

9-1-1997

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Recommended Citation

Dinwoodie, John. (1997). What is a logistics analyst? A perspective from one British university on increasing student awareness and knowledge of logistics education and career opportunities. *Journal of Transportation Management*, 9(2), 9-15. doi: 10.22237/jotm/873072180

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WHAT IS A LOGISTICS ANALYST? A PERSPECTIVE FROM ONE BRITISH UNIVERSITY ON INCREASING STUDENT AWARENESS AND KNOWLEDGE OF LOGISTICS EDUCATION AND CAREER OPPORTUNITIES

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Many sophomore Transport students at a British university were unfamiliar with the role of the logistics analyst. This paper discusses the current extent of student knowledge of some employment roles within intermodal distribution and the processes by which students acquire an understanding of it, providing new information for logistics teachers and career advisors. Qualitative analysis of student descriptions of relevant roles revealed a schema whereby concepts evolved, enabling a teaching package to be devised which accelerated the learning process. The assistance of practitioners, and similar studies by other academics are needed in attempting to raise the awareness of future students.

INTRODUCTION: HOW IS LOGISTICS KNOWLEDGE ACQUIRED?

"For a career in logistics, you must be able to learn and contribute quickly" (Bragdon and Berkowitz 1996, 28).

One aim of the work reported here was to investigate whether the rate at which students at one British university develop their understanding of career openings in intermodal distribution could be raised, following concerns that the concept of "logistics" or the role of an "analyst" were not well established even in sophomores. The demand for such employment roles is relatively well researched (Bragdon and Berkowitz 1996), and there have been useful attempts to define particular roles (Murphy and Daley, 1997), but the ways in which student

knowledge of these roles is acquired have not been widely reported. Before existing teaching regimes could be changed to make learning more effective, it was necessary to establish the existing levels of student knowledge at various stages in courses, given that some of the "softer" aspects of logistics, such as ethical education, may be difficult to teach or involve longitudinal teaching spread over several semesters (Daley, 1994). This approach is consistent with the ideas of educators who identify a learning process which may involve learning through a series of steps, commencing with "raw experience, ...energy flowing through the skin...upon which we erect our perceptions, knowledge and epistemological systems" (Bogoun 1983, 173). Two levels of schema may exist, initially acting as pattern recognition devices, including cortical schemas which transform raw experience, in its entirety, into knowledge, and

further schemas, which organize and retain knowledge. Because an experience is complete, this implies that if we see a pattern, it is associated with a concept, so that if a name tag attached to a face or melody is experienced, this tags a concept, in turn tagging a pattern represented by an abstract, imageless and wordless element of thought.

By asking how a student develops his/her understanding of employment roles in intermodal distribution, we are attempting to reconstruct and explore their concept structure. This assumes that words can tag the concepts in the structure, so that a cognitive map is defined where the territory of verbal concepts have been recorded on paper. Nonverbal concepts only become expressible when a socializing experience results in labels understood by at least one other person to be attached to them, and meaning requires at least two sensations to be mapped.

METHODOLOGY

Any student of intermodal distribution and transport should eventually increase awareness and understanding of relevant occupations, to the point that empirical research might reveal some form of underlying schema development. In an attempt to trace the extent and nature of student knowledge at various stages of the existing study program in Transport at Plymouth, enabling areas in which changes in understanding were needed to be identified and prioritized, a questionnaire was devised to reveal the concepts which students were using to describe their understanding of these occupations. The questionnaires were administered to whole classes ensuring simultaneous replies by students in each group, overcoming some of the problems of conducting interviews, which demand longer time frames. As such, if responses were colored by more recent experiences such as lectures or field visits, they would probably have affected whole groups, with less random tainting of individual replies by such unstable influences. The nature of any schemas which emerged from this research were designed to be of interest to logistics teachers, rather than diagnostic tools for use by vocational guidance professionals. The latter are less interested in the levels of knowledge of students about particular employment roles, but more in skills competence for career management in "exploring resources, reflecting on past and present, planning, monitoring and evaluating self and situation and developing autonomy" (Kidd and Killeen 1992).

In order to focus their attention, students had already been asked to answer questions relating to their own preferred employment within the transport industry, reasons for their choices, sources of information they had used, and details of their previous industrial experience (see Appendix 1). Their reasons for choosing to study Transport at university, and in particular at Plymouth, were also explored (Dinwoodie 1996). At this point, students were asked to provide one line descriptions of the work involved in various occupations in international distribution selected to include several modes and distribution functions with a bias towards logistics. Logistics was a subject of interest to some students sampled in a control group, all of whom had chosen not to major in Transport, and indeed not to study any specialist Transport at all.

