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One World Classroom for Future Seafarers
A design of a new virtual E-learning environment for Maritime Education and Training

By

Ho Chi Minh University of Transport (HCMC-UT)

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Contents

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for Maritime Education and Training

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Abstract: *This paper presents the educational potentials of applying Multi-User Virtual Environment (MUVE) in Maritime Education Training (MET).Although the use of Multi-Users Virtual Learning Environments are widely recognized, the involvement of MET in this field is still limited. It is acknowledged that MUVE can be utilized to create a constructivist learning environment to support the teaching and training of numerous STCW's competency subjects, and to enhance the experience of learners in their distance learning application.*

Keywords: *E-learning, Virtual world, Multi-User Virtual Environment, Maritime Education and Training*

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Glossary and Abbreviations

Active Worlds	A name of a virtual world platform (http://www.activeworlds.com)
HCMC-UT	Ho Chi Minh City University of Transport
IAMU	International Association of Maritime University
In-world	Inside the virtual world
ITU	IT University of Copenhagen
Kaneva	A name of a virtual world platform (http://www.kaneva.com)
MET	Maritime education and training
MMU	Myanmar Maritime University
MUVE	Multi-User Virtual Environment
OpenSim	A name of a virtual world platform (http://www.opensim.org)
Scripting	Programming inside virtual world. This is to defined or assign functionalities to an object
Second Life	A virtual world hosted by Linden Research Inc.©
SIM	Sim node (or sim host), the physical server machine simulating one or more regions.
SLURL	Second Life Uniform Resource Locator. A web link that leads to a particular Second Life location
Teleport	Instantly changing the locations of an avatar
Virtual word	An environment that is synchronous, persistent network of people, represented by avatars and facilitated by networked of computers.
WMU	World Maritime University

1. Introduction

This research aims to investigate the feasibility of utilizing a Multi User Virtual Environment (MUVE) platform to develop a cutting-edge e-learning environment to promote experiential learning and facilitate collaborative development between MET institutions. The report is intended for educators, trainers in Maritime Education and Training (MET) disciplines who are considering applying the virtual world concept and its potentials into their teaching and training practices.

The Research project called "One World Classroom for Future Seafarers: A design of a new virtual E-learning environment for Maritime Education and Training" is funded by the Nippon Foundation as a part of IAMU's (International Association Maritime University) capacity building project.

IAMU has long recognized that it is only feasible to secure, and to preserve highly qualified human resources in the maritime industries through effective education and training. This also highlights the need to develop mechanisms to facilitate and encourage collaboration between MET institutions and MET experts.

The project was conducted through a cooperation of four universities; Ho Chi Minh City University of Transport (Vietnam), World Maritime University (Sweden), Myanmar Maritime University (Myanmar) and IT University of Copenhagen (Denmark).

MUVE had been widely examined by researchers in other interdisciplinary and educational institutions in order to support teaching and learning processes. However, so far, in MET comparably, less attention has been paid to the area of applying MUVE into education and training activities (Pham, 2011, p.4). Having realized the potential and capabilities of MUVE, it is possible for MET institutions to develop a learning environment that could provide and facilitate:

- An engaged learning environment that could promote experiential learning
- An effective mechanism that enables a contribution to knowledge expansion, production, and collaboration between MET's experts and institution.

Although, research from other professions have reported the educational possibilities of MUVE, these claims need to be verified particularly in the specific Maritime Education and Training context.

This research addresses the concern of "How do the actors (i.e. teachers, students, and other experts) react to adopting the concept of a virtual institution into their teaching and learning practices?" In addition, it is to examine "What subjects or competencies areas are suitable for teaching and learning through the virtual world taking into account the requirements of STCW 1978/1995/2010 Manila Amendments?

Finally, the study is identifying the key elements of designing a MET friendly teaching-learning environment within MUVE?
The empirical data used for answering these research questions was extracted from two empirical workshops within MUVE and a literature case study of related researches of designing learning spaces in a virtual world. The workshops involve the participation of MET educators, MET students, and IT experts to investigate their experiences and perceptions of designing learning space within MUVE as

well as to examine their reactions in adopting the new concept of virtual world for teaching and learning in MET scenarios. In addition, the workshops also help the study to determine the key elements of learning space were important and meaningful to them, which directly help to answer the third research question.

1.1 Terminology

Virtual world exists in many forms, where the scope of this research focuses merely on the modern computer based era. The term "Virtual World" used throughout this paper refer to a world where it has the following characteristics: synchronous communication, persistent network of people, represented by avatars, and facilitated by networked computers (Bell, 2008).

a) Synchronous communication

Shared activities necessitate synchronous communication. A notion of "common time" allows for mass group activities and other coordinated social activities. Virtual worlds also offer an awareness of space, distance and co-existence of other participants found in real life spaces giving a sense of environment. The sense of geography and terrain, the concept of near or far are present within the world.

A webpage such as Facebook, Google + are shared social spaced. Their users hardly have the feeling of the space and they do not constitute a navigable landscape, but rather a walled finite space.

b) Persistence

A virtual world cannot be paused. It continues to exist and function after a participant has left. A persistence characteristic does separate virtual worlds from simulation exercises and 3D video games such as Pac-Man or Galaga. A single member or small group of participants cannot be the center part of the world but are part of a dynamic and evolving community.

c) Network of people

People are the center of a virtual world. Participants communicate and interact with each other and with the environment. Participants can form short term or long term social groups (Williams, Ducheneaut, Xiong, Zhang, Yee, & Nickell, 2006), Although this is not a requirement to be an active part of the ecosystem. For instance, a user can go into the virtual world and not speak to anyone but still interact with the environment. Such solitary actions can affect the world for every other participant.

d) Represented by avatars:

An avatar is any digital representation (graphical or textual) that goes beyond a simple label or name that has agency (an ability to perform actions) and is controlled by a human agent in real time. Avatars function like user-controlled puppets. Users command the actions of the avatar, but it is the avatar itself that performs the action. Even in forms of communication that comes more directly from the user, such as voice chat, are presented as actions taken by the avatar (Bell, 2008). Having said that, a textual description of a character in "Second-life" or a game such as "Age of Conan" is an avatar. However, an avatar photo in a Facebook profile page does not really mean an avatar in the virtual world context because it does not have an agency beyond its creator. Therefore, the human agent cannot transfer the action to his/her agency (avatar). For example,

one can say “My avatar rides a bike and go to school”, in contrast; one cannot say “My Facebook profile sent you a message”

e) Facilitation by networked computers:

This allows the data management of all the objects, environments, interactions and transactions that are made possible through the networked computers. People can instantly communicate across national and geographical boundaries and computers help to keep track of all the conversations, social connections and networks of people.

Such definitions differentiate the virtual world of MUVE with other video games and social network sites. There are some 3D virtual environments that are not virtual worlds. For example, there are some online 3D games that a huge amount of peoples can join, but the environment of the game is reset after every new session or when the game objectives have been accomplished. In these types of virtual environment, there can be synchronous communication or synchronous actions, there can be the representation of avatars, and it is facilitated by networks of computers or people, but the environment is not persistent. Additionally, social network, such as Facebook, Google+ are not virtual worlds. These networks do have persistence, but do not provide senses of synchronous communication, environment and sense of space. There are no avatar characters to represent the human agent, only description of agents.

Therefore, the concept of “Virtual Institution” that follows would refer to the organizational environment that is facilitated within and inherits all the characteristics of a virtual world. Next, this paper will go through several important terms that are related to the virtual world concept.

Multi – Users Virtual Environment (MUVE): In this paper, the term MUVE is used to describe a higher level of generalization which includes but is not limited to the definition of the virtual world. Multi-users is the key. A standalone video game – a game that can only be installed and played on a single PC - is not included in this definition. MUVE does include the LAN connected multiplayer game, Massive Multiplayer Online Games (whether these games are a virtual world or not).

