

# The SCM Programs at Western Illinois University: Meeting the Needs of Industry

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## **Abstract**

Organizations wishing to be successful in current global business settings require people with a unique combination of skills working in their supply chains. Unfortunately these persons are continually in short supply. One reason is the curriculums offered by university SCM programs are only partially meeting the needs of industry. This paper demonstrates how the findings from a survey of practitioners who actively recruit at Western Illinois University has been utilized to help establish a SCM curriculum that produces undergraduate and MBA students attractive to a variety of companies.

## **INTRODUCTION**

Some concerns regarding university-level SCM programs have been clearly identified while others remain hazy. It is known for certain that the contemporary global environment calls for businesses possessing a high degree of adaptability in terms of being able to provide clients with a meaningful level of customization regarding products and services. Another certainty is this environment requires an evolved type of SCM worker and organizations are finding them in short supply.

A reason is curriculums regarding undergraduate and MBA-concentration SCM programs at many universities are not aligned closely to emerging business models. The notion of the people involved being critical to the successful execution of the key supply chain processes that enable customer satisfaction is not new. However the question remains if today's programs are providing the breadth and depth of topic coverage required to enable their graduates to be successful.

SCM curriculums vary greatly across institutions. What exactly constitutes SCM and which courses/topics are necessary to a SCM program is open to interpretation across both academia and business. Into this void have entered programs labeled as SCM that are attached to traditional discipline areas such as marketing, operations, logistics, and/or information technology. Many of them do not consider SCM a distinct discipline and are not producing students entirely attractive to industry.

Studies incorporating the responses of SCM executives have suggested that though approaches to SCM vary based on academic discipline or industry perspective, there seems to be a fundamental set of concepts crucial to SCM career success. It is important to note a level of mastery across all is not considered a requirement of new hires. Nonetheless they should enter the marketplace with a general/working knowledge of many of them. These concepts accordingly should comprise the core of a comprehensive SCM program. Some of these studies advocate each program conducting continuous investigation of its industry clientele's needs to uncover what skills would make their graduates desirable as employees.

The SCM faculty at Western Illinois University recently conducted an in-depth review of our program's curriculum. Included was a survey of practitioners from organizations that actively participate in hiring our undergraduates and MBA students to fill internship and fulltime SCM-related positions. Our objective was to facilitate any adjustments necessary to insure our students are as prepared as much as possible to contribute immediately to these particular firms. This in turn should insure their success elsewhere in the industry. The remainder of the paper discusses how this was accomplished.

## **BACKGROUND**

In general a SCM program should attempt to incorporate as many of the various perceptions of SCM as possible. The knowledge that students should be exposed to across their coursework can generally be delineated as: 1) general business skills, 2) SCM-related operational skills, and 3) management/leadership skills. More specifically it is thought that the core skills, capabilities, and mind-sets needed to insure eventual achievement include:

- extensive functional knowledge in the areas of logistics and operations,
- integration-oriented and relationship-based skills that facilitate cross-functional and cross-organizational collaboration,
- analytic, decision-making, and problem-solving skills,
- a level of comprehension enabling applying technology, particularly IT, effectively,
- an understanding of chain-spanning concepts such as lean, agile, network and process management,
- international SCM,
- leadership/people skills, and
- an attitude that learning, individually and collectively, is a continuous never-ending activity.

Finally, all of these need to be grounded in a practical outlook gained through classroom exercises and internships. Given the numerous topic areas (e.g., finance, multimodal logistics, project management) included within the above general categories, it is not surprising various university programs have focused more attention on some over others.

## **Study Methodology**

The WIU survey included thirty-seven subjects/topic areas. They were drawn from various studies and from the topics covered by our own and other SCM programs. This set covers multiple concepts as can be seen on the final page of the paper. This was done to keep the instrument to a reasonable length while at the same time capturing valuable information. (One study suggested there are seventy-eight core SCM concepts fundamental to career success!) The topics were presented in random order on the actual survey.

There were thirty respondents to the survey, a large enough sample size to enable basic statistical analysis. All were associated with companies actively engaged in recruiting WIU students for internships and fulltime positions in SCM. Their replies to the main business activity at their location included: Distribution, Heavy Manufacturing, Light Manufacturing, Retailing, and Transportation.