In designing sampling procedures, a comparative study of university students at the same stage in their careers was attempted, between those studying Transport as freshmen or sophomores and non-transport freshmen, acting as a control group. All Transport students present in relevant classes were surveyed in the first week of term to prevent any bias from current teaching. 100% sampling rates, of questionnaires administered to groups without warning and collected immediately with no exchange of ideas between students, provided unpremeditated first impressions from the following groups:

- a control group including Geographers and Maritime Business students, who had chosen not to major in Transport, but who might reasonably have done so.
- 38 sophomore Transport specialists, including some international exchange students new to Plymouth but with prior Transport education and work experience, and "single honors" or "major" students from the Plymouth freshmen program.
- 30 freshmen Transport students, including some who may opt for major or full degrees in Transport, and some who may select related Maritime Business or other programs.

The research used open-ended questions, designed to reveal concepts considered significant to those answering, and content analysis of replies (Breakwell, Hammond and Fife-Schaw 1995) which allowed sufficient commonalities for some statistical

comparison, although this was not a high priority in the empirical approach adopted. Null hypotheses of no significant difference between the proportions stating a given attribute among different groups were tested against a one-tailed alternative hypothesis of a greater (or lesser) proportion (p), using Z tests of pooled proportions. Where small samples (n) denied its use (where $np < 5$), tests were not attempted, as the inferential power of binomial enumeration is low.

Non Response

Where students failed to reply, this represents a lack of awareness in terms of schema development (Boreham and Arthur 1993). Response rates to questions for freshmen and sophomores are shown in Table 1, with sophomores recording lower non-response rates for all jobs, indicating increasing awareness after one year of study. The control group of freshmen displayed high non-response rates in relation to the roles of distribution manager and logistics analyst, but fared better for freight forwarder, and similarly to Transport freshmen for other roles. The distribution manager's job was the best known role among Transport students, with rail and logistics analyst jobs least well known. Analyst roles and freight forwarder were not described by a majority of Transport freshmen, but 20% more sophomores were aware of these, with 15% more for shipbroker and 1% for distribution manager. In terms of schema development, awareness of managerial functions developed ahead of planning, with technical concepts such as "logistics," "marketing analyst" and "broker" developing later.

A LOGISTICS CAREERS TEACHING PACKAGE

In order to increase their awareness of key functions in intermodal logistics, Transport freshmen were

presented with a package of ad hoc learning activities. In an introductory lecture, they were asked to discuss official statistics showing recent trends in employment in the industry by mode of transport, and detailed occupational and industrial categories. Next, support staff from the Careers Advisory Service introduced students to the concept of self-awareness, and possible types of relevant employment and sources of information available for exploring employment opportunities. In the main exercise students were requested to work in groups of three, to research sources of information for several employment roles. For each role, they were asked to write job descriptions of about 100 words, show the addresses of five relevant organizations, and list and briefly describe five other jobs which a person in each role might come into contact with during the working day. They were then requested to list the educational requirements needed to perform each of the roles shown, record fully all information sources used during the exercise, and present a one page report on each role which could be duplicated and shared with the rest of the class, either orally or in writing. Assistance in finding relevant sources of information, and in evaluating them was provided by specialist careers staff. Finally a "value-added" survey was conducted, which involved repeating parts of the original questionnaire, to highlight any changes in responses.

Non-response following teaching fell to 3% for distribution manager, freight forwarder and rail marketing analyst, roles, 6% for shipbroker and 9% for the logistics analyst, reflecting a substantial increase in knowledge following relevant teaching. Statistical comparisons between group proportions of non-response suggested that we could be 95% certain that proportions following teaching were drawn from different populations compared with those before teaching.

TABLE 1
PERCENTAGE NON-RESPONSE BY SUB-GROUP AND EMPLOYMENT ROLE

Role	Group		
	Freshmen	Sophomores	Control
Distribution manager	30	29	64
Logistics analyst	57	37	68
Freight forwarder	50	29	40
Rail marketing analyst	60	39	52
Shipbroker	47	32	48

ELEMENTS OF EMPLOYMENT ROLES IDENTIFIED BY STUDENTS

A content analysis of the one line job descriptions indicated elements of the action, function and content, associated with some roles, but fewer elements in other roles. The job function and content elements identified were specific to each role, but the action elements of some roles were more general. Detailed findings for each role are presented below. The "action" element of job descriptions revealed categories of:

Responsible/make sure that...

