Developing Master’s Program in Logistics & Transportation

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Abstract

Logistics & transportation is one of the fastest growing disciplines in the U.S. and around the world due to the important role of logistics in businesses. Nowadays, companies compete logistically compared to traditional view of providing superior products or services. Companies cannot attain competitive advantage unless their logistics and transportation professionals, irrespective of their functional orientation and current job responsibilities, fundamentally understand the dynamics of how products move from one place to another. A well designed graduate program in this area can produce graduates who can handle the job. The issue is that the number of graduates in this field is not meeting the current industry demand. Many U.S. Universities have recently developed and are planning to develop graduate degree programs in this area. This research (funded by the U.S. Department of Transportation) analyzed the need and identified best practices in logistics and transportation graduate education.

In developing a master’s program in logistics & transportation, one of the keys was to identify existing programs related to this area and know what makes them successful. Lessons learned from those programs can provide great insights to sustain the program. In the process of developing a master’s in logistics, trade and transportation, we conducted a comprehensive analysis in identifying similar programs in the U.S. While compiling a comprehensive list of thirty two Universities, we contacted them either by phone or email in order to provide responses to our survey questions about their graduate level logistics & transportation degree programs. At the time of this writing, twenty of these Universities have provided responses to those survey questions. Of those twenty Universities who responded, 7 of them mentioned online learning and flexible class options as a benefit to working professionals. 6 of them cited location as a benefit to their programs. 9 of them stated that their relationships with government organizations and major corporations as a benefit and 2 of them stated that the reputation and legacies of their Universities as a benefit to students. In general, it seems that the structure of graduate level
programs in logistics & transportation are focused on working professionals and built around a focused curriculum. This focused curriculum means that most of these programs can be completed in 2 years or less. Another trend noticed was that most of these programs are non-thesis Masters Programs, with only a few requiring a capstone project. Although not conclusive from this data we can see that in general, the graduate degree programs offered in logistics & transportation have a heavy focus on workplace readiness by encouraging interaction with relevant corporations and by helping working professionals to further advance their careers in the logistics & transportation fields.

**Introduction**

US domination in manufacturing in the 1980s were declining steadily until recently due to the mass outsourcing of US products and services to overseas countries (see figure 1). On the other hand the logistics transportation sector is booming in the US (see table 1) [1]. Even though mass outsourcing is blamed for manufacturing job losses, it also helps companies achieve an end product or service by providing an input that is outside the company’s present capabilities and they help the company meet a schedule constraint if manufacturing the good is outside the schedule plan. There are also challenges and shortfalls with outsourcing. This includes communication issues that stem from differences in language and just simply the processes for accomplishing the same task. Job loss in the U.S. is another side effect to outsourcing.

![Figure 1: US Manufacturing Employment 1979-2009](image)
Some experts argue that outsourcing takes up the lower-level jobs and that allows Americans do perform the higher value jobs. But what that argument does not address is the impact it has on the Americans that lose the lower-level jobs or the rising unemployment rate in the U.S. Many workers that are laid off do not immediately find new employment and if they are unemployed for a lengthy time, they may lose their homes and other property they once owned. The good news is reshoring. Due to reshoring manufacturing job loss is down and US is creating jobs back home. Reshoring and increased growth of logistics & supply chain, US is in great need of logistics transportation workforce.

Table 1: Employment by Major Industry Sector [1]