Virtual Environment: the use of this term is to describe the highest level of generalization, which includes any virtual spaces graphically generated by computer(s). For example: PC 2D/3D games, Multiplayer game, Online game, 3D graphic simulation, MMOGs, and virtual world.

Computer games, Video games and Games: These terms are used interchangeably to cover the array of educational electronic sound games. Otherwise, the specific detail for identification will be given to or the term “traditional game” will be used in case of no electronic game.

Simulation: this term should be interpreted generally in wider scales and contexts. It does not particularly mean a strictly requirement of Marine Simulation as in the MET field. For more clarifications, see the Appendix I - “what is Game, Simulation and simulation game?”

1.2 The use of Second Life in this research

There are a variety of virtual platform options available in the market. However, the Second-Life from Linden Research Inc. will be used to investigate the case due to the following reasons:

a. Many educational purpose experimental activities are associated with this platform. Based on the Second-Life education directory, Over 150 educational institutions have registered

themselves and are participating in Second-Life. (Data retrieved on September 03 2012, from http://wiki.secondlife.com/wiki/Second_Life_Education_Directory)

b. Second-Life represents the most mature of the social virtual world platforms, and the above stated high numbers of registration compared with other competing platforms reflect this dominance within the educational world (Warburton, 2009).

What is Second Life? Second Life is a virtual world owned and managed by the company Linden Research, Inc. (http://secondlife.com/). To enter the virtual world, users need to download a free program provided by SECOND-LIFE called "Second Life Viewer" (Second-Life-Viewer). With a free account registered from the Second-Life homepage, one can then get access to the virtual world via a computer with internet connection. While a player is in-world, there are variety of ways to communicate with others. Verbally, the user can use text, voice chat or an embedded email program, which can help the user to send an email to other directly through the Second-Life - viewer. The program also supports non-verbal communications such as body gestures, animation, and visual appearance. Moving from place to place in Second-Life is easy with instant teleport function.To participate in event such as discussions, conferences, classes, a user just enters what is called "a grid-address" and the avatar will teleport to the destination. The user can locate other online people in the vicinity area through a mini-map. Instantly, a user can also search for on-going events, interesting places to visit, and participate in such events. For example, in this research, the authors could search for educational campuses, and then utilize its facilities to test several purposeful activities.

Educational Activities within Second-Life– The educational purpose of MUVE has been long recognized through the use of gaming platform. Second-Life is not an exception as more than 150 institutions have registered themselves in the educational directory of Second-Life, and have officially established their virtual facilities. In other literature, the number is even higher. Michels (2008, p.4) indicated that at least 300 universities around the world teach courses or conduct research inside Second-Life.

Educational organizations such as the New Media Consortium (NMC) and the International Society for Technology in Education (ISTE) have constructed infrastructure inside Second Life (Inman, Wright& Hartman, 2010).

Figure 01 and Figure 02 present the descriptive analysis of the raw data collected from the Second-Life education directory, which is available online on Linden Lab's Website. The raw data is a list of institutions that have registered themselves as participating in educational activities with this platform. The 152 institutions registered in Second-Life represent for 21 countries. As is visible in figure 01, North America with Canada and America dominate with 64% of the users, whereas Europe and Australia come after with 21.1% and 9.2% respectively. Figure 02 shows that most of these institutions are universities with 71.05% and community college with 11.18%. Surprisingly, some K-12 level schools have already taken initiative in the area of using MUVE into education activities.

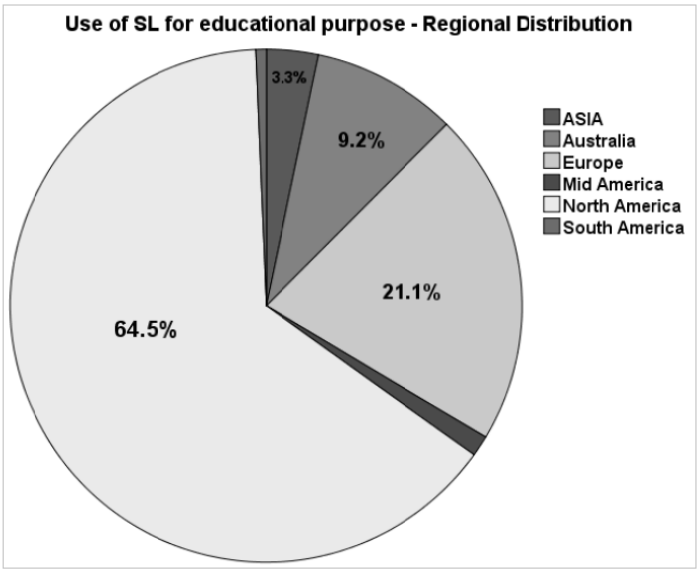

Figure 01 - Utilizing Second Life in education, Regional distribution (2012)
Source from http://wiki.secondlife.com/wiki/Second_Life_Education_Directory

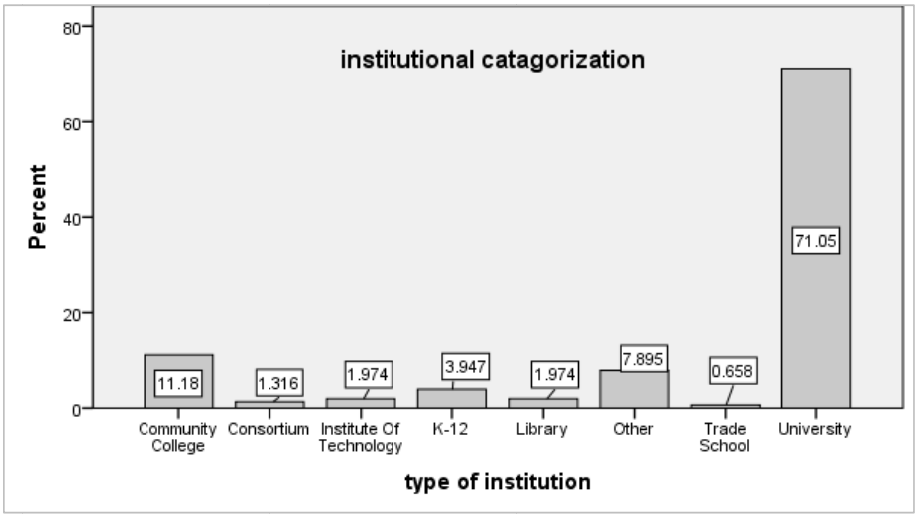

Figure02 – Types of institutions that are involving in educational activities in Second Life

Virtual worlds are increasingly used by educators to teach students, conduct classes, and to explore new opportunities for teaching and learning (Inman, Wright, Hartman, 2010, p.46). There are a variety of subjects being taught in the Second-Life environment ranging from programming, natural science, economics, laws, foreign language, and literature art. In addition, Second-Life platform can also host a number of (often free) educational events such as conferences, lectures, interviews, discussions, and meetings.

2. Background

New advancements in Information Communication Technologies (ICT) open up more and more choices for new modes of learning. The potential and capability to deliver learning at a distance has led to a global revolution in education. Many educational institutions now provide a range of courses and programs to students outside the local campus. In addition, there are an increasing number of open courses that students can participate in distantly over the internet. The contemporary youth generation is showing a great potential in adopting the use of new media. The increasing number of interactive and communication networks that connect peoples, organizations, and data sources have completely changed the way people work, socialize, communicate, live and learn.

Obviously, these changes are also reflected in both MET and maritime workplaces in general. As new requirements are introduced, the educational knowledge and skills one has today, may be challenged or even obsolete tomorrow. The fast rate of change in the development of ICT puts MET students vulnerable to the increasingly complexity and uncertainty of work realities.