The survey participants were asked to rate the importance of each topic (a five-point Likert scale) not in relationship to each other, but rather as to its *individual significance to the future success of WIU students seeking a career in SCM*. A separate rating for each category, undergraduate and MBA was requested. They were also asked to keep in mind the MBA students are not pursuing a master’s degree in SCM, but seeking to attain a concentration in SCM, meaning they would complete three graduate classes in SCM in addition to their traditional MBA courses. Respondents were encouraged to provide other input or comment as they wished; including a rating for any additional topic(s) they felt was missing from the list.

**FINDINGS**

The thirty-seven topics were intuitively placed in five groups in reporting the findings. They are listed in Table 1 ranked by the group mean per thirty usable responses regarding the undergraduate category. Only fifteen of the respondents provided usable responses regarding the MBA category, so while data for it is provided throughout this report, the statistical analysis focused on the undergraduate category.

**Table 1: Skill Groupings**

<b>Group Label</b>	<b>Items/ Topics</b>	<b>Group Mean: Undergraduate</b>	<b>Group Mean: MBA</b>
People Skills	5	4.2	4.4
Technical Skills	8	3.8	3.9
Traditional Logistics	9	3.5	3.4
Traditional Operations Management	9	3.3	3.4
Conceptual/Philosophical	5	3.2	3.2

*Scale: 1 = Not Important, 2 = Little importance, 3 = Moderately important, 4 = Important, 5 = Very important*

The data in Table 1 provides support for the notion graduates should enter the marketplace with a general/working knowledge of each of these skill sets as each has an overall rating  $\geq 3.2$ . This indicates each category is at the least moderately important. The area of people skills is rated as above important for both undergrads and MBA students. This grouping will be the first examined in more detail.

**Skill Groupings #1: People Skills**

The importance of “people skills” as delineated by the five topics shown in Table 2 is frequently mentioned in the literature as being critical to a successful career in SCM. A recurring theme is SCM professionals must have the capability to lead inter- and intra-organizational collaboration by taking a process approach in working with diverse parties to achieve chain improvements.

**Table 2: Topic Ratings – People Skills**

<b>People Skills Topics</b>	<b>Undergrad Rating</b>	<b>MBA Rating</b>
Leadership skills	4.6	4.8
Interpersonal communication skills	4.5	4.4
Building and working in teams	4.3	4.2
Managing relationships across the supply chain	4.2	4.2
Hiring/Evaluating/Managing/Mentoring People	3.5	4.1
Scale: 1 = Not Important, 2 = Little importance, 3 = Moderately important, 4 = Important, 5 = Very important		

Multiple t-tests were conducted to determine if the mean ratings of the items concerning the undergraduate category were significantly different from each other at  $\alpha = 0.05$  (a 95% level of confidence). The bottom item in Table 2 is separated by a dotted line from those above. This means it is perceived by the thirty respondents as significantly less important to the future success of WIU students seeking a career in SCM than the four topics above it.

Nonetheless the Hiring/Evaluating/Managing/Mentoring topic had a 3.5 rating which places it in the moderately important to important range. The four topics above it are in the important to very important range. The ratings for this bottom item suggest the respondents who responded for both categories would expect MBA graduates to have an appreciably higher level of proficiency upfront concerning direct supervisory skills than undergraduates. The central finding is WIU needs to insure students in both programs are receiving adequate exposure to all five topics in this grouping.

### **Skill Groupings #2: Technical Skills**

The importance of the “technical skills” shown in Table 3 is also mentioned often in studies and reports. Negotiation skills are frequently referred to and could have been placed under multiple categories, but seemed to fit best here.

**Table 3: Topic Ratings – Technical Skills**

<b>Technical Skills Topics</b>	<b>Undergrad Rating</b>	<b>MBA Rating</b>
Business communication skills	4.5	4.6
Critical problem solving skills	4.5	4.5
Decision-making techniques	4.1	4.2
Negotiation skills	3.8	3.9
Statistical Computing: Spreadsheets/Databases	3.8	3.7
Make/Buy decision-making	3.2	3.4
IT in SCM: RFID/CPFR/ERP/E-Commerce	3.2	3.4
Costing Models	3.1	3.3
Applying calculus in business situations	2.1	2.6
Scale: 1 = Not Important, 2 = Little importance, 3 = Moderately important, 4 = Important, 5 = Very important		

The top two topics in Table 3 are perceived by the thirty respondents as being significantly more important to the future success of WIU students than the remaining seven. Each of the next set of three topics is perceived as being significantly more important than the ones below them, and so on. The ability to apply calculus was not perceived as especially important. The group means for Technical Skills provided in Table 1 therefore do not include this item.

