The Developing Model Of Distance Learning Programme Utilising Technology At Inland Water And Ferries Transport Polytechnic Of Palembang During Emergency Situation

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Abstract. Indonesia is one of the world’s biggest supplier of seafarers is being threatened by the growing share in the development of international seafarers by other countries in Eastern Europe and Asia, particularly China. The employability of seafarers depends largely on the quality of education they have acquired and the effectiveness of training that they have undergone pursuant to the requirements of STCW’95. If the country remains complacent about the present level of competence of its seafarers, it may lose out to other countries in the global labour market competition. The Philippines has to respond to the challenges in the global maritime environment by maintaining a viable supply of well-trained mariners. To achieve that, however, will require new approaches to maritime education and training. This new MET approach should be one that affords high quality output to a great number of seafarers. In other words, it must be something that meets both the quantitative and qualitative requirements of the industry and international regulatory authorities, particularly the IMO. This new approach to MET in the Philippines could be the establishment of a Distance Learning Programme. Distance learning employing state-of-the-art telecommunications technology, IT and satellite communications system will enable the Philippine MET to train a great number of seafarers even while they are at sea without sacrificing quality.

Keywords: Developing; Distance Learning Programme; Technology

1. Introduction

Incidentally, the National Maritime Polytechnic (NMP), being the country’s only government owned maritime training centre, with a more complete array of sophisticated equipment and simulators for both marine engineers and navigators, is most likely to spearhead in this endeavour. In fact, Leonardo Quisumbing, then Secretary of the Department of Labour and Employment (DOLE), in his address to the 2nd LSM Manning and Shipping Conference held in Manila in 1996, made NMP part of his central strategy to meet the challenges of the STCW’95. That strategy included the expansion of NMP facilities to Luzon and Mindanao for the provision of quality training to cater to the

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growing needs of the industry and bring it closer to its clientele. The rationale of the expansion of NMP’s facilities is the corollary extension of its training capabilities.

In the same vein, the setting up of a Distance Learning Centre in NMP will definitely expand and improve its training capabilities. It can maximise its training output with relatively minimal input. The NMP must also meet the technological challenges posed by developments of the 21st Century.

Such requirements will necessitate the acquisition of a classroom not solely dedicated to distance learning. It should rather be one that supports distance learning and many other functions. To optimise its efficiency and maximise its functionality and its return of investment, an ultra-modern 21st Century classroom should be multipurpose and multifunctional. It should be designed to support teaching a range of subjects from Maritime English, Cargo Handling, Stowage and Stability, Ship Management, Maritime Law, Marine Engineering, Medical Training, to Computer Aided Design (CAD), etc. It should also be user-friendly to both computer literate students and the relatively novice.

This classroom must be able to support a variety of needs such as the following:

- General Purpose Classroom
- Computer Lab
- Computer-Aided Language Learning (CALL) Lab
- Computer-Based Training (CBT)
- Video Conference Room
- Multimedia-Based Classroom
- Lecture and Presentation Room
- Internet Web-Based Learning Centre
- Curriculum Design and Production Room
- Administrative Meeting Room
- Distance Learning Centre

The above list is by no means exhaustive. More functions and uses could be added depending upon the limits of one’s imagination and the needs of the institution.

Ideally this classroom should, of course, be multi-modal distance learning instruction capable. It should be flexible enough to support either or both site-to-site and site-to-

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multi-site distance learning programmes. It must be a computer supported, multimedia-based distance learning centre. It must be capable of supporting every multimedia communication for both short-distance, where students and teacher are within the same classroom, and long-distance learning, where students could be thousands of miles apart somewhere in the middle of the Atlantic\textsuperscript{5}, Pacific or Indian Ocean, or virtually anywhere on earth. It must have the possibility of linking with other similarly equipped classroom(s) anywhere in the world. It should be able to provide an interactive environment regardless of the distance. It must support 3-way interaction, that is: teacher to student(s), student to student(s), and student(s) to teacher. ‘Classroom-to-classroom communication’ should be possible. That is, face-to-face and screen-to-screen communications with students at a remote site and an instructor or team of instructors in a distance learning centre in another location\textsuperscript{6}.