As Muirhead (2003) recognizes, in MET, ICT is opening up new opportunities to extend the learning and training environment to onboard the ship. Within a MET context, such changes are bringing about challenges as well as opportunities for the industry to better support their workforces. That also means MET should provide innovative teaching and learning tools, to create an enhanced learning environment that can go beyond the limitation of traditional systems. It also provides opportunities for the MET communities to collaborate and to facilitate the utilization of the intellectual resources. New technologies also help to promote a two-way knowledge exchange between the industry and the educational process.

The importance of lifelong support for seafarers and the extending of education beyond the traditional systems have long been recognized. In a paper about the role of maritime universities in empowering seafarers, Solanki and Nakazawa (2007) emphasize the need of continuously supporting quality education for the seafarers. It is recognized that most shipping journals, magazines, conferences, and seminars highlight the shortage of well-educated and trained manpower on board ships, whereas 90% of seafarers sailing and ashore feel the need for higher education. It is suggested that empowering seafarers through higher integrated education and multiple skill development makes the career at sea more attractive by opening up a multitude of career options through the sea career path. By implication, a MET institution should not only create educational programs that are less expensive in time and money, and more flexible, but also making the best uses of both class teaching and online learning that promote independent learning and reduce the class seat time (Granham & Keletta, 2002).

Not only that, there are also other challenges due to the effects of globalization, where the maritime industry is becoming an increasingly multicultural working environment with a high workforce mobility. Such changes in the working environment also impact the educational sector. Horck (2004) predicted that one day MET institutions might be faced with a student body of cultural mix that they are not trained to handle.

The introduction of STCW 1978/1995/2010 Manila Amendments have brought about new challenges for MET stakeholders. The aim is to bring the Convention and Code up to date with recent development in the maritime industry as well as to tackle issues that are foreseeable in the future.

Amongst these amendments, there are some specific training issues that have received considerable attention recently;

- Resource management and leadership & teamwork,
- Multicultural and Communicative competence.

These important skills are sometime referred to as soft-skill training or non-technical training. However, it is a question of how MET can integrate non-technical training with technical training and that how such training can be organized, structured, and blended into the MET curriculum.

Being influenced by many factors such as technology innovation, the dynamic change in international laws and regulations, and the changes in industry culture, the future seafarers need to be equipped with interdisciplinary skills and knowledge to handle the dynamics and uncertainty of working reality. This means that the faculty members of MET institutions should also find ways to upgrade, and exchange knowledge and expertise with their students and their peers. Actually, the calling for the utilization of collaboration tools to address the immediate needs of the campus has been strongly emphasized.

In expertise exchange, whether it is a maritime expert or a faculty who is from other professions, there are always challenges of understanding and embracing the pedagogical and scholarly demands associated with a dynamic balance of theoretical and experiential education (Zingale, 2007). Obviously, in the current era of constant technology innovation, many educational assisted tools are constantly developing and gaining more and more attention. These include simulation, video conferencing, and online learning tools that are used in teaching and learning concepts for e-learning, blended learning, and ideas like open educational resources.

There is also an emerging trend of utilizing the 3D virtual world of Online Multi-User Virtual Environments (MUVE) for educational activities. They are getting more attention and increasingly being examined by researchers. The term MUVE is currently used to describe a persistent 3D graphical environment which can be accessed over the internet and allow large number of simultaneous users to interact and communicate synchronously (Salt, Atkins & Balckall 2008).

The implementation of the “Virtual Institution” concept, which is a utilization of progressive development of MUVE platforms, have been introduced and its use is being examined by industryas well as by many highly reputable universities. Examples are Harvard, MIT, Yale, Princeton, Lund University, IBM, Microsoft. Additionally, there is a considerable amount of research that has focused on evaluating and reporting about experiences of using the virtual worlds in education.

However, in MET, less attention has been paid to the area of applying MUVE in educational activities. Having realized the challenges and foreseen future developments in MET as well as taking into account the potential and capabilities of MUVE, it is possible for MET institutions to develop a learning environment that can provide and facilitate:

- An enhanced learning environment that can foster experiential learning
- Lifelong learning opportunities for the maritime society and to improve MET current distance learning effectiveness.

- A mechanism that effectively enables a contribution to knowledge expansion, production, and collaboration back from the maritime society

Although, many advocacy works and research from other professions have reported the educational possibilities of MUVE, these claims need to be verified in aMET context. The utilization of MUVE in educational practice is a young research area. Having realized the potentials, challenges, and the limitations of MUVE and its applications in MET from several piloting study, this research, however, will explore further in the directions of how MUVE's application can fit into STCW 1978/1995/2010 Manila Amendments' training requirements with below concrete competency targets:

- Communicative competence
- Multicultural training
- And Team building

This research aims at creating a "Virtual MET classroom" and positions as a cutting-edge component in a broader research initiative to support the MET community. The virtual MET classroom is explored to further common e-learning approaches with a number of new potentials. The main focus is to examine the feasibility of adopting the concept of 'virtual institution' to MET scenarios in terms of pedagogical, technical and practical aspects with the desirable goals as:

- To exemplify the possibilities of utilizing virtual e-learning system to construct a new learning environment that provide life-long learning support for future seafarers and MET experts and to improve the process of knowledge transfer between maritime experts and MET institutions
- And to understand the socio-technical design of a new virtual e-learning environment.

To achieve such goals, the following questions will guide the process of conducting this research:

R01: Which subjects or competence areas are suitable for learning through the virtual institution?

R02: How do the actors (i.e. teachers, students, and other experts) react about adopting the concept of a virtual institution in MET?

R03: What are the key elements of designing a virtual institution in MET?

The research objective R01 is archived by investigating the MUVE from a pedagogical perspective. Several pedagogical theories that lie underneath the educational applications of MUVE will be examined under the light of certain applicable STCW competencies required by STCW 2010 Manila Amendments. The research will look at how virtual environments can help MET educators to provide a learning environment that engages students in more meaningful ways than those that are typically seen in the traditional classroom (McLester, 2005), or an environment in which engagement and higher-order thinking skills combine in a challenging, learner-centered instructional setting (Shaffer, Squire, Halverson & Gee, 2005).

The research objective R02 is achieved by examining social technical aspects of the applications of MUVE directly in STCW oriented lessons (e.g. Maritime English class, Culture awareness topic and ship familiarization lesson). Reflections from MET expert who has been involved in experiment activities and recorded video data are key components to beinvestigated. In addition, literature case

studies of other empirical research that are conducted by other universities or educational institutions across other professional fields will be analyzed. Such examinations provide this research with information about how MUVE can be best implemented in MET daily teaching and training practices as well as the lessons learned from difficulties and challenges in the implementation process.

In order to accomplish the research objective R03, the barely technicality and practicality aspects of applying MUVE in the MET will be considered. In this sense, various source of information in the area of the virtual learning environment, and from MET's experts will be discussed. To support the assessment tasks, the empirical data from the two experiment works will be used. Additionally, a research from Open UK University - Design of Learning Spaces in 3D Multi-user Virtual Environments is used as the reference framework to identify the key elements of designing a virtual institution in MET.

3. Related works and theoretical framework

The premise of learning by doing is widely recognized, especially in specialized education and training as MET. In this sense, the learning activities should reflect the reality of work. Dewey argues that knowing and doing are tightly coupled (Dewey 1915, 1958). Learning happens in the context of an activity where a person is trying to accomplish some meaningful goals and has to overcome obstacles along the way.

