

The Integration of Technology and Commerce in Maritime Transport Education

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Abstract

The aim of this project was to evaluate the new honors degree course designed to cater for recent developments in the maritime transport industry. The course combined technical and commercial management aspects which were to be offered as separate electives. Data regarding the attitude of students, staff and potential employers towards the restructured curriculum were collected through interviews, questionnaires and observations. All students considered, to some extent, that a knowledge of both technical and commercial aspects of the industry would offer them a wider spectrum of job opportunities. However, they found it difficult to see first stage course subjects as 'building blocks' upon which second and third stage studies are based, very often not recognizing the relevance of subjects, such as statistics, to their future studies. Staff responses varied considerably. While the maritime experienced staff were aware, and convinced, of the requirements for the parallel field, non-maritime experienced staff's responses were much more subjective, and varied, in their opinion. They were far less clear about the full curriculum. Opinions were also collected from the industry. A high interest in employing graduates from the degree was indicated from their responses. Of the 17 questionnaires returned out of 40, only 2 were in the negative sector of a 'No Use/Very Useful' choice spectrum. Implications based on the findings mentioned above were drawn to improve and further integrate the course into a coherent whole.

Reasons for the Project

The aims of this project are documented in the original proposal, and, in a summarised format, in the interim report. However, since all participants of this conference may not have read these papers, a brief introduction may be of value. The project was felt by the Department of Maritime Studies to be of value since both it, and the industry which it serves, were undergoing a period of change. With respect to the Department, which has been in existence under various titles for more than 40 years, the academic level and focus of its work has evolved radically during the past few years. This evolution has been driven, first by the changes in maritime industry career paths chosen by young Hong Kong people, and second by changes and developments within the industry itself. This industry, which is not only Hong Kong's oldest but probably also its most stable, currently generates more than 20% of the territory's Gross Domestic Product (GDP) and supports about 20% of all business establishments in Hong Kong, thus providing employment for one fifth of the workforce.

The Maritime Transport Industry comprises not only the management and operation of ships themselves, but also port infrastructure and freight forwarding by single or intermodal transport systems. Recruitment to the industry tends to follow traditional lines in which there are two sectors, one of which is trained, educated and experienced in commercial practice, whilst the other is technology based.

We contend that such recruitment policies, which may be rendered unviable in the near future, require alternative 'fast-track' educational methods and qualifications. That shipping management

itself, after a spate of international disasters in recent years, needs to become more holistic in its organisation, is emphasised by the compulsory introduction of the International Shipping Management ('ISM') Code of 1995, with which all shipowning and management companies worldwide must comply, and which starts in 1998.

The following extract, from *Lloyds List Maritime Asia* (Grey, 1995: 41), supports our contention:

As in many advanced economies, Hong Kong young people have shown a marked aversion to a seagoing career with so many rival attractions, and a considerable marine infrastructure based on one of the world's great ports needs to be replaced. But rather than resigning itself to the eventual employment of large number of expatriates in maritime management, Hong Kong Polytechnic University, in conjunction with local shipowners and the maritime industry itself, has devised its own solution to the problem of skills replacement. It is significant that Hong Kong is actually confronting a problem which is faced by a large number of advanced countries at present. But rather than waiting for manpower shortages to develop, in personnel terms, this important marine and trading centre is looking 30 years ahead as it plans its maritime future.

This article refers to the Department's new honors degree course, B.Sc.(Hons.) Degree in Shipping Technology and Management (Course Code 4460), which is expected to be the main beneficiary of the outcome of this Action Learning Project.

This course, after an initial core/common stage, streams students into either 'Technical Management' or 'Commercial Management' electives, but with substantial core/common subjects in both the second and third stages of the curriculum. Being a new course, the entry quota is limited to 30 students, allowing optimum personal interaction between both students and academic staff. The limitations of the project, at this stage, are that only one stage, or year, of the degree programme has so far been completed, the first intake being in September 1995.

This paper must then be seen simply as the initial step in an on-going project. In the longer term, the rationale of the project is as follows.

The Project Rationale

Commerce and technology may not be perceived as cognate units by students, by some academic staff, and by some sectors of the industry itself, therefore the project, as an on-going whole seeks to answer the following questions :

- 1 Will students be convinced of the relevance of the combination of technical and commercial elements within their respective mainstream studies — particularly with respect to the potential careers for which they may become candidates?
- 2 Will the teaching methods used create a positive and lasting understanding of these units?
- 3 Will the core/common units of the curriculum produce a cross-fertilisation of concepts and a holistic view of the industry between the two main-stream groups?
- 4 Will students actually use the gained cross-expertise during their careers?
- 5 How will industry itself value the total package of student gained expertise?