Manage/oversee/coordinate

Contact with customers

Control

Plan

Decides

Study/find/investigate

Optimize/advise

Responsibility implies a board level function, but management a lower level, and control or customer contact could be at either level. Planning, deciding, studying or advising imply a horizontal staff function within the organization.

The Distribution Manager

In terms of their actions, there was some confusion initially between the planning and executive management actions of the distribution manager among freshmen students, which appeared to clarify by the sophomore stage. In particular, some 10% of Transport freshmen wrongly perceived the distribution manager as "planning" or "deciding," compared with all of the Transport sophomores who responded, who identified him correctly as solely "managing" or "being responsible." After the teaching package, the proportion of freshmen stating "manage/oversee/coordinate" actions rose from 23 to 74%, a statistically significant shift. This contrasted with only 24% of the freshmen control group who were aware of the functions of the distribution manager, where most failed to reply.

The function of the distribution manager was described initially as "organizing operations, routing/scheduling" or "handling," by 37% of Transport freshmen, but by only a couple of sophomore students. More sophisticated concepts of "distributing," "how to transport," "inflows and outflows" and "movement and storage" were reported by sophomores, and a few of the control group who did reply. The content of the distribution manager's job was identified as "areas/ places" (13% of both Transport freshmen and sophomores), but the "firm" or "distribution firm" (freshmen) and "products/goods or processes" (sophomores) were also noted. This reveals a greater generality of understanding in sophomores, but was also the case for those in the control group who did reply. After the teaching package, freshmen students perceived the function as "organizing operations" or "distributing/delivering," and the content as a "distribution firm" or "products/ goods."

Typically freshmen Transport students defined the distribution manager as somebody who "manages (distribution) operations for a firm," sophomore Transport students thought that he "manages distribution of products," but the control group failed to reply. Even in this one example teaching was highly effective, by emphasizing differences in roles within a group, hierarchies within organizations, and groups in organizations.

Logistics Analyst

This was the least well-known role, with only 43% of Transport freshmen responding initially, but rising to 90% following the teaching package. The median initial response of an "investigative" role (23% of freshmen, 26% of sophomores) rose to a statistically significantly different proportion of 65%, following teaching of freshmen. The high proportion (14% of freshmen) who incorrectly attributed a "managerial" or "responsibility" role fell slightly by year two (8%), and the correct action was identified by 50% of Transport sophomores but only 29% of freshmen. This indicates that the concept of planning developed for many students during their freshman year.

In terms of the function of the logistics analyst, 58% of sophomores correctly identified "routing/scheduling" or "how to transport goods," compared with 36% of Transport freshmen before the teaching package and 65% afterwards. Gratifyingly, no Transport sophomores, but 7% of Transport freshmen initially quoted the executive function of

"distribute/deliver," and 8% of the control group "organizing operations."

Initially 34% of Transport sophomores identified "products/ services" as the content of the role, but only 16% of the control group and 10% of Transport freshmen identified the same categories, with 80% initially not referring to any content context. After the teaching package, there was an increase in awareness, with role contents including "the whole firm" (23%), or "service, processes or systems" (26%), or a "distribution firm," "industry" or "products" (10% each).

Typical definitions for both groups of freshmen involved no reply, changing to "studies routing/scheduling of products" for Transport sophomores or "studies routing/scheduling in the whole firm" following freshmen teaching.

Freight Forwarder

More complex descriptions of the freight forwarder were offered by students, including combined elements of action, function and contents of the role. For example, 40% of Transport sophomores identified the concept of a "middleman for cargo exchange," but none of the Transport freshmen did so. Instead, they referred to such concepts as "generally seeking freight for a company." "Handling and planning of freight" were identified by 25% in both groups, but 64% of the control group failed to reply, and a majority of those who did so, confused the role with that of the distribution manager. The "middleman" concept discriminated clearly between freshmen and sophomore Transport students initially, but after the teaching package, 62% of freshmen identified this concept, although the idea of "planning the movement of freight" still required refinement, as the next most frequent response.

