategies, bottleneck management, etc. | 75% | 70% |
| 6. | Operations Strategy | How operations is essential in both influencing and implementing business strategy. | 70% | 70% |
| 7. | Supply Chain Management | Make or buy decisions, buyer / supplier relationships | 65% | 80% |
| 8. | Business Process Reengineering | Process Analysis, measurement metrics, process redesign | 50% | 40% |
| 9. | Planning and Control | Types of demand, forecasting demand, etc. | 45% | 60% |
| 10. | New product/process development | Time-to-market, simultaneous engineering, Quality Function Deployment. | 35% | 30% |
| 11. | Project management | Techniques. | 30% | 20% |
| 12. | Issues for International Operations | Facility locations, aspects of international manufacturing and service operations. | 20% | 20% |
| 13. | Time based competition | Time as a competitive element, time issues in manufacturing and operations. | 15% | 20% |
| 14. | Cost elements | Estimating production costs, financial auditing of operations. | 10% | 20% |

Table 2: Course content of top 20 MBA core courses in the USA and 10 MBA core courses in Europe. European results derived from Goffin (1996).

NYU has a lot on Process Analysis, Inventory Management and Linear Programming (3 sessions!). The latter has become very unpopular. We found it in only 10% of the course outlines.

Whereas NYU appears to be highly focused on a relatively small number of topics, UCLA and Texas attempt to offer the broadest and most complete picture (many topics) of POM. This shows that, although most schools agree on the most important topics to be covered in the POM core, there are some substantial differences in how schools resolve the completeness/focus dilemma. Should a core course sweep all topics that can broadly be classified as belonging to POM or should it instead go for more depth in restricting itself to fewer topics? We posit that the way different schools have answered this question may depend more on history and individuals than on deliberate choices resulting from a strategic thinking exercise. Looking at our own schools, the choice also heavily depends on electives and their popularity.

We conclude that there are no big differences between topics covered in US and European POM core courses. US courses seem more focused on operations and less on the organization and its competitive environment. At the end of the 1980s, several authors were worried about the positioning of POM and the proliferation of topics in POM courses in the USA (as opposed to Europe). Our results do not support the fear of these authors. We admit that the list of 14 topics in Table 2 is still quite impressive, but then again, the first 6 topics are covered in at least 70% of the US schools. This situation is only slightly different from what Goffin found in Europe.

4. Pedagogies and delivery methods

Apart from traditional lectures and cases, many other teaching methods are used in POM classes. In this section, we deal with:

- Lectures and, in particular, case studies
- Factory visits
- Videos
- Guest speakers (e.g., practitioners)
- Games and simulations
- Other technologies (e.g., IT).

Lectures and, in particular, case studies

Not surprisingly, all schools in the USA and Europe, use lectures and case studies.

Goffin observed that the cases 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 developed themselves. LBS⁷, Warwick⁸ and IMD⁹, all of whom have published a large number of cases, use much of their own material.'

Case studies are popular in the USA. We examined the course outlines and identified all cases studies that were labelled as such¹⁰. One school did not provide us with information on the cases, so the following figures refer to 19 schools. In the 19

⁷ London Business School. London (UK).

⁸ Warwick Business School. Coventry (UK).

⁹ International Institute for Management Development. Lausanne (CH).

¹⁰ We did not include the exercises.

courses there is room for no less than 237 case study sessions. This is an average of 12.5 per course¹¹. A total of 143 different cases were used in these 237 'case sessions'. Although there is a lot of diversity in the case studies used, some cases are surprisingly popular. Table 3 shows the case studies used at three or more schools. Two things immediately strike the eye. First, Harvard cases are very dominant. Second, the cases are, in our opinion, rather old. The average age is 11.1 years (in 1997).

Apart from the case studies in Table 3, 15 cases were used at two schools. These cases are: ACME Widget Co., Analog Devices, AT&T Universal Card Services, Chaircraft Cooperation 1988, CIGNA Cooperation, Copeland Cooperation, Cyclone Grinder, Detroit Motors, First City National Bank, Florida Power and Light, Honda Today, L.L. Bean, Process Control at Polaroid, Solagen, and Sunwind¹². The average age of these cases is 9.6 years (in 1997).