The relatively low rating for IT in SCM is somewhat surprising. However, the general consensus appears to be SCM students need to be aware of how to apply IT to the benefit of the chain, but do not require in-depth knowledge of the details as to the nuts-and-bolts of how it functions. Some of the respondents' comments indicated that while students should have some general knowledge concerning RFID, ERP, and so forth, they will need to learn the particular firm's system thoroughly regardless. Furthermore these technologies are constantly evolving, so extensive experience with any one system while helpful, may be time better spent on other subjects.

**Skill Groupings #3: Traditional Logistics**

Despite the proliferation of SCM programs in name, many businesses continue to experience a shortage of applicants with even basic knowledge concerning the customary logistics functions listed in Table 4. One consequence is they lack an adequate understanding of what occurs upstream or downstream in a supply chain.

**Table 4: Topic Ratings – Traditional Logistics**

<b>Traditional Logistics Topics</b>	<b>Undergrad Rating</b>	<b>MBA Rating</b>
Transportation Management	3.9	3.4
Procurement and purchasing	3.7	3.8
Customer service/Order fulfill/After-sale support	3.6	3.8
Warehousing and Material Handling	3.6	3.0
Global Logistics: Sourcing/Transportation/Packaging	3.5	3.3
Inventory control: EOQ/MRP/DRP/Safety Stock	3.5	3.3
Logistics network design	3.5	3.8
Inventory philosophies and theory	3.4	3.5
Global SCM: Documents/Payment/Incoterms/Insurance	3.1	2.9
Scale: 1 = Not Important, 2 = Little importance, 3 = Moderately important, 4 = Important, 5 = Very important		

The final topic in Table 4 is perceived as being significantly less important than the ones above it. Nonetheless its ratings imply it is as a minimum somewhat important to the future success of WIU students. Increases in international operations calls for a capacity to offer products and services that are relevant to the local region. This in turn has pushed a good deal of decision-making to the tactical level. Thus the firms that hire students from WIU's SCM programs expect them to possess at the very least a working knowledge of many of the topics in Table 4 in order to make sound decisions in these areas.

#### Skill Groupings #4: Traditional Operations Management

Topics historically regarded within the realm of operations continue to be considered as essential for coverage in a legitimate SCM program: project management, production planning, forecasting, flow and process management, and the others listed in Table 5.

**Table 5: Topic Ratings – Traditional Operations Management**

<b>Traditional OM Topics</b>	<b>Undergrad Rating</b>	<b>MBA Rating</b>
Project Management	3.8	4.2
Demand forecasting and planning	3.8	3.7
Capacity Planning	3.5	3.6
Process analysis and selection	3.5	3.6
Master scheduling/Available-to-promise	3.2	2.9
Quality Control, including six-sigma	3.2	3.4
Production Scheduling	3.1	3.0
Aggregate Planning	3.0	3.1
Facility Location and Design	2.8	2.8
Scale: 1 = Not Important, 2 = Little importance, 3 = Moderately important, 4 = Important, 5 = Very important		

The top four topics in Table 5 are perceived by the thirty respondents as being significantly more important to the future success of WIU students than those remaining. However these five at a minimum are somewhat important to the future success of WIU students and require an adequate level of coverage.

#### Skill Groupings #5: Conceptual/Philosophical

The new evolved type of SCM worker required by the global environment is thought to need an expanded set of conceptual or “soft” skills in areas such as: new product design and launch, a broad understanding of the needs of supply chain stakeholders via a holistic systems approach, value creation through collaboration, environmental/sustainability issues, and conceptualizing and implementing supply chain solutions based on leading-edge best practices. The five items listed in Table 6 were included in the survey to capture the importance of this category of knowledge.