Rail Marketing Analyst

The marketing analyst's role is an interesting one, including both a relatively familiar marketing function, and a less familiar analyst's action in the job title. Perhaps not surprisingly, a majority of Transport freshmen initially failed to respond to this role, but with concepts of "market research" or "product promotion" predominating for those who did. A few sophomores (13%) introduced more sophisticated concepts of "statistical analysis" or "modal competition," although some freshmen Transport students (14%) commented on the more

concrete "timetable" functions. The freshmen control group highlighted "promotion" and "statistical analysis."

Typically, responses before the teaching package involved no reply for both freshmen Transport and control groups, but "researches/promotes/advertises knowledge of customer wants" for sophomore Transport students. Following the teaching package for the Transport freshmen group, a statistically significant proportion of responses shifted to "researches trends in the market" with "knowledge of customer wants" the second major element. This is a gratifying shift, as it provides evidence of deeper understanding of other applied areas of the course, such as transport marketing studies.

Shipbroker

Descriptions of the role of the shipbroker included the action and functional elements, but few references to any context. Functions were split equally between those of a "middleman" and "finding the best deal for a customer," but a majority of both freshmen and sophomore Transport groups identified no function. Many Transport sophomores (47%) correctly identified "chartering ships/ ship space" as the prime action, but fewer Transport freshmen (30%) did so, some of whom referred to the "control of shipping," but with "buying and selling of ships" also highlighted. Among the freshmen control group, only part replies were offered including "middleman" and "buying and selling ships" most frequently. Typical initial responses for both freshmen and sophomore Transport groups were "a middleman who charters ship space." After the teaching package, statistically significant changes in the proportions noting the function of the shipbroker as a "middleman, dealer, agent" and "one who charters ships or ship space" were recorded, replacing those who previously did not know.

CONCLUSION

This paper has reported how students at one British university began to acquire a knowledge and understanding of key employment roles and functions within intermodal distribution and transportation. While no claim is made to extend the currency of these findings beyond the time and place in which this work was undertaken, teachers and assessors at other institutions need to raise their own awareness of how schemas such as those identified in students at Plymouth evolve in students

at their own institutions. Having acquired this knowledge, they will be better placed to identify and prioritize shortcomings in their own student understanding, and devise new approaches to teaching which can accelerate the relevant learning processes.

At Plymouth, one schema was found to evolve from an initial understanding of simple executive line management actions, as performed by the distribution manager, into an understanding of planning or middlemen roles. In another area, student use of technical concepts such as logistics or marketing, and relational concepts such as competition, were indicators of a more advanced stage of awareness. In terms of the perceived content of jobs, there was evidence of a shift from "the firm" initially, through "product" and "place," and eventually to "service," and the knowledge of techniques including routing, scheduling and statistics increased in more advanced students. In the light of these findings, the freshman program at Plymouth was amended to emphasize planning, analyst and freight forwarding or agency functions in logistics, rather than the traditional line functions in transport. The scope for earlier exposure to basic marketing concepts, case studies and teaching of particular techniques is also being explored. Lecturers at other universities could usefully repeat the diagnostic testing of student knowledge reported

above at their own institutions, in order to assess the need for raising the profile of studies relating to vocational and employment issues among freshmen, but there is insufficient evidence at this stage to conclude that this single measure in isolation will raise student recruitment into Transport and Logistics programs.

The assistance of practitioners in encouraging measures such as visits into their workplaces by high school students or work experience placements, and raising the public profile of their business activities is essential if talented young people are to be attracted into careers in transport and logistics. High levels of non-response in the freshmen control group at Plymouth implied that only those students who are already planning careers in transport and intermodal distribution, or those with friends or relatives involved in such work had any real awareness of these occupations at present. The most effective method of raising the knowledge and awareness of a wider range of young people in relation to these occupations, involves placing them in situations where they must confront their future occupational selves. Practitioner assistance in providing specialist lectures, library materials, or realistic groupwork exercises in which students could explore their self-awareness is essential, but the most effective context is likely to involve hands-on industrial work experience for young people.

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APPENDIX 1

Survey of How Transport Courses and Careers Are Perceived

Have you ever considered a career in the transport industry? Please list which careers you have considered.

How might you find out more about courses or careers in the transport industry?

List the features of work in the transport industry in the order that they are most likely to attract you to want to work in it.

Please describe any work experience you have had to date.

Who/what made you want to study Transport at university ?

What makes studying Transport at Plymouth attractive ?

Please describe the work involved in the following jobs (in no more than one line).

Distribution manager Logistics analyst Freight forwarder Rail marketing analyst Shipbroker

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