The use of MUVE as a educational tool is getting more and more attention of educators. There are a variety of ways of utilizing MUVE across educational activities. Educators are looking to virtual worlds for their potential to foster experiential and constructivist learning (Inman, Wright, Hartman, 2010). Dede (1995) states that 3D virtual environments could potentially provide safe environments whereby students can learn by doing. Dickey (2003) found that although there are constraints, 3D virtual worlds do support constructivist learning because it enables the users to interact with each other and with the environment.

However, with the definition of virtual world used in this research, one could contest how a virtual learning environment, where students sit in front of their computer, moving a computer mouse, and barely pressing the keyboard can resemble learning something authentically? How such environment can facilitate learning processes to happen? Before moving forward to realize the potential application of MUVE in MET, it is essential for us to investigate the intrinsic educational theories that lie under MUVE concept.

3.1 Epistemic Frame

Epistemic frame theory suggests that professional thinking is best understood not in terms of knowledge and skills in a professional domain, but rather as an epistemic frame composed of knowledge, skills, values, and identity linked by a particular professional epistemology – a way of making decisions and justifying actions. Different professions have different epistemic frames or different ideologies – ways of seeing, valuing, being in the world (Gee, 2005). For example, lawyers act like lawyers, identify themselves as lawyers, they are interested in legal issues, and know about the law. Such skills, habits, and understanding enable them to look at the world in a particular way – by thinking like a lawyer. It is the same for doctors and seafarers, but with a different epistemic frame – a different way of thinking. Then reproducing the practices of the community are the means by which the new members develop such epistemic frame. In other words, by replicating the real world practices or simulate a real world problem solving model it is possible to provide an alternative educational scheme that help practitioners to develop their epistemic frames.

The virtual world of MUVE with its powerful recreation and collaboration capabilities can complement the educational activities of different professions, resulting in the ability to simulate or create the real world attributes, for example; lighting, gravity, interaction with objects and with the environment, communication with other people, and visual auditory experience. This set of attributes can enable the learners or trainees to immerse themselves in a virtual learning environment that represent the reproductive practices that are valued by its professional community. By participating and acting in such replication worlds, it is possible for the learners to develop situated understandings, effective social practices, identities, and to recognize the shared values, and ways of thinking of a community of a practice. (Shaffer, Squire, Halverson & Gee, 2005; Laughlin, Marchuk, 2005).

Shaffer (2006) argues that the connection between epistemology and practices that make up an epistemic frame are potentially powerful in designing of an instructional 3D virtual environment that replicate or reproduce practices that are valued by its community of practice. An obvious example of this theory is the use of maritime simulation in MET practices.When a student acts as a real seafarer in a bridge simulation room, he can link his thinking, knowledge, skills, practices and values of a real responsible seafarer. The epistemic frames that are formulated within him will help to transform the learning process into his competencies of problems solving in real world.

> *Therapists, soldiers, pilots, lawyers, business doctors, nurses and teachers all engage in real life role play while learning the contexts and conditions particular to their professions during their days at the university or in training. (Jarmon, Traphagan, Mayrath, and Trivedi, 2009). Then Multi-User Virtual Environments (MUVEs) are uniquely suited media for developing role playing scenarios to engage learning, if we provide the right mix of opportunity and structure. Indeed, role-playing in MUVEs may represent perhaps one of the single most compelling educational opportunities for adults in the 21st Century. (Second-Life transcript, Special Speaker Series in Second Life, International Society for Technology and Education, March 27, 2007).*

3.2 Learning theory – learning as products and the conceptions of learning

As with most educational and training specializations, there is an increasing focus on competency based learning activities. The learners are expected to use their knowledge, and understanding of subject matter, to perform some kinds of hand-on practices in order to demonstrate their competencies for the job. Having said that, then the shifting in their performance from novice to professional can be seen as the outcome of the learning process. In order words, the learning process has affected the learners to change their behaviors both mentally and physically such as the ways of thinking, the cognitive processes, skills, and performances. As a result, there is a shift from an incompetence or novice learner to a competence, or a professional. Such approach to learning highlight the "learning as products" view point, and emphasize on a crucial aspect of learning is to change.

However, according to Merriam and Caffarella (1991, p124), doing actual hands-on practices is not the only way that one could make learning happen. If the learning is perceived as the product of some process and resulting in changing behaviors, then there are other mechanisms that can make the learners to change their behaviors.

Smith (2003) mentions in his paper that Säljö (1979) has carried out a useful piece of research that suggests five main conceptions of learning – five ways that learning can happen which can cause the learners to change their behaviors:

[a] Learning as a quantitative increase in knowledge. Learning is acquiring information or 'knowing a lot'.
[b] Learning as memorizing. Learning is storing information that can be reproduced.
[c] Learning as acquiring facts, skills, and methods that can be retained and used as necessary.
[d] Learning as making sense or abstracting meaning. Learning involves relating parts of the subject matter to each other and to the real world.
[e] Learning as interpreting and understanding reality in a different way. Learning involves comprehending the world by reinterpreting knowledge. (quoted in Ramsden 1992, p.26)

The conceptions [d] and [e] are qualitatively different from the first threes. Conceptions [a], [b], and [c] imply a less complex view of learning (Ramsden, 1992) and consider learning something external to the learners. Conception [a] is likely to happen in the teacher centered paradigm where learning just happened or is done to students by the teacher, whereas the conception [b] sees learning as something upgradable, the more you get the more you possess and likely to happen in a sense of extensive reading. As with the conception [c], there is a growing emphasis on "knowing that" to "knowing how" where actual hands-on practices and reflections of learning context is a key. The last two conceptions [d] and [e] look into the internal or personal aspect of learning and refer to learning that may happen by conceptualizing and synthesizing the knowledge gained to comprehend the world.

Based on this, it can be argued that in order for a learner to learn something – or to change their behaviors - they can also engage in alternative ways of learning. A simulated world of an immersive 3D environment may support the learner to conceptualize the reality of work via its virtual setting so that the learning can happen at higher order thinking skills.

However, such arguments does not mean to diminish the importance of hands-on practices but rather to demonstrate that an immersive virtual world can support the learners to acquire soft-skills rather than physical skills.

3.3 The Educational Potential of MUVE

3.3.1. How MUVE has been used by other disciplines?

The virtual worlds of MUVE, in general, have been increasingly used by educators to teach students, conducting classes, and to explore the opportunities that virtual worlds may present for teaching and learning (Inman, Wright, Hartman, 2010, p.46). There are a variety of subjects being taught in the Second-Life environment ranging from programming, natural science, economics, laws, foreign language, and literature art. It is also a host of a number of (often free) educational events such as conferences, lectures, interviews, discussions, and meetings. Virtual worlds are being employed for holding meetings and conferences, training (e.g. simulating crime scenes for law enforcement training), therapy (e.g. community-based therapy for military veterans), and for demonstrating prototypes through simulations to get early stakeholder feedback before real-life production of products and services (Minocha, Tran M. Q., Reeves, 2010).

A massive amount of advocacy works involving the potential use of MUVE in education is emerging. Many of these pioneer researches have focused various aspect of virtual learning environment. Many studies across disciplinesdo suggest that3D virtual world (MUVE) supports new ways of learning, particularly, informal learning through socializing, collaboration, role-play and exhibition simulation. There is a transition from the traditional "directional" mode of teaching to more social constructivist pedagogy. An appropriate design of a 3D virtual environment can foster creativity among students, aid socialization, facilitate informal learning, and enable experiential learning. (Minocha, Mount, 2009).

There is increasing research that focuses on experimenting, evaluating the use of MUVE, and assessing different aspects of educational purpose of MUVE. Kay and Fitzgerald (2008) suggest a long list of educational activities categories that they believed can be carried out in Second-Life – a dominated MUVE platform on the market:

- self-paced tutorials;
- displays and exhibits;

- immersive exhibits;
- role plays and simulations;
- data visualizations and simulations;
- historical recreations and re-enactments;
- living and immersive archaeology;
- machinima construction;
- treasure hunts and quests;
- language and cultural immersion;
- creative writing.