Of the above, only questions (1)(5) and, to a limited extent, (2) can be addressed at the present time, but will continue to be the subject of this project.

Methodology

To date these questions have been explored by interviews, by questionnaires and by subjective observations of students, staff and potential employers.

Students

Students were interviewed in focus groups of five or six, the objective being to determine their initial attitudes towards the industry and their perceived relevance of the curriculum with its twin streaming. Questions were asked by a research assistant in Cantonese, and conducted in a comfortable, relatively informal atmosphere, allowing students freedom to express opinions in confidence. In the interview plan for B.Sc.(Hons.) Shipping Technology and Management (Stage 1) students, the questions asked were intended to determine:

- why students chose this particular course;
- their initial views of the maritime transport industry;
- whether they held preconceptions of potential career paths;
- their view of combining both commerce and technology in their academic studies;
- their perceived interest in the subjects studied.

The answers, and the variations in them, were illuminating, particularly as to why students chose this course.

Alternatives

Students were very honest in their answers, a number of them saying that they would have been equally happy — and in a small number of cases, more happy — to have studied Accounting, Economics, Business Studies, Computer Studies, Building, Radiography, etc. This is not surprising, since most of the above programmes mirror subjects which students have studied at secondary school, or comprise already well-defined, and well-paid career paths known to students. Astutely, students recognise the decline in the manufacturing industries, and the rise of the service industries and business sector in Hong Kong.

Positive Reasons

Positive reasons for choosing the course can be ranked in order.

- To have a degree means that it will be easier to obtain well-remunerated employment.
- The maritime transport industry is perceived as being both interesting to work in, and challenging — students are aware of Hong Kong being the pre-eminent port in world container handling.
- No other university in Hong Kong offers a similar degree course.
- All students expect to be offered a relatively high rate of pay on entering the industry. However, the majority expect a ceiling for maximum salary and also expect that the work required will be hard, in comparison to other potential careers.

With respect to the future prospects of the industry, and the industry in Hong Kong in particular, the following comments apply:

- The industry is very important to Hong Kong's prosperity.
- It is also very important to China, and students do have concerns that Hong Kong may lose the

advantage after 1997.

- Shipping is seen as an irreplaceable mode of cheap mass transport, but the intermodal forms of transport are also considered important.

Why Students Indicated a Preference for a Stream

Since the course was new, students were asked to indicate a preference for either the Commercial or the Technical Stream on entry to the course. Note that, currently, the division into the two electives does not take place until the second semester of the second stage of the curriculum. Perhaps surprisingly, those students who chose the Technical Stream had more positive reasons for doing so than those who chose the Commercial elective.

Reasons given were:

- Technology skilled persons will find it easier to assimilate commercial practices, particularly having studied relevant core subjects, than vice-versa.
- Competition for career positions is less than that for commercially biased positions — where it is felt that Business Studies graduates from this and other universities will be competitive.

All students considered that a knowledge, to some extent, of both technical and commercial aspects of the industry would offer them a wider spectrum of job opportunities. However, when asked to comment on similar aspects of comparative industries, e.g., China Light & Power, the air transport industry, etc., students either had no opinion or, in the majority, considered the commercial aspects to be more important.

Satisfaction with the Course (1st Stage Students)

A series of questions asked students' opinions on the first stage of the course — whether it was what they expected, whether they felt it was a good introduction, which subjects they liked most or least, and which they found easiest and hardest. As might be expected, there was a wide variety of opinion. Students in general find it difficult to see first stage subjects as 'building blocks' upon which second and third stage studies are based, very often not recognizing the relevance of subjects, such as statistics, to their future studies. There is obviously some work here which it is necessary for the Department's, and contributing Department's, staff to do, in convincing students of the intrinsic value of subjects which staff know are cognate — but students initially do not.

With respect to subjects which are 'liked most/least' and 'easiest/hardest', staff must be made aware of the disparities.

Later Views

Just before this Conference, the same group of students, now almost half way through the Degree programme, were asked about the 'Technical stream/Commercial stream' preference which they had indicated on entry to the course. Surprisingly, all students opted for their initial choices, and again, technical stream choice students were more positive in their reasons for making that choice. For academic staff there may be a concern that aspects of what psychologists would term 'conformity' or even 'role modeling' might be intruding on logic. There is a potential, particularly perhaps with Hong Kong students, that an individual may not wish to appear to have made an incorrect decision at the outset. With respect to 'role modeling' there are of course stereotypes of both technologists and business men, neither of which is necessarily true to life.