<table>
<thead>
<tr>
<th>Employment by major industry sector</th>
<th>Thousands of jobs</th>
<th>Change 2000-10</th>
<th>Percent distribution</th>
<th>Annual rate of change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>146,236.0</td>
<td>-316.7</td>
<td>100.0</td>
<td>-0.2</td>
</tr>
<tr>
<td>Nonagriculture wage and salary</td>
<td>132,425.0</td>
<td>19,741.2</td>
<td>90.6</td>
<td>1.4</td>
</tr>
<tr>
<td>Goods-producing, excluding agriculture</td>
<td>24,569.7</td>
<td>-6,864.2</td>
<td>15.8</td>
<td>-3.2</td>
</tr>
<tr>
<td>Mining</td>
<td>520.4</td>
<td>248.0</td>
<td>0.4</td>
<td>2.3</td>
</tr>
<tr>
<td>Construction</td>
<td>6,766.4</td>
<td>-1,260.8</td>
<td>4.6</td>
<td>-2.0</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>17,302.9</td>
<td>-573.0</td>
<td>11.8</td>
<td>-4.0</td>
</tr>
<tr>
<td>Services-providing</td>
<td>107,853.3</td>
<td>-227.0</td>
<td>3.0</td>
<td>0.5</td>
</tr>
<tr>
<td>Utilities</td>
<td>601.3</td>
<td>495.0</td>
<td>0.4</td>
<td>0.3</td>
</tr>
<tr>
<td>Wholesale trade</td>
<td>5,933.5</td>
<td>-477.0</td>
<td>4.1</td>
<td>-3.8</td>
</tr>
<tr>
<td>Retail trade</td>
<td>15,229.8</td>
<td>1,243.7</td>
<td>10.4</td>
<td>1.9</td>
</tr>
<tr>
<td>Transportation and warehousing</td>
<td>4,410.3</td>
<td>5,036.2</td>
<td>3.0</td>
<td>1.9</td>
</tr>
<tr>
<td>Information</td>
<td>3,630.6</td>
<td>-919.0</td>
<td>2.5</td>
<td>-2.9</td>
</tr>
<tr>
<td>Financial activities</td>
<td>7,687.5</td>
<td>-573.0</td>
<td>5.3</td>
<td>-0.1</td>
</tr>
<tr>
<td>Professional and business services</td>
<td>16,666.1</td>
<td>-573.0</td>
<td>11.4</td>
<td>1.2</td>
</tr>
<tr>
<td>Educational services</td>
<td>2,390.6</td>
<td>-573.0</td>
<td>1.6</td>
<td>2.2</td>
</tr>
<tr>
<td>Health care and social assistance</td>
<td>12,719.3</td>
<td>-573.0</td>
<td>8.7</td>
<td>1.3</td>
</tr>
<tr>
<td>Leisure and hospitality</td>
<td>11,861.6</td>
<td>-1,158.0</td>
<td>8.1</td>
<td>1.0</td>
</tr>
<tr>
<td>Other services</td>
<td>5,885.3</td>
<td>-372.0</td>
<td>2.0</td>
<td>1.6</td>
</tr>
<tr>
<td>Federal government</td>
<td>2,865.0</td>
<td>573.0</td>
<td>2.0</td>
<td>1.6</td>
</tr>
<tr>
<td>State and local government</td>
<td>17,925.0</td>
<td>1,243.7</td>
<td>12.5</td>
<td>1.9</td>
</tr>
<tr>
<td>Agriculture, forestry, fishing, and hunting</td>
<td>2,300.2</td>
<td>1,243.7</td>
<td>1.6</td>
<td>1.2</td>
</tr>
<tr>
<td>Agriculture wage and salary</td>
<td>1,354.0</td>
<td>-130.0</td>
<td>1.6</td>
<td>-1.1</td>
</tr>
<tr>
<td>Agriculture self-employed and unpaid family workers</td>
<td>1,042.2</td>
<td>-841.8</td>
<td>0.7</td>
<td>0.6</td>
</tr>
<tr>
<td>Nonagriculture self-employed and unpaid family workers</td>
<td>9,313.7</td>
<td>775.0</td>
<td>6.4</td>
<td>6.3</td>
</tr>
<tr>
<td>Secondary wage and salary jobs in agriculture and private household industries</td>
<td>141.7</td>
<td>111.0</td>
<td>1.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Secondary jobs as a self-employed or unpaid family worker</td>
<td>1,959.4</td>
<td>517.0</td>
<td>8.0</td>
<td>1.3</td>
</tr>
</tbody>
</table>

US is not producing enough logistics transportation graduates that it needs. In this context, universities in the US are moving ahead with logistics transportation related programs. We found that at least 32 US universities opened master program in the logistics & transportation related
disciplines. Opening a graduate program is not a trivial matter as it requires lot of resources and needs to maintain a good quality program. This paper describes the process of developing a master program in a US university that proved successful in terms of attracting good quality students, quality of delivery, and competencies in its graduates.