Warburton (2008b) states that the virtual world has been deployed within a number of disciplines to create educational opportunities, which implies both formal and informal learning approach. These can be role-play and performative learning, experiential learning, cooperative learning and game-based learning.

The educational activities that are currently in operation, experimented with and being constructing or planned inside virtual worlds are extensive and thus an attempt to provide a complete snapshot is likely to be impossible.

With all the effort making the preview closer to the MET practices, the examples of utilizing MUVE has been intentionally selected in a sense that follow common MET's training courses (e.g. Law & convention class, Maritime English class, Shipboard familiarization, Culture awareness, etc.).

Figure 03:Courtroom simulation in Second Life, Image source: University of Portsmouth

- **Linguistic training:**This is one of the most popular experiment activities in many MUVE platforms and not surprisingly, the potentials of MUVE have been cultivated over a long time. For example; American ESL (English as a second language) teachers with a real life English school in Germany, have been experimenting with ESL teaching in Second-Life since 2006 (Ruberg, 2008). These studies suggest that the affordances of the 3D virtual world enable teachers to provide authentic immersive learning experiences with opportunities to use language apparently in real setting. These simulated worlds can

facilitate multilingual, multicultural environment that enrich opportunities to speak English (Derrington & Homewood, 2008)

Figure 04: The hairdressing room use for English Class (Derrington & Homewood, 2008)

Figure 05: Shopping in simulated Super market used for practicing foreign country traveling (Derrington, 2011)

- **Hazard detection:** a 3D virtual world has been utilized to enable students to practice hazard detection training in a safe and controllable yet cost effective environment without building a physical simulation. The study conclude that using such 3D virtual world to teach and assess hazardous detection skills provide great help to the students with more than 82.5 percent of positive feedback. These exercises produce more engaged discussion when compare with traditional classroom activity (Sutton G, 2011).

Figure 06: the hazardous area is highlighted (red) and giving additional feedback as a pop-up window.

3.3.2. How MUVE has been used in MET.

The trend of applying MUVE into teaching and training practices is increasing across interdisciplinary domains; however, there is insufficient focus on the area of utilizing MUVE within MET practices (Pham T. H., 2012). In accordance to a piloting study conducted in 2012 - although that interpretation should be assessed with additional sampling data to have statistical significance confirmation, there is a tendency to infer that the applications of MUVE are still very limited in MET.

The survey questions in the study asked the respondents whether they have experienced or used any game-based or MUVE for teaching purposes. With n=12, there are 83.3% that has not had any experience with the use of MUVE in teaching activities before. Interestingly, in further investigating the other 16.7% of respondents, it turned out that these respondents had misinterpreted the concepts by indicating "CBT, and Bridge Simulation" which is a different concept. This leads to the conclusion that the valid percentage is 100% of the respondents that had not had experience with utilizing MUVE in education.

Table 1: The percentage of respondents regarding the use of MUVE in MET's practices

The use of Multi-User Virtual Environment in teaching

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	10	83.3	**83.3**	83.3
	yes	2	16.7	**16.7**	100.0
	Total	**12**	100.0	100.0	

Base on the literature review process together with the result of this survey, it appears that MET are quite behind the trend in embracing new educational technology and ICT innovation to enhance the effectiveness of their teaching and training practices. However, it is important to take into account the fact that the survey asked the respondents about their personal experience with MUVE, but not asking about the use of MUVE at their institution level. With a small sample (n=12), and 33.33% respondents come from other types of institutions, probably there are MUVE implementation processes that are undergoing at institutional levels that the survey did not fully cover.

4. Research Approach

The study was conducted using qualitative flexible design approach where qualitative and ethnographic methods were used to evaluate the empirical material.
The intention was to understand the real application of MUVE in a maritime education situation. The research approach focused on capturing the meaning of experiences, behavior in context and its full complexity. To this end, a flexible design research approach is preferred compared to fixed design quantitative alternatives; Working hypothesis could be put forward and tested during the research process and the emergence of concepts from the data was in focus rather than their imposition in terms of a priori theory (Robson, 2002 p.25).

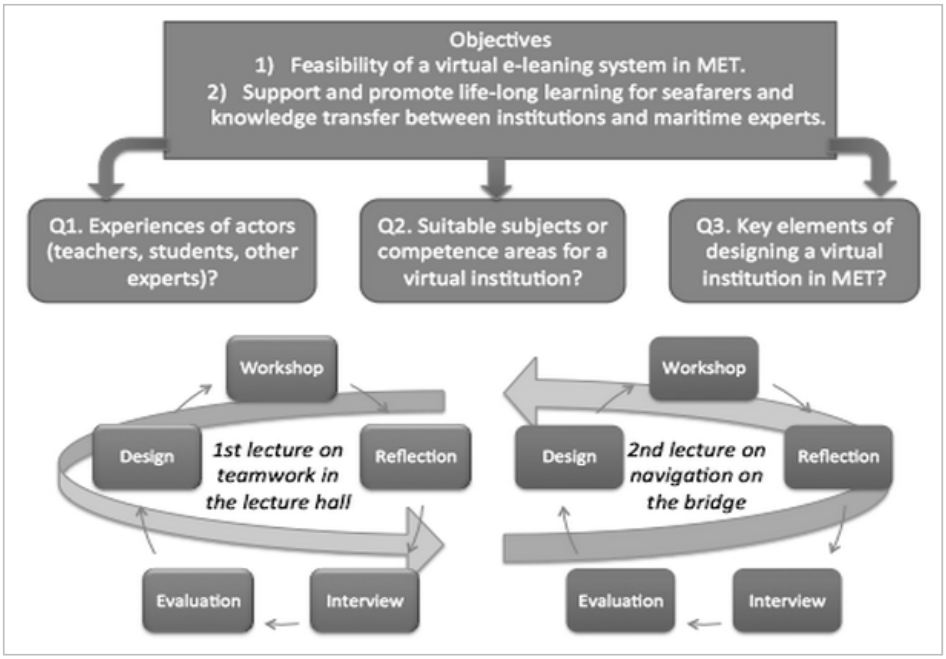

Figure 07: research approach and the rationale of the two workshops

To answer the research questions, two cycles of MUVE experiments with follow-up evaluative empirical data gathering constitute the empirical material in this research. These experiments simulate educational scenarios in a MET setting where a teacher engages with students in MUVE:

- **1st lecture on teamwork in the lecture hall:** The first workshop experiment was designed and carried out in a grounded theory manner. There is no prescribing expectation from the outcome or fixed areas of inquiry. Instead, the intention was for the experiment as much as possible to resemble a real prospective situation where MUVE as an educational tool could be used.
- **2nd lecture on navigating on the bridge;** The second experiment targeted a number of specific dimensions of interest for further enquiry based on the evaluation outcome of the first exploratory experiment. It was conduct in a comparably control environment at one maritime university with one student group.

The MUVE workshops and their design are described in the chapter 5. The evaluation of the MUVE workshops were carried through for interlinked activities, which are accounted for in detail in chapter 6 and 7:

- **Recorded video and audio materials:** During the MUVE teaching and learning experiments, both the interactions inside and outside the virtual world were recorded. Inside the virtual world, a screen-capture software was used to record the teaching and learning situation. Outside the virtual world, the activities of the students at their computers at each site were also captured by video camera. This dual recording provided important benefits, as it was possible to capture the students "outside" behavior to "inside" events (see figure 8 and 9). After the experiments, an immediate follow-up evaluation session was carried out with the students inside the virtual environment. The evaluation of the recorded video and audio material is described in section 6.1.