2. Discussion

Since many of NMP’s target students (seafarers) could be in different time zones at any time, it is desirable to have the capability for both synchronous (for face-to-face teaching or for remotely situated land-based students within the same or similar time zones) and asynchronous links, mainly for those onboard ship sailing in a completely different time zone. This is a feature that will allow a teacher to provide face-to-face instruction which could be transmitted in real time (synchronous) to another remote learning centre or even to ships at sea operating in the same or similar time zones. In addition, the same lecture/presentation could be recorded simultaneously and be

transmitted at a later time (asynchronous) suitable to students onboard ships plying in opposite or nearly opposite time zones.\textsuperscript{7}

The classroom must support any computer platform: PC, Mac, Sun, etc. and work even without CPU, only monitors. Integration of any data or videoconferencing systems or any multimedia peripheral must be made possible. A migration path for integrating old and new equipment, analogue and digital with any emerging or future technologies should be provided. In that case the distance learning/multipurpose facility will not become easily outdated, at the same time large savings could be generated from the ability to use older and existing equipment and facilities instead of buying new ones.\textsuperscript{8}

An ideal 21\textsuperscript{st} century classroom should have the facility to automatically record both teacher presentation and student work to be re-used later when developing case studies, curricula or student portfolios or even transmitted via satellite in an asynchronous mode to help and guide students at sea.

A creative packaging of various communication media should allow for a multi-modal approach to didactical communication. It should allow for different forms of communications links for the delivery of knowledge and information. This linkage could be digital or analogue, wired or wireless, (e.g. ISDN, fibre, ATM, T1, etc.) including ordinary telephone lines. Thus the instructor will not be tied up to a single type of connection. He or she will have the freedom and the liberty to choose the medium dictated by the place where he or she is connecting and the topic he or she is teaching. During the course of the class, he or she will have the flexibility to shift from one connection to another as the need arises.


\textsuperscript{8} Pillsbury, C (1997). ‘Technology Is Not Training (TINT)’. \textit{IMLA’97: The New World of Maritime Education Conference and Workshop}. (September 7-11, 1997: Newfoundland, Canada). Fisheries and Marine Institute of Memorial University of New Foundland. Newfoundland, Canada: IMLA.
One must not however forget that it is not only technology that is important, but even more so are the people who run and manage such technology. An important consideration would be that they must be empowered to control such technology instead of being controlled by it. This will only be possible if these people are properly equipped with appropriate knowledge, skills and attitudes required to handle the job. This drives home the point of the importance of training, that is, training the right people to run and manage such a high-tech enterprise. Teacher in-service training and professional development in the aspect of educational technology is the single most critical element in this ultra-modern educational environment. Teachers and school administrators must learn how to manage their technologists and technologies rather than being managed by them. Therefore a vital component of any installation package employing such technologies should include training. Without training it would be tantamount to building a super high-tech ‘car’ (classroom) without providing a training programme for the driver (teacher).

2.1 Distance Learning Network Design Architecture

Having defined the functional requirements of an ultra-modern, multipurpose and multifunctional classroom capable of supporting distance learning, it is now logical to explore various distance learning network designs’ architecture. This then can provide NMP with a more concrete basis with which to assess and evaluate their suitability. As noted by R.Adm. McMullen of Texas A&M University, the technology associated with distance learning is the same technology that is used in an ‘electronic classroom’.

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In that case then the World Maritime University’s Computer Lab can serve as a fine model and provide some basis in the equipment/facilities needed and costs involved. After all, McMullen (1999) noted that once one has established an electronic teaching/learning environment, he or she is only a small step away from projecting that outside the walls of the building. Figure 7 above shows WMU’s Language Lab allowing one to visualise and scrutinise its functions and capabilities.\(^{10}\)

This design architecture shows a capability for video/desktop conferencing, document viewing and projection into the instructor and students’ PC as well as into a wide screen. The electronic white board allows what is written on it to be shown on the PC screen and even print a hard copy. Video could also be shown into a large TV and transmitted into a remotely located TV linked to the Lab. It has other capabilities not obvious from the diagram. However this network shows only a single external connection via ISDN. This configuration may make it capable of supporting distance

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learning to PC’s with Internet connection but not necessarily to ships at sea unless it has an extra satellite link.

A more complex and sophisticated infrastructure is the so-called Ed21 - Knowledge Web School as shown in Figure 8. This configuration is suitable for a large, complex and truly global school system consisting of several multipurpose and multifunctional classrooms which could be contiguous to each other or situated hundreds or thousands of miles apart. It has linkages with several organisations outside the local school system. But building such a system would be too costly and beyond the reach of the average institution particularly in developing countries.\(^{11}\)

Another model configuration is a modification from the original COMWEB Multipurpose and Multifunctional 21\(^{st}\) Century Classroom. It is a little simpler than the Ed21-Knowledge Web. The beauty of this model is that it could be built in a modular manner forming the basic web then into more sophisticated configuration such as the one shown in Figure 2.\(^{12}\)


