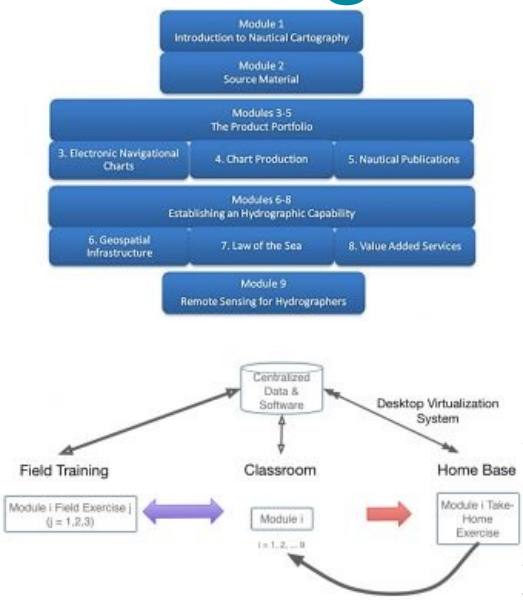
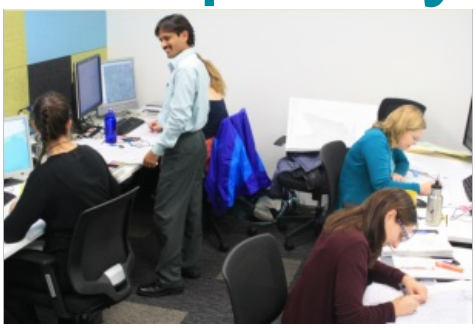
# *TECHNOLOGY AND BLENDED LEARNING FOR FLEXIBLE, MODULAR TRAINING*

# Approaches to Hydrographic Training and Capacity Building



The Challenge: To provide a stimulating educational framework that blends relevant theory with practical exercises without removing individuals from their work environment for too long a period and optimising investment in complex and expensive equipment that may only be used a few weeks per year. The IHO FIG/IHO/ICA International Board for Standards of Competence (IBSC) has recognised the need for the competency standards to continue to evolve to meet these contemporary and future requirements. This paper presents an approach taken to modernise the training and capacity building aspects of these challenges.




The demands made upon the world's charting authorities continue to ramp up. There is increased competition amongst ports and a growth in the size and number of ships. Cruise ships are offering more port of calls and global warming is facilitating vessel traffic in uncharted regions. In addition, there are emerging markets like wind farms, marine turbines, habitat and coral reef mapping which are all providing interesting career options for aspiring hydrographers.

Unless the graduating student has previous experience in the profession there is considerable additional investment required to bring the graduate to the level of competency in the field of work for which they have been hired. In addition, today's survey operations comprise of sophisticated integrated systems that require knowledge in project leadership, risk mitigation, and financial management.

Coupled with this is the demand placed on the existing hydrographic surveyor who is already contributing to their organization's bottom line. They are pressured to maintain Continuous Professional Development (CPD) by their professions, their company, and their own self efficacy. There is a clear demand for programmes that facilitate employee CPD without a prolonged tenure away from the workplace.

## Challenges in Recruiting and Training

New approaches to education have to take into account students from the download generation who are confident, question authority, and where leadership may come from enthusiasm rather than experience. Even the mature student, who is already employed, is well-adjusted to this new way of thinking. However, existing financial obligations and commitments, as well as personal preferences and circumstances, require training programs that do not dislocate them from their work environment for extended periods.

It is too simplistic to make the leap from the profile of millennial learners and assume that a solution like e-learning is the complete answer. While we strive towards creating and facilitating a hydrographic program that adequately provides the necessary domain specific technical training we still need to incorporate the appropriate practical framework.

## Training Options

We rely heavily on learning institutions that provide the fundamental basis from which the student can evolve. However, once a candidate begins focusing on their chosen domain, in this instance hydrography, there are limited options. The same could be said for employees who follow a CPD program.

A recent communicate from the IHO suggests a proposed new structure will have separate Standards for Category A and for Category B programmes, both in S-5 (Hydrography) and in S-8 (Nautical Cartography). The International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers (IBSC) has recognized the need for the Standards to meet contemporary and future

requirements. At the time of writing the IBSC has awarded recognition to approximately 50 programs worldwide. A summary of the list indicates that approximately 70% of those programs are oriented towards government and/or Naval career oriented students. Only approximately 5% of the programs offer an S8 (Nautical Cartography) course.