**Table 6: Topic Rankings – Conceptual/Philosophical**

<b>Conceptual/Philosophical Topics</b>	<b>Undergrad Rating</b>	<b>MBA Rating</b>
Total Quality Management	3.4	3.4
Outsourcing/Third-party providers	3.4	3.6
Collaborative product/process development	3.2	3.2
JIT/Lean Supply/TOC	3.2	3.0
Sustainable/Green SCM	2.8	2.9
Scale: 1 = Not Important, 2 = Little importance, 3 = Moderately important, 4 = Important, 5 = Very important		

The final topic in Table 6 is perceived as being significantly less important than the ones above it. Nonetheless its ratings imply it is as a minimum somewhat important to the future success of WIU students. The relatively low rating for Sustainable/Green SCM is surprising. One function of academics is to inform industry practitioners of trends/subjects that should be of interest to them. This is a topic where WIU will continue to provide adequate exposure to our students to enable them to help their employers to move ahead in this critical area.

**UTILIZING THE SURVEY FINDINGS**

The main objective in conducting the survey was to obtain feedback from organizations actively recruiting WIU’s SCM students as to the set of skills that would make them most attractive as employees. Table 7 provides a listing of the program’s core courses as well as a sizeable portion of possible electives. Additional electives are also available to students depending on their individual career interests, for example in the departments of Agriculture and Marketing.

**Table 7: Courses in SCM at WIU**

<b><i>Undergrad Core (Required) Courses</i></b>	<b><i>MBA Concentration (three or more)</i></b>
SCM 211 Supply Chain Management	SCM 529 Worldwide Logistics and E-Commerce
SCM 340 Transportation Management	SCM 531 Supply Chain Management
SCM 411 Global Supply Chain Management	SCM 539 Transportation and Warehouse Management
SCM 451 Supply Chain Negotiation	SCM 549 Strategic Procurement and Sourcing
SCM 453 Supply Management	SCM 559 Cost Negotiations
OM 352 Operations Management	SCM 600 Independent Research in SCM
CS 302 Spreadsheet and Database Applications	OM 457G Project Management
<b><i>Undergrad Selected Elective Courses</i></b>	OM 551 Integrated Global Operations Management
SCM 330 Warehouse Management	
SCM 370 Inventory Strategy	
SCM 465 Supply Chain Risk Management	
OM 455 Total Quality Management	
OM 457 Project Management	

The topics with a rating  $\geq 3.0$  were cross-listed with the undergraduate courses in Table 7 to evaluate the adequacy of our coverage. This matrix may be found on the final page of this report. Please note that the Business Core courses required of every business student are not included in this analysis. These add further exposure across many topics including business communications, critical problem solving, and leadership, among others.

A topic coverage knowledge level of “M” on the matrix is an indication that exposure to the topic is provided that meaningfully contributes to a level of mastery in the context of undergraduate education via lecture, assignments, exercises, and/or readings. A “W” is an indication that exposure to the topic is provided that meaningfully contributes to a working level of knowledge. An “L” is an indication that exposure to the topic is provided that meaningfully contributes to a light (i.e., introductory) level of knowledge. While an inexact subjective process, this allowed us to evaluate our overall coverage of a topic in the context of its rating in a structured manner and make any needed adjustments.

It was valuable to us, for example, that justification for retaining an elective semester-long class in Warehousing and Material Handling was found (rating of 3.6). Many SCM programs do not offer one, though we were fairly certain it was valued by industry. Ample validation was also provided of our formal addition of OM 457 – Project Management in fall of 2011, which had been suggested in the past by some of our industry partners. Its rating is not only the highest among the Operations Management topics, but also enables substantive coverage of other highly rated topics such as leadership, business communication, critical problem solving, and interpersonal communication skills, as well as building and working in teams.

### **PROVIDING A PRACTICAL FOUNDATION**

SCM programs too often overemphasize academic subject matter at the expense of pragmatic content. The matrix on the final page of the report only provides an indication of WIU's "formal" scholastic exposure to these topics. Just as importantly we also incorporate in-class exercises, projects, and other assignments that are grounded in real world encounters into the curriculum. One way this is accomplished is by hiring only faculty with substantial industry experience who inject strong practical content throughout the courses offered. Themes such as collaboration, good report writing, sound decision-making, continuous learning, and becoming a solid SCM professional are emphasized in every course and aspect of the programs.