Methodology to identify best practices

In order to identify the best practices for logistics & transportation graduate education which is a multi-disciplinary area, first we looked over the list of universities in the US both under engineering and business schools. By no means, the list of the universities that offer logistics & transportation program are comprehensive. We simply analyzed their practices of developing and managing their programs. Most of these universities follow some guidelines for keeping their university at the top. Those guidelines are nothing but the best practices. In every university website under engineering & business departments we found some criteria that keep that program as the best one. By noting all such criteria (program value to stakeholders, program competencies, learning outcomes, flexibility in offerings, etc.) we have analyzed and organized best practices into four groups i.e., Program Content, Program Delivery, Experimental and Active Learning, and Career Placement [2-11].

We tried our best to identify the most US universities (4 years) that offer master or higher degrees in logistics & transportation and very closely related areas. Following table shows the list of all of those US institutions.

Table 2: List of US Universities offering Masters in Logistics and Transportation

<table>
<thead>
<tr>
<th>University Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. American military university (AMU)</td>
</tr>
<tr>
<td>2. University of North Texas</td>
</tr>
<tr>
<td>3. University of Southern Mississippi</td>
</tr>
<tr>
<td>4. North Western University Transportation Center</td>
</tr>
<tr>
<td>5. University of Washington</td>
</tr>
<tr>
<td>6. University of North Florida</td>
</tr>
<tr>
<td>7. California state university</td>
</tr>
<tr>
<td>8. GEORGE MASON University</td>
</tr>
<tr>
<td>9. Texas A&amp;M Galveston</td>
</tr>
<tr>
<td>10. University of Pennsylvania</td>
</tr>
<tr>
<td>11. Florida Institute of technology</td>
</tr>
<tr>
<td>12. University of Memphis</td>
</tr>
</tbody>
</table>
After identifying the best practices, we looked up for the universities that are performing those best practices. Different universities may have same best practices and all the universities may have similar best practice. Following table shows the mapping of identified universities (table 3) with identified best practices. Figures 3-5 show specific best practices adopted by US universities that offer master program in logistics & transportation related programs.

Table 3: University mapping best practices

<table>
<thead>
<tr>
<th>List of best practices for graduate education</th>
<th>Number of universities practicing best practices</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Best Practices Related to Program Content</strong></td>
<td></td>
</tr>
<tr>
<td>1. Clearly stated program requirement</td>
<td>22</td>
</tr>
<tr>
<td>2. Well-rounded curriculum</td>
<td>19</td>
</tr>
<tr>
<td>3. Up-to-date and effective course content</td>
<td>27</td>
</tr>
<tr>
<td>4. Well integrated research</td>
<td>25</td>
</tr>
<tr>
<td>5. Continuous improvement of program</td>
<td>26</td>
</tr>
<tr>
<td><strong>B. Best Practices Related to Program Delivery</strong></td>
<td></td>
</tr>
<tr>
<td>6. Contextualized teaching</td>
<td>20</td>
</tr>
<tr>
<td>7. Highly professional faculty</td>
<td>29</td>
</tr>
<tr>
<td>8. Effective teaching</td>
<td>27</td>
</tr>
<tr>
<td>9. True assessment of student learning outcome</td>
<td>16</td>
</tr>
<tr>
<td>10. Supportive educational environment</td>
<td>32</td>
</tr>
<tr>
<td><strong>C. Experimental and Active learning</strong></td>
<td></td>
</tr>
<tr>
<td>11. Travel support for students</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Program</td>
</tr>
<tr>
<td>---</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>12.</td>
<td>Financial aids</td>
</tr>
<tr>
<td>13.</td>
<td>Pathway programs</td>
</tr>
<tr>
<td>14.</td>
<td>Internship programs</td>
</tr>
<tr>
<td>15.</td>
<td>Recent Graduate programs</td>
</tr>
<tr>
<td>16.</td>
<td>Entrepreneurship</td>
</tr>
</tbody>
</table>