\(^{12}\) R.Adm. W T McMullen, mcmullew@tamug.tamu.edu (1999). Email, 28th April
Since its installation could be phased in, this becomes more likely to be affordable to smaller institutions such as the NMP. Referring to Figure 9, modified from the original COMWEB Multipurpose and Multifunctional 21st Century Classroom, one could see its multiple capabilities meeting the functional requirements mentioned previously. It has ISDN, satellite, fibre optics as well as ordinary telephone lines. The classroom has a video conferencing capability. It can record simultaneously classroom activities, and compress and decompress data/video to be transmitted in either synchronous or asynchronous mode. The system capability basically meets all the required functionality stipulated previously.  

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Another model worth considering is International Datacasting shown in Figure 10. This could easily be adopted for distance learning. It is capable of both synchronous and asynchronous transmission, which could be suitable for NMP’s purpose. Video transmission could be of very high quality with its MPEG 2 and high bandwidth satellite. The satellite utilised here however is unlikely to be INMARSAT as its transmission rate is from 258 Kbps to 400 Mbps. This will therefore make it not suitable for distance learning at sea until such time when higher bandwidths are widely available onboard. If, instead, V-SAT is used it may prove useful for onboard distance learning, albeit only to a limited number of seafarers. This is because of V-
SAT’s expensive hardware limiting its availability mostly to cruise liners and some super tankers and other well-equipped modern ships\(^{14}\).

**Figure 4. International Datacasting**

![International Datacasting Diagram]

*Source: Via Satellite*

With several configurations explored, including those which were not shown, the most suitable distance learning network design architecture, which meets NMP’s needs and requirements, appears to be the Multipurpose and Multifunctional 21st Century Classroom of COMWEB. It may not necessarily be the best system in the world, but there is no doubt that it is the one system that fulfils all the functional requirements of what was visualised as an ultra-modern classroom that supports Distance Learning while serving other functions and purposes for the institution (NMP)\(^ {15}\).


2.2 Specific Hardware and Costs Involve

Table 1. COMWEB Price Quotation for a Typical Multipurpose Room

<table>
<thead>
<tr>
<th>Equipment List</th>
<th>ID Code</th>
<th>Qty.</th>
<th>Unit Price</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Control Box (System Hub)</td>
<td>MCC-390VKM</td>
<td>1</td>
<td>$3,550</td>
<td>$3,550</td>
</tr>
<tr>
<td>Touch-sensitive Control Panel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Handheld Wireless Remote Control and RS0232 Ports</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auxiliary System Controllers (Multimedia Sub-system)</td>
<td>MCC-391VKS</td>
<td>1</td>
<td>$4,450</td>
<td>$4,450</td>
</tr>
<tr>
<td>SVGA Video In/Video Out (800x600)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SVGA On-Screen Pointing Tool (800x600) (Digital Chalk)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Video Switch/Amplifier</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extension Box (Coupler)</td>
<td>MCC-190VKS</td>
<td>21</td>
<td>$650</td>
<td>$13,650</td>
</tr>
<tr>
<td>Standard Cable Sets</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muting + Keyboard/Mouse Locking</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Keyboard/Mouse Remote Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student Call Button</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMWEB Mics and Earphones (as required)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mounting Brackets</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whiteboard, Digitising 3” x 4”</td>
<td>MCC-BOARD</td>
<td>1</td>
<td>$2,050</td>
<td>$2,050</td>
</tr>
<tr>
<td>Pivoting Desktop Camera PAL/220V</td>
<td>MCC-Camera2</td>
<td>1</td>
<td>$1,295</td>
<td>$1,295</td>
</tr>
<tr>
<td>HiRez Document Camera w/Zoom</td>
<td>MCC-Camera1</td>
<td>1</td>
<td>$3,675</td>
<td>$3,675</td>
</tr>
</tbody>
</table>
2.3 Marine Applications Software and Videos Needed

For the most part, the intended training programme will be using CBT packages from Seagull, and in some cases from MARINTEK. PC Maritime’s OOW, DMI’s DeskSim and other marine applications software will also be considered depending on the type of training offered. Videos mainly from Videotel will be used in conjunction with some CBT packages. In due time, the institution will try to develop its own tailor-made CBT scheme and training videos.

Incidentally, only prices for Seagull’s CBT modules are available. As per information in its brochure, a price tag of NOK 625 (about $73.50) per module for one-year subscription period is the basis for cost projections. This does not however include shipping and handling of the CBT modules contained in a CD.