A second means of providing pragmatic learning opportunities and exposure to different points of view are on-campus clubs. The WIU SCM Student Club is open to all, including MBA students. It is an active club that sponsors numerous interesting speakers as well as field trips at little to no expense to members. It functions as a clearinghouse for information regarding scholarships, and internship and/or fulltime job opportunities. Most importantly it provides its members -- particularly its officers -- the chance to further develop their interpersonal, organization, and leadership skills in a practical setting.

Finally the most effective means of tying a SCM curriculum back to industry is via internships. A common complaint of SCM managers is the lack of a mix of educational background and hands-on experience when hiring new personnel. WIU responded to the recommendation of industry clientele several years ago by installing a required for-credit internship (SCM 400) in the undergraduate SCM program. (It is available as SCM 620, but not required as part of the MBA program.) The structured internship package is project-based and includes proposals and written reports jointly agreed upon by the student, his/her company supervisor, and WIU.

Students are encouraged to complete multiple internships though only one is required to be granted a degree. The Introductory SCM course was moved from a junior-level class to the sophomore-level to help facilitate this. Some students complete it their freshman year, enabling them to experience three diverse internships during the course of earning their degree.

### **FUTURE PLANS**

The survey will be continuously refined and conducted on an ongoing basis. It will be administered in person at our SCM days in Macomb and Moline to enhance participation. These provide an excellent opportunity to ascertain what skill set(s) will make our students as attractive as possible to industry. They also function as a forum for WIU to help make practitioners more aware of advancements in academia of interest to them.



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Topic	Import Rating	SCM	SCM	SCM	SCM	SCM	OM	CS	SCM	SCM	SCM	OM	OM
		211	340	411	451	453	352	302	330	370	465	455	457
Leadership skills	4.6	L			W						W		M
Business communication skills	4.5	W	L	L	W	L	L	W		W	M	W	W
Critical problem solving skills	4.5	W	M	W	M	M	M	M	M	M	M	M	M
Interpersonal communication skills	4.5	L	L		M	L					L	L	W
Building and working in teams	4.3	L	L		W	L	L					L	M
Managing relationships across the supply chain	4.2	W	W	W	M	M	L		W	W	M	L	L
Decision-making techniques	4.1	W	M	L	W	M	M	W	M	M	M	M	M
Transportation Management	3.9	W	M	M		L			L		L		
Project Management	3.8					L	W						M
Demand forecasting and planning	3.8	W	L			W	M		L	L			
Negotiation skills	3.8		L	L	M	W							L
Statistical Computing: Spreadsheets/Databases	3.8	W	M	L		W	W	M	L	M	L	M	M
Procurement and purchasing	3.7	W		L	W	M	L		L	L	L		
Warehousing and Material Handling	3.6	W							M	L	L		
Customer service/Order fulfillment/After-sale support	3.6	W	W	W	L	W	L		W	W	W	W	L
Global Logistics: Sourcing/Transportation/Packaging	3.5	W	L	M		W					L		
Inventory control: EOQ/MRP/DRP/Safety Stock	3.5	W				W	W		L	M	W		
Logistics network design	3.5	L	L	L					W	L	W		
Process analysis and selection	3.5	L	W			L	M		W	L	L	W	L
Capacity Planning	3.5	L	L			L	M		W	W	L		
Hiring/Evaluating/Managing/Mentoring People	3.5				W		L						W
Inventory philosophies and theory	3.4	W	L	L		L	W		W	M			
Total Quality Management	3.4	L				L	W					M	
Outsourcing/Third-party providers	3.4	L	W	L	L	W			W	L	W		L
Make/Buy decision-making	3.2	W	L	L	L	M	W		L	W	L	L	L
IT in SCM: RFID/CPFR/ERP/E-Commerce	3.2	W	L	W		W	L	W	M		W		
Master scheduling/Available-to-promise	3.2					L	M			L			
Quality Control, including six-sigma	3.2	L				L	W			L	L	M	
Collaborative product/process development	3.2			L	L	W	W					L	W
JIT/Lean Supply/Theory of constraints	3.2	L	L			W	W			W			
Costing Models	3.1	W	M	L	L	W	W	L	W	M	L	L	L
Production Scheduling	3.1	L				W	M			L		L	L
Global SCM: Documents/Payment/Incoterms/Insurance	3.1	L	L	M		L					W		
Aggregate Planning	3.0						W		L				

Topic coverage level: M – Mastery, W – Working, L -- Light