# Recognizing Change – Case Study

IIC Technologies has been producing ENCs and nautical charts on behalf of hydrographic offices for over 15 years. It is important that the competencies of our production team are of the highest standards that enable us to align our business performance to corporate goals. In accomplishing those goals, we have trained nearly 500 people in various components of nautical cartography, as well as photogrammetry and mapping, through the learning arm of IIC, the IIC Academy (Academy). The Academy is open to both the public and private sector individuals.

The Academy has implemented a Marine Geospatial Information (MGI) learning program – an IHO Category B recognised course based on the S8 nautical cartography syllabus. We designed the program by studying the needs of both organisation and individual and focused on the delivery approach as much as the syllabus in order to maximize the overall effectiveness.

Integrated into our operational environment we have a Quality Management System (QMS) whereby we align our learning programs to our organisational strategies and objectives. Throughout our learning and production processes we review the effectiveness of training not just with tests and exams following training courses but later through performance metrics using the QMS. The objective of this continuous improvement strategy is to monitor the effectiveness of our educational techniques through graduate performance and the quality of output.

Three main core design principles were implemented during the course development.

## Experiential Learning Techniques

Hydrography is well fitted to experiential learning in that the subject matter is highly practical. Most hydrographic and cartographic training has evolved through theory with practical exercises. The subtle but important difference in our approach was a move towards a more conscious adoption of the full cycle, whereby the theory is preceded by learning exercises and followed by group reflection before moving to consolidation.

From the very beginning IIC designed the MGI course to be modular and to be taken over an extended period. In this way, we were able to take into consideration organisational needs to balance training and project work. The learning modules and the intervening periods are considered part of a full cycle of experiential learning. In essence, the intervening periods can be considered to be “work terms” so where practicable, each module will be followed with project work, which will be supported by learning interventions to provide both the reflection and consolidation parts of the cycle.

## Blended Learning

It takes effort and resources to facilitate the demand by the current generation of learners and their desire to use advanced technology. Our approach was to build a learning resource framework that blended the traditional with the modern. Within our strategy, we developed e-learning components that are considered a supplement, not a substitute, in the learning mix. The purpose is to facilitate flexibility in allowing the student access to additional teaching materials while away from the classroom. An enhancement to the approach is the development of the e-learning around shared experiences and workspaces thus keeping the student in a collaborative relationship with other colleagues.

Another important element in our approach was access to, and working with, Subject Matter Experts (SMEs) in the production environment. SMEs now play several key roles and are our “virtual faculty”. The SMEs not only keep us current in teaching methods but also provide new case studies based on recent projects in which they are involved.

## Leveraging Technology as an Aid

Cost was a primary factor in meeting the challenges of providing quality up-to-date training without removing the individual from their work environment for too long a period. The Academy addressed this challenge, especially from the nautical cartographic practical aspect, by facilitating students to log into the Academy’s centralized Citrix server from a remote location for practical exercises. The approach involves the concept of “desktop virtualization”, whereby a computing device can be turned into a fully functional desktop without sacrificing the users IT security rules.

In our approach, lab data remain at the IIC Academy and is made accessible to the students via Citrix remote access technology. This means that a broadband Internet connection is not required and the costs associated with moving huge amounts of data over the Internet are avoided. The data and the processing horsepower needed are on the IIC Academy server; only the command keystrokes/mouse clicks and an optimised replica of the computer screen are passed across the Internet link, requiring far less bandwidth. A related benefit is better utilization and version control of software packages used to process data. Thus, the Academy, and the student are operating on up-to-date software versions and laboratory exercises. Thus, the student can reside anywhere and does not need to carry the software with them.

# Conclusion

The Marine Geospatial Information (MGI) program is an example of how we have started to blend in direct theoretical classroom and practical distant learning using remote technology and resources. Individuals wishing to attend are able to adapt the program to their working environment due to the modular and flexible design. Organizations who wish to sponsor students are able to periodically monitor employee improvement through their Quality Management System. The course has access to the best tools available but accessed remotely which reduces the cost of transporting the equipment, the course setup and the various software licensing issues.

## More Information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https://www.hydro-international.com/content/article/approaches-to-hydrographic-training-and-capacity-building