- **Breakdown of MUVE workshops:** To systematically analyze how the planned design of the MUVE workshops was realized during the workshop, a breakdown workshop was carried out. This breakdown workshop was carried out at an offsite location with Dr. Dittrich, who did not participate in the workshops, to prompt additional perspectives and questions on the recorded video and audio material. The breakdown of the MUVE workshops is described in section 6.2.

- **Interview and focus groups:** To get yet additional perspectives of the sequence of events that took place during the experiments from the students' point of view, follow-up semi-structured interviews were carried out. These were carried out onsite with the students in Sweden, Vietnam, and Myanmar and are described in section 7 (also see figure 10).

- **Reflections from the teacher and technical facilitators:** The final evaluative activity carried involved self-reflection of from the teacher and technical facilitators based on their notes during and after the MUVE workshops. This is described in section 7.5.

Figure 08. Recording of video and audio material from the MUVE workshops:
All the recorded material from the different sites and the screen capture from 2nd life were edited together in special software. As shown from the figure 8, each video and audio became a layer (bottom) that could be merged together in different configurations (top-right). This enabled the researchers to move between and switch certain aspects of the empirical material on and off during the evaluation. This feature also enables researchers to sync the virtual world activities with the real world behavior of participants for further analysis.

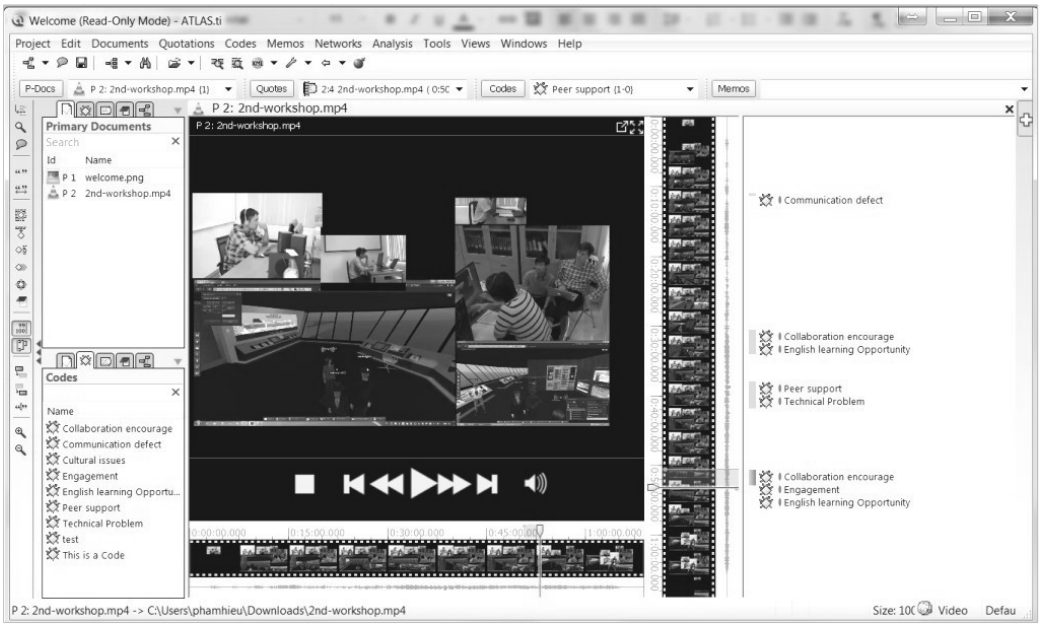

Figure 09. Data analysis of recorded video and audio material from the MUVE workshop: The coding and the extensive analysis process are assisted by another special "qualitative Data Analysis and research Software" - ATLAS.it (http://www.atlasti.com/index.html)

Figure 10: Onsite interview and focus-group with students at Myanmar Maritime University carried out by Kitada and Bolmsten

Trustworthiness of the empirical data

The authors took care to create a scientifically valid account of the MUVE workshops. Specifically, (1) we provided the most possible completed account of the empirical research and its analysis (traceability); (2) the MUVE workshops were complemented with other data sources like recordings of meetings, interviews, and workshops to further understand the empirical material (data triangulation); (3) the author Dittrich has provided support for reflection on the social constructions of the research material through offsite debriefing session (researcher triangulation); (4) the MUVE workshops as well as parts of the analysis have been evaluated and discussed with the participants of the MUVE workshops (member checking). Based on these grounds, we are confident that we can provide a trustworthy account of the research process and results below.

5. Description of the experiments

5.1. First exploratory MUVE experiment

The design of the experiment

The first MUVE experiment was carried out on the 28th of June 2013, between 08:00-12.00 (UTC+01.00). Student groups from the three Maritime Universities participated:

- World Maritime University in Malmö, Sweden (6 students);
- Ho Chi Minh University of Transport (2 students) in Ho-Chi Minh, Vietnam,
- and Myanmar Maritime University (3 students) in Yangon, Myanmar.

As described below, the experiment was preceded by a number of planning, training, and technical configuration preparations. After the experiment, a Follow-up semi-structured interview was carried out with the students from all the three participating universities.

Preparation

Because the workshop was conducted entirely inside the virtual environment, a basic training session was arranged for both the researchers and the students. The training session intended to equip everyone with sufficient skills to operate the virtual setting. The training covered:

- Register with the Second Life service; create an avatar and basic configuration.
- Manipulating the navigation of the avatar inside the virtual world, interacting with various basic objects. For example: moving an avatar around, flying, teleporting an avatar to a desired destination, sitting down on a chair, and how to change the gestures.
- Handling 3D grammar, visual proximity and physical proximity such as adjusting the point of view, using the mini-map and regional map.
- Managing the communication features: getting to know how to use the voice chat in public channel and private channel, instant messages and group messages, managing email, group and contacts.

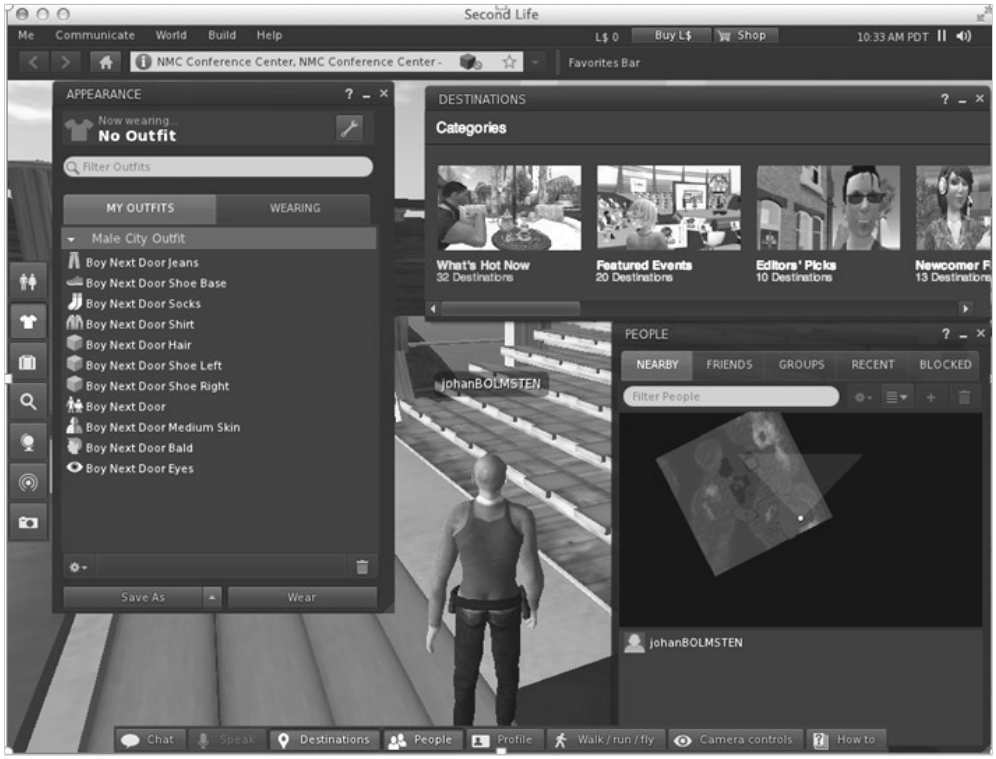

Figure 11. Configuration and selection menus for avatar. Left, configuration menu of avatar that includes selection of clothes and other personal attributes. Top-right, selection of popular destinations to teleport (travel) to. Bottom-right, mini-map showing the current environment and the location of friends

The Learning space

Based on the workshop configuration planned by the research team, it was clear that there was a need to provide traditional classroom setting (lecture hall alike setting) which could minimize the gap of familiarity to the environment of the students.