The following observations were made:

(For the Technical Stream) 'Quite interesting — more flexible — more competitive advantages in my future career.'

(For the Commercial Stream) 'I have more interest in commercial subjects, so I will have more incentive to study. Then my academic results will be better than (if I had taken) the technical ones.'

Departmental Courses Other Than the Degree Course

Prior to the introduction of the Degree course, the major courses offered by the Department were specifically and deliberately biased in the separate areas of either commerce or technology. These courses were, respectively:

Course 4457: The Higher Diploma in Shipping Management Studies (Commerce)

Course 4456: The Post-experience Diploma in Ship Command (Technology)

These courses catered for the traditional lines of recruitment to the industry referred to at the beginning of this paper. Both courses are still offered, but whereas applicants for the Higher Diploma are in their thousands each year, those for the Post-experience Diploma can be counted in single figures, and the course is likely to be discontinued. This is of concern to the industry, and therefore to the Department and its teaching staff, since technical expertise is an increasingly important factor in the maritime transport infrastructure. Additionally, the Higher Diploma students feel threatened from the point of view of job opportunities, where they naturally feel that the degree students have the edge. A survey conducted recently of second year HDSMS students indicates that the area of technical expertise, which is taught only at a basic level within the Higher Diploma programme, is recognised as such by the students, and that they feel correspondingly less competitive.

It is important for us to know more (about) both the technical and the commercial aspects of the industry. If we know nothing of the technical aspects, it is hard for us to know the total environment of the industry.

The survey indicates that students themselves, although lacking practical experience in the industry, appreciate that the required skills and abilities voiced by industry's representatives, of which will be seen later, are in a state of change.

Staff Also Have Learnt from These Views

The Higher Diploma curriculum will be modified in the new future to address the perceived shortcomings, and the introduction of the credit-based semester system will not only make the course more flexible, but will give students the opportunity to study a wider choice of electives, some of which will be taken in conjunction with degree students. With respect to the remaining few students of the Post-experience Diploma in Ship Command, since the course content is largely dictated by the requirements of the International Maritime Organisation, by internationally agreed conventions and via Marine Department of the Hong Kong Government, little change to the curriculum is envisaged. As intimated, the course is very likely to be discontinued within the Polytechnic University. The decline in numbers of such qualified people has, however, led to a steady demand, both afloat and ashore, for their services in Hong Kong's industry.

Staff Perceptions

The maritime transport industry shares a number of distinguishing features with other international industries, perhaps the closest industry being that of air transport. These two transport in-

dustries are unique in the respect that they are truly, physically, international in terms of commercial dealings, employees and long distance transportation between various states. The spectrum of expertise required by the industries is very wide covering all aspects of law, commercial practices, logistics, engineering and geophysical systems, in addition to the research and development necessary to remain competitive and within the guidelines of an increasingly environmentally conscious global society. It would be impractical for all students to study all subjects in depth — and equally of little value for them to study all to a shallow level. Therefore, as mentioned previously, the course presently streams students into Technical or Commercial management streams. The credit-based system, when fully implemented, will eliminate the streaming system but will allow students a wider choice of cognate elective subjects. The net result of this is that academic expertise required of staff ranges all the way from mechanical engineering, through meteorology to maritime law. The days of university academic staff having an all-round knowledge of an industry are long-gone — if they ever existed at all. Staff now have well-defined, if not narrow, fields of excellence.

The other problem with departments such as ours, and courses such as this, is that, unless a university has a Faculty of Marine Studies, or at least a large well-established department with a number of marine, maritime and transport courses, such courses do not apparently 'fit' into convenient pigeon holes. Such pigeon holes are constructed over the years, varying with institutions, and are labeled 'faculties', with matching sub-divisions labeled 'departments'. When something new comes along, if it cannot precisely fit into an appropriate existing pigeon hole, difficulties may be created. Before the commencement of this project, there was a feeling amongst a limited number of staff, with specialised fields of expertise, that other departments, and perhaps other Faculties, might offer better inducements to their talents and to the Degree programme. Some staff members who have previously worked in maritime-centered departments would disagree with this, saying that the cohesiveness and general benefit of overlapping interests and expertise, when contained within a single department, lies at the very heart of the integration this project is attempting to achieve. For further reference please see the HMI report on 'Degrees which integrate Engineering with Business Studies', Department of Education and Science, UK.