2.4 Additional Facilities Required and Costs Involved

It should be noted that distance education has several enabling infrastructure technologies. These include T1-based technology, ISDN, Internet/Intranet, Asynchronous Transfer Mode (ATM) as well as satellite. One’s choice should consider certain advantages/disadvantages. Primarily cost, both fixed and variable, should be taken into account. In the technical aspect, bandwidth and latency should be considered too. It is also important to consider learning styles of students, i.e. symmetric and asymmetric learning, which must be reflected in the

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syllabus/curriculum. Videos mainly from Videotel and some other producers, as well as films locally pro-duced by NMP may be utilised from time to time.

In addition to the core facilities, if transmission of video via satellite is being con-sidered, such as those produced by Videotel as well as NMP’s locally produced films, compression/decompression device or CODEC such as H.320/H323/ATM may have to be included. This will require, in turn, video input and output sources such as cameras, VCR, microphones, monitors, document camera, etc. COMWEB already included many of these (see Table 4). In the USA, according to Walt Magnussen (1999), the cost of a room including CODEC like H.320 run on dedicated 128 or 384 Kbps lines, for instance, costs a staggering $55,000! If one opts for H.323 run over Internet the cost will nose dive down to $300-$8,000. For ATM converted to ATM cells providing high quality video and low latency also costs $55,000 like the H.320. A minimum of two 26” multi-system televisions or bigger may be needed in the multipurpose classroom. Each will cost roughly between $800 and $1,200\(^{17}\).

Since maritime communications will almost invariably involve satellite, Inmarsat SES will definitely be necessary. This entails obviously additional cost. The lowest priced terminal in the INMARSAT alphabet is Inmarsat-C. It costs $10,000. Its big brothers, Inmarsat-A and Inmarsat-B, are priced from $25,000 to $30,000. An upgrade to HSD will require an additional $5,000 for Inmarsat B but $10,000 for Inmarsat-A. Iridium terminals are already available in the market but the author has difficulty getting their price tag. But it is reasonable to guess that they must be within a similar price range. For high quality video transmission V-SAT, available in some cruise liners, would be more suitable for receiving high quality video. In that respect it is much better than

Inmarsat, which is capable of receiving only slow scan video. However, V-SAT is priced very expensively at $100,000 as of 1996, (Brödje, 1996). For Computer Aided Instruction (CAI), a Web server costing $10,000 plus Web development tools costing an additional $2,000 will be needed. At least 12 computer units will be necessary in the multimedia laboratory. Each may cost between $1,500 to $2,000 for Pentium I with 32 MB of RAM and at least 1-Gigabyte hard disk capacity. A reliable Internet line is also required. As for streamed video a streaming video is worth $10,000 to $50,000. In addition, streamed video development tools will cost an extra $500 to $2,000. Likewise, a reliable Internet connection is also necessary.

From the technical point of view, the types of communication lines should also be considered. Dedicated ISDN, T1 or ATM lines offer the advantage of continuous availability whenever they are needed. However, this advantage of ‘always being there’ means wastage when not needed. An alternative is a packet-based connection like the Internet/Intranet. This allows for the carriage of all traffic, voice, video, and data. Unfortunately, with the Internet/Intranet it is difficult to control delay. It is a gross misconception to think that placing things in the Internet is ‘free’. There is no such thing as ‘free lunch’, as they used to say. There is always a trade off in terms of compromised capabilities.

3. Conclusion

A research by Dr. Larry Lippke (COMWEB, 1998) into Distance Learning universities and colleges in North America showed that instructor/tutor salaries account for the highest percentage of distance learning costs and expenditures (31.72%). In 1997 this even accounted for 37.21% of total costs. This only goes to show that personnel cost,
instructor/tutor remuneration, is one aspect of distance learning expenditure that should not be overlooked.

The number of tutors and other human resources involved are obviously one determining factor in this aspect of expenditure. So if one has to cut down expenses on this recurring and continuing cost, the barest minimum of personnel should be considered. It is probably best to only have a core of permanent personnel involved in distance learning. To achieve this, temporary or contractual employees or even tapping the services of private specialised companies/organisations may be considered when there is much work to be done or when no internal expertise is available. Outside experts have to be employed occasionally when necessary.

The distance learning activity proposed to be established by the National Maritime Polytechnic (NMP) would not be a special purpose school, but rather it will be a programme to be offered as a sideline activity or, more appropriately, as a parallel activity. That is, parallel to the existing conventional courses offered by NMP. The same courses taught in classrooms the conventional way will also be offered via distance learning.

Reference