The venue for the workshop was a virtual lecture hall designed by NMC Virtual World named NMC Conference Center

(http://virtualworlds.nmc.org/portfolio/conference-center/).

This virtual hall is designed to facilitate a conference experience from start to finish. There were many rich interactive media objects available to support the participants such as the display of streaming movies and web pages. It also supported live streaming of the conference program out into the web and even two way interaction between conference participants and audience members who were unable to come in-world.

However, based on the requirements of the first exploratory workshop, just some basic features of the NMC conference Center were used. In particular, we used the display board to stream a web page that connects to a prepared Google-app documents and presentation.

Figure 12: the Overall configuration of the lecture hall with stage area in the front together with presentation board and seating area in the back

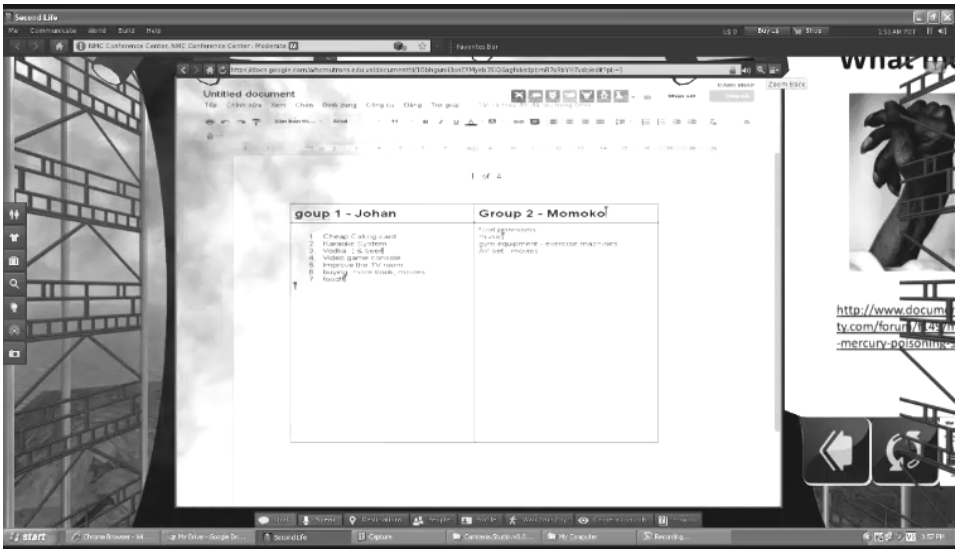

Figure 13: Close up of the presentation board in the front of the lecture hall, where a Google-doc is embedded

The Researcher roles

Because one of the desirable goals of this research is to exemplify the possibilities of utilizing virtual e-learning system, STCW-78/95/2010 Manila Amendments' requirements were used as the reference for decisions regarding the design of the subject to be taught. STCW 2010 new requirements, leadership and teamwork were selected to be a topic of the 1st workshop. Bellows were agreed to ex-ante:

- Teacher: Dr. Kitada
- Teacher/ Technical Facilitator: MSc. Bolmsten, MSc. Pham, May Soe Aung
- Students: 6 students from WMU, 2 students from UT-HCM and 5 students from MMU[1]

The workshop Configuration

The workshop configuration has four main sessions.

Icebreaking session, (2) Lecture, (3) Teamwork & leadership group exercise, and (4) Round up & reflection.

The workshop truly represented the multicultural working environment where eleven students are from six countries (Vietnam, Myanmar, Ukraine, Colombia, Kenya and Egypt).

[1] *Due to the availability of PCs and internet access, 5 MMU students shared 2 avatars to operate in group.*

Table 02: The detail configuration of the first workshop

	Content	Pedagogical & Technical Intention
1	**Icebreaking session** Warming up, get students familiar with the virtual world lecturing grammar. Students are getting to know each other. Lead by free conversation as of the first day international student gather in a lecture hall.	**[Pedagogical]** • Practicing basic skills in MUVE environment • Reflecting on verbal and non-verbal behavior • Introduction to group work in virtual world • Cross culture exploration • Introduce STCW cultural related matters via virtual world • Leadership in ad-hoc group • Rounding up the development of learning outcome • Reflection on learning situation, experience and engagement. **[Technical]** • Resolve technical problem if any • To understand the communication affordances of MUVE • Assessing group presentation, collaboration affordance of MUVE
2	**Lecture** Introduce the topic of the day, teamwork and leadership under the STCW Convention. Explain the updates in the STCW Manila amendments and highlight the importance of leadership and teamwork. Discuss the challenges of training such non-technical skills among seafarers from various cultural backgrounds.	
3	**Teamwork & leadership exercise** Mix the regions of participating students and form a group of 5 or 6 people. **[Team Building]** Each group; decide who is the Captain, Chief officer, second officer, Chief Engineer and second engineer. If the team has more people, name them bosun, helmsman, cook etc. Given scenario is that the team members are seafarers on a tanker ship. Their ship has just been allocated 10,000 Euro to be used strictly for welfare on board. The crew has to discuss the 'wish lists', along with some appropriate budget figure for each item. (An example could be to buy a computer, DVDs and books, Karaoke set, BBQ party, sports equipment.). The Captain asks his/her crew to share the top priority item on their individual lists with the entire team. As a team, discuss the individual priority listings and attempt to arrive at consensus on a team list. Post this information on an embedded discussion board.	
4	**Round up & reflection.** The lecturer rounds up the class and summaries the main points of the lecture. The students may wish to comment and feedback to their experience and share their ideas in the classroom.	

Figure 14. Virtual classroom in 2nd life from the from an avatar's perspective. During the lecture Pham's and Kitada's avatars were present on the stage. All the students were asked to sit down and listen in the audience places. The green symbol above the avatar indicates that he is talking. In addition, the avatars could communicate with each other by text (bottom-right), either broadcasted to all participants or in private.