This still leaves 107 'unique' cases, i.e., cases used in only one of the top 20 US business schools. It appears that some schools prefer to use a lot of these unique cases. Schools that use more than 7 unique cases are Harvard (36 sessions), Virginia (40 sessions), Dartmouth (22 sessions), Indiana (15 sessions), and UNC (31 sessions).

¹¹ The average POM course has 21.4 sessions.

¹² A full reference to these cases is given in appendix 2.

| Case study | Author(s) | School | Year | % schools |
|---|------------------------------|---------------|------|-----------|
| National Cranberry Coop. (abridged 1988) | R.D. Shapiro | Harvard | 1974 | 60% |
| Toyota Motor Manufacturing USA | K. Mishina | Harvard | 1992 | 50% |
| Benihana of Tokyo | W.E. Sasser & J.R. Krug | Harvard | 1972 | 35% |
| Sport Obermeyer Ltd | J.H. Hammond & A. Raman | Harvard | 1994 | 35% |
| Hank Kolb, Director of Quality Assurance | F.S. Leonard | Harvard | 1981 | 30% |
| Kirsten Cookies | R.E. Bohn | Harvard | 1986 | 25% |
| Manzana Insurance-Fruitvale Branch | C. Loch & D.P. Grant | Stanford | 1987 | 25% |
| National Bicycle Industrial Company | S. Kotha & A. Fried | Penn. Wharton | 1995 | 25% |
| Barilla Pasta SpA | J.H. Hammond | Harvard | 1995 | 20% |
| Burger King | W.E. Sasser & D.C. Rikert | Harvard | 1980 | 20% |
| Fabritek Corporation | R.D. Shapiro <i>et al.</i> | Harvard | 1992 | 20% |
| University Health Services Walk-In | D.H. Maister <i>et al.</i> | Harvard | 1980 | 20% |
| Bank of America, Accounts Payable | J.M. Harrison & J.M. Patell | Stanford | 1994 | 15% |
| Benetton | J.L. Heskett & S. Signorelli | Harvard | 1984 | 15% |
| Donner Company | R.D. Shapiro | Harvard | 1988 | 15% |
| Doré-Doré | J.H. Hammond & A. Wong | Harvard | 1991 | 15% |
| Hewlett-Packard Desk-Jet Supply Chain Mngt. | H. Lee & L. Kopczak | Stanford | 1994 | 15% |
| The Great Nuclear Fizzler at old B. & W. | H.B. Meyers | - | 1969 | 15% |
| McDonalds | W.E. Sasser & D.C. Rikert | Harvard | 1980 | 15% |
| Michigan Manufacturing Corp. (Pontiac) | C.M. Christensen | Harvard | 1994 | 15% |
| Shouldice Hospital | J.L. Heskett | Harvard | 1983 | 15% |

Table 3. Case studies used in three or more US MBA POM core courses.

Factory visits

Incorporating the Real World was a key theme at the POMS conference on teaching POM¹³. A plant tour or factory visit is, of course, a very strong way of achieving this goal, especially since many MBA students have little or no experience in manufacturing. However, judging from the course outlines in the USA, factory visits do not appear to be overly popular. We discovered that 40% of the schools had scheduled a factory visit. It is interesting to note that 15% of the schools (California, NYU, and UNC) combine this factory visit with a group project. Students are asked to submit a report or give a presentation after the factory visit. According to Goffin, 80% of the European schools organize factory visits.

Videos

We did not manage to get a clear picture of the US situation. Although some schools have scheduled videos in their course outlines, other schools may use them as well (without explicit mention). Goffin found that all 10 European schools use videos and we suspect the same to be true in US schools. From personal experience, however, we would like to mention the lack of crisp short videos to illustrate specific concepts or practices. Many videos are either associated with a case (e.g., an interview with the CEO) or were made by companies with general public relations purposes in mind (rather than precise didactical goals).

Guest speakers

We found scheduled guest speakers at 20% of the schools in the USA. Apparently, guest speakers are not very common in POM core courses. As stated in the .

¹³ See note 3.

introduction, not all guest speakers are necessarily announced in the syllabus.

However, if guest speakers were designed into the course and a regular feature, one would expect the syllabus to mention this explicitly. In Europe, 30% of the schools use guest speakers 'to add a 'first-hand, up-to-date' view of OM' (Goffin, 1996).