Staff Interviews

In an attempt to determine what staff views were on the foregoing, and of the homogeneity of the course, all were asked :

- whether they considered their fields of teaching to be commercial or technical;
- whether or not, and to what extent, their teaching included elements of the parallel field;
- their views on the total emphasis of the course in which they were teaching.

As might be expected, staff responses varied considerably, and might best be divided into two sectors.

1 Maritime industry experienced staff

All staff members who had worked in maritime-centered departments, although defining their own fields clearly, were aware, and convinced, of the requirements for the other field. Observation "Rational decisions should be based on sound commercial and technological information."

2 Non-maritime industry experienced staff

As might be expected, these responses were much more subjective, and varied in their opinion. A number of such staff were from other departments, servicing subjects in the programmes for which there are — currently at least — no staff within the department itself.

The following comments were made by staff:

Commerce could be learned & gained through experience while technology could be formally trained.

(On economics of Markets & Trade) I think that this subject is not too relevant to the (student's) career.

(On Shipping Finance & Accounting) Would be better if the instructor has actual shipping finance and accounting experience.

However :

(On Maritime Law) Graduates need to understand how legal problems arise in the shipping business and — as many problems of a legal nature have a technical foundation, i.e., an error malfunction — there must be an understanding of this.

In general terms, section two substantiates the previously made point that an integrated department, ideally without service teaching, is the best basis for informed teaching, development and related research. If this is an impractical ideal and inter-departmental teaching on credit-based courses becomes more the norm, then teaching team skills will be necessary. Teaching teams must be made aware of the full curriculum, and of why and how each subject fits into the whole. It is felt that the results of this Action Learning Project and its on-going implementation have already served to lay foundations for this.

Industrial Views

Since 1994, senior management personnel from the industry in Hong Kong, in Singapore and elsewhere have been canvassed for their views on whether or not the degree was appropriate to the needs of the industry, and whether the award level of Honours degree was appropriate. Probably the most constructive reply came from the Chairman of World-Wide Shipping Agency Ltd.:

The course provides the graduate with a detailed and comprehensive overview of the elements of a multi-faceted industry. It will provide a good platform for the graduate to function in the maritime infrastructure, but the degree does not give the graduate qualifications and experience which will enable him/her to assume managerial responsibilities the necessary skills and specific qualifications needed in the maritime industries cannot be obtained through a degree course. The course may, however, provide the graduate with an enhanced ability to absorb and learn the specific requirements of a sophisticated and highly technical environment. In managing and operating ships, on-the-job training is an essential ingredient not only at sea, but also ashore.

There is a lesson to be learnt here, particularly by those academic staff who have little, or no, experience in industry, and indeed by the students themselves. With respect to the students, it is a common deflationary experience after graduating to find that, in many occupations, the graduate realises not only how little he or she knows about the job, but additionally how much even less more experienced colleagues think that he or she knows. Academic staff must be careful to instill in students a confidence that they do have ability, but not such that they become affronted by accusations of lack of experience. Again the Project has served to alert staff to the fact that many aspects

of the industry, and its development are unfamiliar to them. To back up previous canvassing to selected individuals within the industry, a general mail-shot questionnaire was also used in April of this year, being sent to companies in all sectors.

The objectives of this questionnaire were twofold :

- 1 To find out if the industry in general was sufficiently interested in the course and its students to respond to the request for information.
- 2 To determine the extent to which the individual companies categorised the ratios of commercial and technical expertise within their own organisations — and thus the likelihood of their employing our graduates.

The response to the unsolicited mail-shot was encouraging, as 17 returns were gained from a total of 40. This in itself indicated a good level of interest. The responses additionally showed a high interest in employing graduates from the degree. Of the 17, only two were in the negative sector of a 'no use/very useful' choice spectrum. It must however be remembered that all of the foregoing comments from industry were obtained from senior personnel. People, it might be said, who were in the best position to give opinion on recruitment to the industry, but, it must also be said, people whose positions in that industry are unassailable, and people with whom newly graduated recruits would have little direct contact initially. There are a group of people who were not so canvassed, and therefore did not have to put their comments in writing, but who were quite vocal in opinions given. These are the people presently at lower levels in the industry, with whom new recruits would work, and who may well feel that their prospects may be threatened by new entrants with new qualifications.

Most academics will have heard similar comments before:

I went to the University of hard knocks.

You don't need a degree for this job, you need experience.

How can you educate someone to be a manager of a shipping company? I had twenty years at sea, and I'm still learning the job.

I've got an MBA, your kind of degree isn't necessary.