### D. Career services and graduate placement

<table>
<thead>
<tr>
<th></th>
<th>Program</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.</td>
<td>Targeted marketing</td>
<td>13</td>
</tr>
<tr>
<td>18.</td>
<td>Innovation through technology</td>
<td>19</td>
</tr>
<tr>
<td>19.</td>
<td>Career courses and workshops</td>
<td>32</td>
</tr>
<tr>
<td>20.</td>
<td>Career fairs</td>
<td>29</td>
</tr>
<tr>
<td>21.</td>
<td>Mock Interviews</td>
<td>17</td>
</tr>
</tbody>
</table>

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Figure 2 - Number of Universities with Best Practices Related to Program Content
Figure 3- Number of Universities with Best Practices Related to Program Delivery

Figure 4- Number of Universities Practicing Experimental and Active Learning
Survey Analysis

While compiling the list of all universities listed in this paper, we conducted a survey either by phone or email in order to verify the findings about their graduate level logistics and transportation degree programs. Out of thirty two, twenty of these universities have provided responses to these four survey questions. Survey questions were designed to identify some program information and practices that are working best at their respective organization. Following sections describes the summary of survey results.

Of those twenty Universities who responded, 7 of them mentioned online learning and flexible class options as a benefit to working professionals. 6 of them cited location as a benefit to their programs, 9 of them stated that their relationships with government organizations and major corporations as a benefit and 2 of them stated that the reputation and legacies of their Universities as a benefit to students. Only 3 Universities responded that they require internship/co-op program completion for their students; however, almost every University mentioned the option for internships/co-ops existed and could help students if they wished to pursue it.
In general, it seems that the structure of graduate level programs in logistics and transportation are focused on working professionals and built around a focused curriculum. This focused curriculum means that most of these programs can be completed in 2 years or less. Another trend noticed was that most of these programs are non-thesis Masters Programs, with only a few requiring a capstone project. The only programs which seemed to have a broader range of courses as part of the program were the MBA and business focused programs. While programs such as Transportation Engineering focused more strongly on the coursework specific to the field.

The programs that included an internship or co-op requirement for their studies seemed to be ones with a greater number of traditional students enrolled in the degree, while ones that forewent the requirement were focused on working professionals attempting to gain higher education. Figure 6 represents the reported number of faculty and students in each Logistics program at each university. The x-axis represents the reported faculty numbers and the y-axis represents the reported student numbers. Figure 7 represents the internships & work requirements by surveyed universities.
Figure 6-Faculty to Student Ratio in Logistics Degree Programs of Surveyed Universities

Figure 7-Internship and Work Requirements for Surveyed Universities
Although not conclusive from this data we can see that in general, the graduate degree programs offered in Logistics and Transportation have a heavy focus on workplace readiness by encouraging interaction with relevant corporations and by helping working professionals to further advance their careers in the Logistics and Transportation fields.

**Discussions & Conclusions**

The hourglass model suggested by Indira Nair [12] reasons that the ideal method for education is to have a curriculum model encouraging a broad array of subject matter in the beginning as students become accustomed to the classes and teaching formats, and then focusing more on the degree specific specialized courses as the student progresses through their degree program. What was discovered from surveying the Universities listed here is that very few graduate programs followed this model. This is understandable, as the hourglass model is suggested as a model for undergraduate education as students become accustomed to the college experience and since a graduate education usually happens within a smaller time frame and with a greater degree of focus on relevant subject matter. The exception, however, is that graduate degree programs in Logistics and Transportation that focus on the business aspect of the field, such as specialized MBA programs, will usually include a broader range of subject matter, with a greater build in specialization later on.

The universities which are following the best practices are likely to excel in their programs. Universities like ours that just started or want to start a program in logistics and transportation related areas do not have start from scratch if they are exposed to this research. These best practices are organized into three categories: Program content, Program delivery, Experimental and active learning and Career services & Graduate placement. Among these 4 categories
different sections are explained and reasons for which they are categorized into best are been concluded. Different universities have different best practices based upon their course structure and environmental conditions. All of them don't follow the same practices because they have some standard regulations on which they develop their best practices. However, most of the universities understand and follow most of the good practices in graduate education.

References:


6. Experiential Learning at Northeastern University: http://www.northeastern.edu/experiential-learning/