Games and simulations

Games and simulations can be powerful tools to illustrate phenomena or show the usefulness of tools for analysis. They also make the course more hands-on, action-oriented. The *Beer Game* (Sterman, 1989) is very popular in the USA. No less than 40% of the schools have it in the course. Computer simulations are used less frequently. 25% of the schools explicitly ask their students to solve problems using, e.g., the QUEUE program or EXCEL-files (to be downloaded from the Web). 40% of the schools (!) do not make use of games or computer based simulations in their core courses. According to Goffin (1996), 90% of the schools in Europe use games or simulations to illustrate particular points. The Europeans seem to have taken the lead here.

Other technologies (IT)

Goffin (1996) mentions methods like interactive television, distance learning (computer based), the use of PC's (see also *games and simulations*) and textbooks with CD-ROM packages. Except for games and simulations Goffin does not indicate whether any of these methods are actually used in Europe. None of these methods are mentioned in US course outlines either.

To summarize, the case study method is very common at business schools in the US as well as in Europe. Harvard Business School cases are still the most popular. Many cases are so old they may be considered to be 'evergreens'; take, e.g., the *National Cranberry Cooperative*, *Benihana of Tokyo*, *Hank Kolb*, etc. We see three possible explanations for this phenomenon. The first is simply a matter of quality. Apparently, these cases are so good that they beat every other case on the subject. If this explanation is true, then it would be worthwhile to study what makes them such good cases. Note that even though the cases may be excellent in illustrating a point from the teacher's perspective, students may still perceive them to be so outdated that they disconnect and the whole learning process is hampered. The second possible explanation is the fact that (good) case studies on particular subjects (e.g., services) are scarce. In this situation, teachers opt to use a case not so much for reasons of quality as for reasons of pure availability. Networking might be the third reason. Teachers use a case simply because it is used by respected colleagues or institutions. We feel that there is room for further analysis here.

Apart from the use of videos, we feel that other innovative delivery methods are not very common in US schools. We did not detect many factory visits or guest speakers. Even the use of games and IT-based simulations is, in our opinion, disappointing. Granted, the *Beer Game* is quite popular, but, then again, only few schools use computer based simulations. Here, the European schools seem to have taken the lead.

5. Assessment methods

Looking at the course outlines, the following assessment methods are commonly used:

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

Some schools also grade homework, quizzes, and plant trip reports or presentations. But in general, assessment methods are very similar. Differences occurred when we looked at what constitutes the final grade. At 15 schools, the grading system was clearly specified in the syllabus. These systems varied from pretty straightforward to rather sophisticated. For the latter, take, for instance, the following grading system (from the Virginia (Darden) course outline):

1. Classroom participation will count for 50 % of the Fall grade and 50 % of the Spring grade.
2. A midterm examination, worth 50 % of the Fall grade, will be given prior to Winter break.
3. A final examination, worth 50 % of the Spring grade, will be given at the end of the course.
4. The Fall grade is worth 45 % of the Final grade, the Spring grade is worth 55 % of the Final grade.

No less than 14 of these 15 schools grade class participation. The relative weight of classroom participation varies considerably over the 15 courses. On average, classroom participation contributes 19.83% to the final grade¹⁴.

¹⁴ With a range from 0 to 50%.

Examinations are used in almost every course. The single school without a final exam graded students as follows: 30% class participation, 30% written assignments and 40% group project. In the other schools, examinations constituted between 25% and 80% of the final grade.

Goffin discovered that examinations are used at every school in Europe. Written assignments also account for a significant part of the grade. Surprisingly, class participation is assessed at only 30% of the European schools (with weights varying from 10 to 70%).

It is interesting to note that classroom participation is considered much more important in the USA than in Europe. A possible explanation for this might stem from the fact that US schools have always put a greater emphasis on oral communication skills whereas Europe may still rely more heavily on traditional lecturing techniques.

6. Discussion

In this paper we provide a lot of data on US business schools and, where appropriate, comparisons with data from a similar study in Europe. Our hope is that our colleagues look at the trends (not at the individual schools) and draw their own conclusions about ways to improve POM core course teaching in MBA programmes. We therefore tried not to be prescriptive and to minimize statements reflecting our own interpretation. In this concluding section we do give some personal reflections. When we make statements about Europe vs the US, please keep in mind that the

European sample was somewhat 'UK-biased' (see Appendix 1). In addition, student populations in the European sample are much smaller (quite different when organizing factory visits, for instance) and several schools are very much 'teaching-oriented' (as opposed to research).