It has to be added, perhaps unnecessarily, that most of the above comments came from older expatriates, with perhaps most to lose in competition with young, bright local people. New graduates must be aware that they will come across bias, ignorance and downright aggression in some cases. As the first people with a new qualification, they must also be aware that, in some respects, they are breaking new ground. Staff must also be aware that, in their dealings with industry, they have a duty to break down such prejudices.

Similar Experiences in other Areas

Some staff members, and some employees in the maritime transport industry have needed to be convinced, as we have seen, that the proposed integration and cross-fertilisation of ideas is beneficial or even desirable. In this context other views and experiences prove useful in getting over concepts to the sceptical. For example, with respect to commercial sceptics, Nyström (1990) explains that:

Technology is viewed in its broadest sense as the knowledge required to change social and economic mechanisms and processes, in society as a whole and in individual companies. With this outlook technological innovation becomes the most important factor for the long run transformation of society and the basic condition for market innovation and successful product and company development.

For the Academically Unconvinced

Currently a number of similar programme types of are in operation, in various industrial fields, in the United Kingdom and elsewhere. On some degrees in the United Kingdom which integrate Engineering with Business studies, a report by the Department of Education and Science (1991) states:

The five courses inspected exhibit many good features. They have innovative curricula which provide integrated and coherent programmes of study, effective leadership, and enthusiastic teaching teams. Overall enrollments are rising. The courses attract a higher proportion of female students and have better progression rates than many specialist engineering degrees. Staff from industry helped with the design of the courses and are involved in course delivery.

... and graduates are recruited to appropriate positions in industry.

Since some understanding of business and management is essential to a practicing professional engineer, all engineering degrees now contain elements of business studies. However, in the five schemes that were inspected the business aspects have a greater representation than on conventional engineering degrees, and in one case they predominate. Particular features have been introduced to these degrees to aid integration between the two areas of study, and to enhance the relevance of each to the other.

Much of the above is reflected in our own programme.

Conclusions

At the time of writing this Project report a number of factors limit the overall conclusions which can be made concerning the integration of technology and commerce in maritime transport education. These are as follows:

- The Degree course in Shipping Technology and Management is still in its infancy, having been in operation for only three semesters. It is anticipated that this course, and its undoubted successors, will be the main beneficiary of this Project and subsequent research.
- The Department's staff is undergoing reorganisation such that, within a two year period from the Project's commencement more than half of the academic staff will either have retired or been replaced for other reasons, this being due to the change of emphasis from largely vocational qualification courses to higher level work.
- The rapid expansion of trade in China and Southeast Asia, with a consequent rapid expansion in all transport modes, but particularly the full infrastructure of maritime transport, has led to an equally rapid expansion of personnel in those industries.

There is however, no uniformity as yet in the education, or training, of such personnel.

The Hong Kong Polytechnic's lead in this, quite different from other areas of Asia, has yet to be proved and accepted.

Some valid preliminary conclusions can be made, however. Referring to the Project rationale:

- Students are convinced of the relevance of combined studies, as indicated by interviews and questionnaires. Regardless of whether they see themselves making careers in either the commercial or operational areas of the industry, a broad-based knowledge is acknowledged as being essential.

General comments favour more cross fertilisation of concepts, and there is concern amongst students of the Higher Diploma in Shipping Management Studies that the subjects currently of-

ferred to them are too limited, and that they will be less competitive than the Degree students, not only in the level of their eventual qualification but also in its contents, when they seek to embark on a career.

- With respect to academic staff, some of whom may have had invalid concepts of the relevance of some subjects offered with the degree programme particularly, the Project has served to initiate a holistic view of the programme and of the students.

Staff realise better that the teaching of their individual subjects must be such that they will interlock with those delivered by other staff members.

Interestingly, the various journals available within the Department's library are increasingly being read by staff whose individual expertise might be only on the periphery of such journals' contents. One such example, and a very useful one, is that of the Department of English lecturers who teach English language skills to all our students. Staff are also reacting very favourably in terms of their delivery of subjects. There is considerable enthusiasm for multimedia course development, for simulation, and, very importantly, for industrial site visits. Students' feedback on these — still developing in both the major courses of the Department — is very appreciative.

- The Industry itself has been exposed to the Department's course development in a number of ways — by direct interview, by mail-shot questionnaires, through the media of the Hong Kong Shipowners Association and through various journals, both local and international.

Most responses have been both positive and supportive, reflecting that the industry itself has been developing and diversifying over recent years. As indicated previously, however, a small core of older individuals remains to be convinced that innovations are both acceptable and beneficial.

Although the Project, as funded research, has now completed the impetus will be continued within the Department in conjunction with the industry which it serves.