We would like to stress again that we concentrate on POM core course teaching at 20 top US business schools. We assume that these 20 schools are somehow representative of POM core course teaching in the US or at least influence it significantly given the reputation of the top schools. Our information is almost completely taken from course syllabi. Other methodologies would have been possible (e.g., interviews) but we preferred to go by written information to 'the customer'. Granted, course outlines can change substantially from one year to another as professors rotate. So by the time this paper appears in print, the situation at some schools may indeed have changed considerably. Of course, the *Business Week* ranking may also have changed. All of that does not really matter for our purposes. What we are interested in here are trends, not individual schools. Additionally, if course contents at some schools vary substantially from one year to another, does this not indicate that perhaps these schools have not quite worked out for themselves what exactly they mean by the POM core course?

Although our research methodology did not allow us to get at every detail, we feel that our findings provide a reasonable accurate picture of POM core course teaching at the top US business schools as well as some differences and similarities with (i) Europe and (ii) the situation in the US some 10 years ago. In terms of similarities, the time allocated to the POM core varies enormously on both continents. Case

studies are very popular, and Harvard cases dominate. *The Goal* is used frequently in the US as well as in Europe. In addition, course objectives are largely similar.

Whereas there is agreement on the popular case studies, traditional textbooks differ completely between the USA and Europe. We also found big differences between assessment methods. US teachers apparently, find oral communication skills (e.g., classroom participation) much more important than their European colleagues.

Nevertheless, US professors disagree considerably on how this should be reflected in the final grade. On the other hand, European faculty appear to invest more time and effort in making their courses more real-life and/or action-oriented through factory visits, guest speakers, games, and simulations. We have summarized the differences between the US and Europe in Table 4.

We found indications that the (positioning) problems of defining POM, a concern at the end of the 1980s in the USA, have largely disappeared. For one, we found no big differences in the top 7 favorite topics on both continents. So, there is a clear convergence towards agreement although the US courses are still more 'operations based' whereas the Europeans put operations in a wider organizational and competitive context. In the context of increased competition in global markets, a narrow view on operations can seriously reduce a firm's window of opportunities. We feel that operations faculty have an important role to play in showing that operations management goes far beyond the routine of managing daily operations. Operations cannot be isolated. They are an essential part of key processes like Supply Chain Management and New Product Development that may run across several enterprises and even continents. They are therefore also at the intersection

with several other functions like Marketing, Accounting, Human Resources Management, and (Information) Technology Management.

| Course aspect: | USA | Europe |
|---|----------------------------------|-----------------------------------|
| Duration (sessions) | 11 to 40 (average = 21.4) | 9 to 38 (average = 16.1) |
| Time devoted to services (%) | 0 to 25 % (average = 10.75 %) | 10 to 50 % (average = 33.50 %) |
| Time devoted to strategy (%) | 0 to 25 % (average = 12.25 %) | 15 to 50 % (average = 30 %) |
| Factory visits (% schools) | 40 % | 80 % |
| Guest speakers (% schools) | 20 % | 30 % |
| Games/simulations (% schools) | 60 % | 90 % |
| Class room participation graded (% schools) | 93.3 % | 30 % |
| Examinations (% of final grade) | 0 to 80 % | 33 to 80 % |

Table 4. Differences between US and European POM core courses. European results derived from Goffin (1996).

In fact, many course objectives indicate that both US and European faculty acknowledge the need to provide a more strategic perspective on the discipline. However, our colleagues seem to have a hard time putting this into action (Table 4).

A similar discrepancy between intentions and reality becomes apparent when looking at the split in attention paid to services versus traditional manufacturing operations. Our colleagues seem to have difficulties introducing more materials from service environments even though they all acknowledge the overriding dominance of

services in our modern western economies and the need to bring operations in services to the same level of maturity as those in manufacturing plants (Table 4).

Failure to align the POM core course content with industrial reality (increasing strategic role of operational capabilities and importance of service operations are just two examples) poses a serious risk of marginalization of POM in MBA curricula. Fields like Strategy and Marketing will quickly and quite rightly fill the gap. It would therefore be useful to investigate why POM faculty apparently find it difficult to move from intention to action. There may be many reasons. We offer just a few. First, many POM faculty have been (and are still being) trained in hard core analytical POM¹⁵. Often, their PhD training pays very little attention to developing teaching skills and to getting acquainted with operations in business. Obviously, these colleagues may feel uncomfortable with the (softer) issues in services and operations strategy and therefore reluctant to introducing them in their courses. Given that core courses are often delegated to junior faculty, our results are not at all surprising (but still just as worrisome). Some changes in our PhD training as well as more involvement of senior faculty in core course design and teaching may do wonders here.

A second reason for the gap between intentions and reality may be the lack of good pedagogical materials. Considering the average age of some ten years of the popular cases, one must ask questions about the availability of good recent cases on operations strategy or service operations or about the efficiency of their distribution.

¹⁵ Our research methodology did not allow us to get a clear picture of the balance between qualitative and quantitative aspects in the core courses, though it is fair to say that pure 'technique' sessions like LP have all but disappeared from the core.

A mechanism for identification and efficient distribution of good cases (and other pedagogical materials for that matter) could render a great service to our profession.

A third reason, of course, could be that POM professors are rather conservative in their selection of course materials. Considering the delivery methods that are still predominant in POM core course teaching, some reluctance to change can definitely not be ruled out. Quite frankly, we were disappointed by the lack of innovativeness in delivery methods. Classic lecturing and case discussions (of rather old and predominantly Harvard cases) still prevail. Modern pedagogical tools like games, simulations and other IT based delivery methods are not very common. This is a pity because we feel that POM teaching lends itself quite naturally to the integration of IT. A follow-up paper focuses explicitly on IT content and delivery in POM teaching.

To conclude, we would like to emphasize the opportunities in helping our profession by a more efficient exchange of ideas and pedagogical materials (syllabi, simulations, games, cases, videos, etc.). A web site that could also be used as a forum for discussion would be a useful first step. It is rather telling that we had a fairly hard time to obtain the data for this paper. All we wanted were clear syllabi of the POM core course at the Top 20 US business schools. One would expect that these could be downloaded from the web and that they would tell the prospective users (i.e. our students!) precisely what to expect. Well, no. Quite a few syllabi were not on the web at the time of this research and a fair number were not overly clear and informative. That in itself is an interesting conclusion in a field priding

itself on quality, efficiency, transparency, and speed of operations and on being a prominent user of modern IT technologies.

Appendix 1: European Schools

The core courses of the following European schools have been investigated by Goffin (1996):

- Ashridge Management College (United Kingdom)
- SDA Bocconi (Italy)
- Cranfield School of Management (United Kingdom)
- EAP Ecole Européenne des Affaires (France)
- IMD International Institute for Management Development (Switzerland)
- INSEAD European Institute of Business Administration (France)
- Lancaster University - The Management School (United Kingdom)
- London Business School (United Kingdom)
- Group ESC Lyon (France)
- Warwick Business School (United Kingdom).

Appendix 2: Case Studies.

Apart from the cases in Table 3, we referred to the following case studies (used by two schools).

| Case Study | Author(s) | School/Publisher | Year |
|--------------------------------|---------------------------------|-------------------------|------|
| Analog Devices | R.S. Kaplan | Harvard | 1990 |
| AT & T Universal Card Services | R.D. Shapiro <i>et al.</i> | Harvard | 1993 |
| Chaircraft Co. 1988 | R.D. Shapiro & S. Kuzman | Harvard | 1989 |
| CIGNA Cooperation | D.B. Stoddard | Harvard | 1994 |
| Copeland Cooperation | A. March & D. Garvin | Harvard | 1986 |
| Cyclone Grinder | L. Poklop | Corp. Design Foundation | 1991 |
| Detroit Motors | R.W. Schmenner | Indiana | 1995 |
| First City Nat. Bank | J.W. Lorsch | Harvard | 1974 |
| Florida Power & Light | C. Hart & M. Montelongo | Harvard | 1988 |
| Honda Today (revised) | M. Iansiti <i>et al.</i> | Harvard | 1992 |
| L.L. Bean | F.L. Tucker & C.M. Leighton | Harvard | 1965 |
| Process Control Polaroid | S.C. Wheelwright <i>et al.</i> | Harvard | 1992 |
| Solagen | D. Leonard-Barton <i>et al.</i> | Harvard | 1986 |
| Sunwind | B. Collins | IMEDE | 1988 |

The ACME Widget Company Memorandum is an anonymous case. Even the schools that use the case, could not help us to trace out its origins.

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