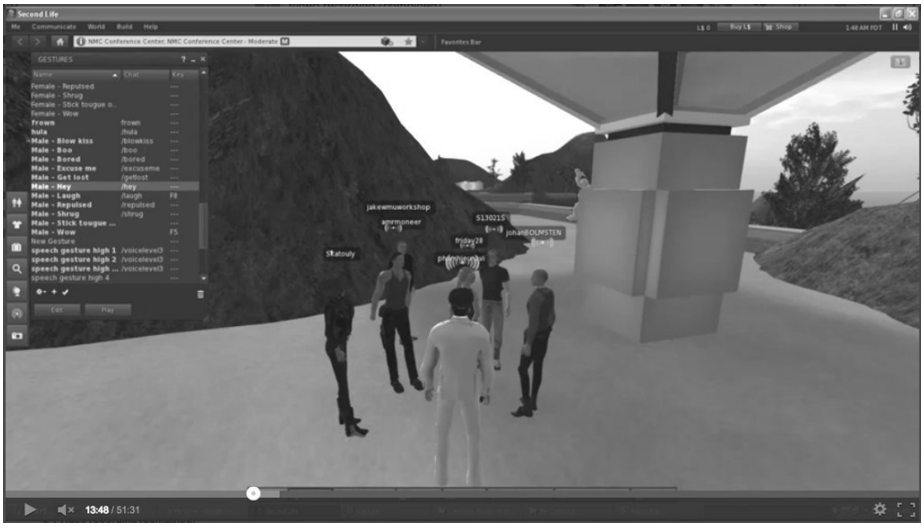

Figure 15. Avatars communicating with each other by voice in break-out group. The students were asked to find a private space in the lecture environment and carry out a group exercise. As the groups moved away from each other, they could speak in private. The top-left menu is used to choose different body-gestures for communication such as pointing, jumping, and laughing. These body-gestures complement speaking to each other by voice.

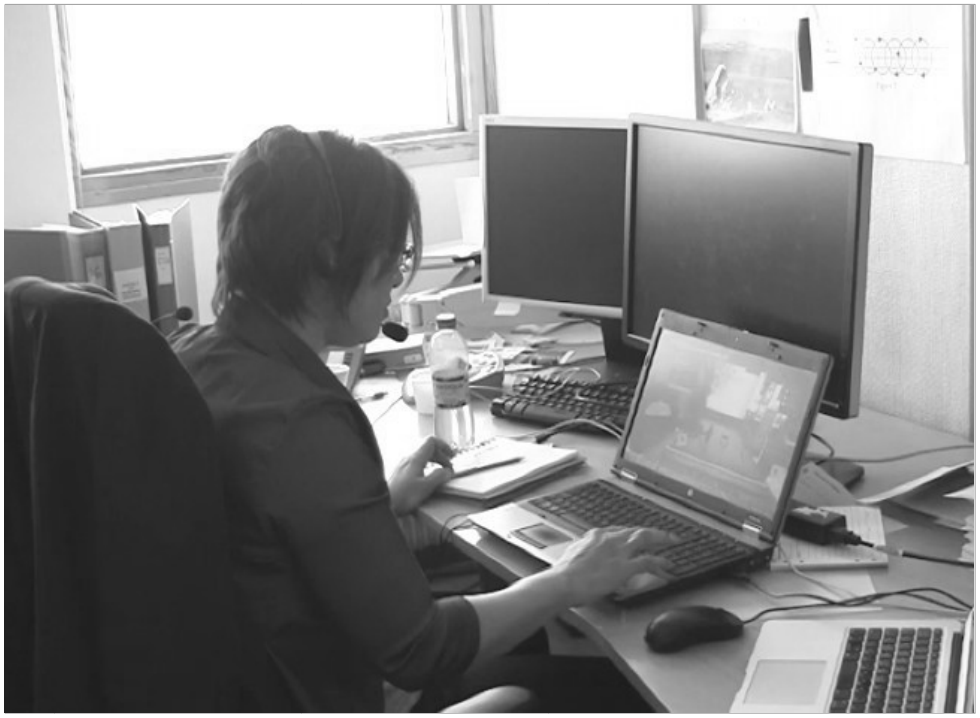

Figure 16. Kitada teaching in separate room at WMU campus. Kitada used one laptop to operate her avatar in the virtual environment. In addition, a second laptop was used to keep in contact with the teaching / technical facilitators at the different campuses. As is visible, both teacher and students used headsets to communicate during the workshops

Figure 17. WMU students and teaching / technical facilitator Bolmsten (middle) at WMU campus

Figure 18. Ho Chi Minh student and teaching / technical facilitator Pham at UT-HCM campus

Figure 19: MMU Students assisted by Lecturer Aung during the workshop in Myanmar

5.2 Second follow-up MUVE experiment

The design of the experiment

Based on a initial evaluation of the first experiment, the need to conduct the follow up workshop (2nd experiment) was called for of the following reason:

By analyzing the interview data, it was indicated that bringing more practical environment seemed to benefit students better. One of the critical comments in the interview was to question the benefit of resembling a classroom-type of lecture in MUVE while video conferencing or group chat by skype can offer the same contents in a relatively easier preparation without special training.

There were some technical dimensions that needed to be investigated more in depth. During the first experiment, some of the students encountered technical problems with the Internet connection and compatibility of their computers, which caused some interruptions with the lecture and thereby impacted the assessment process of the research criteria.

There were evidences showing that the differences in academic level as well as experiences among groups of student brought about additional dimensions for further analysis. Most of the Vietnamese and Myanmar students were undergraduate Bachelors and they did not have any seagoing experiences or daily intercultural experience. Students in WMU were all at Master Level on the other hand, and half of them had seagoing experience. Additionally, in the first experiment, some students were not used to 3D grammar enough so that they might have spent most of their energy to handle their avatar rather than focusing on the lecture

Therefore, the design of the 2nd experiment focused on the following key point:

- All students in the 2nd experiment should be well train with 3D grammar (having experience with 3D game, having strong experience in Second-life virtual world platform.
- The computers are well prepared in terms of technical specification (processing speed, discrete graphic card, internet connection speed, good quality microphone and headset)
- MET practical subject oriented & MET familiar environment – a ship bridge were selected.
- The networking and the affordance of MUVE for distance learning are further exploited.
- The experiment was conducted in Vietnam on 6th of August 2014 from 13:30 to 16:30 GMT+7. The decided topic was "Shipboard familiarization and basic information about navigational equipment". All the students participated in this experiment are Vietnamese and they are undergraduates from Maritime Navigation Department – future seafarers.

Preparation

The challenges for setting up this experiment were to find a way to simulate the networking from dispersed location. Each student was isolated in separate room so that, unlike the 1st experiment, it hard for the facilitator to support them if they encounter technical problems.

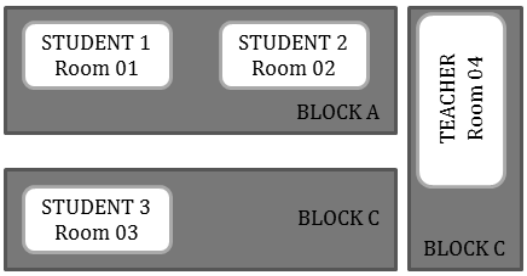

Figure 20. Each students are isolated in a separate room in UT-HCMC campus.

To record the activities of avatars inside the virtual world, screen-record software was installed in each computer. External cameras were set up to record real-life behavior of students.
Because the use of MUVE in MET is still very limited, there are no pre-established virtual facilities inside the virtual world of Second-Life that are MET oriented for the workshop. Although there are many ship-model available, most of these ships are simply non-physics model. In other words, these ships only give the users the sense of spaces, their movement and dynamic stability characteristic do not necessarily follow any mathematical function.
However, building a virtual ship for the exercise goes far beyond the scope of this research, so the researchers decided to utilize a cruise ship model. After examining dozen of ship-model, there was a cruise ship that met the requirements for the 2nd experiment– an SS GALAXY Cruise. This was a huge ship so it took some time for the researchers and the students to get familiar with it, and they has to go through decks, compartments, and rooms to get into the ship bridge. Several criteria have been established for selecting a learning space:

- Does this virtual space support voice communication? (some SIM disable audio communication and only allow text chat)
- Is flying and teleporting available? (Flying is a navigation function of an avatar, however, flying in a ship make it an alien environment to the student. Teleporting function enable students to instantly appear at an exact location by clicking on a location address (SLURL). It is expected that students (avatars) walk through the compartments.
- Accessible schedule for the workshop activities? The virtual world does contain its own etiquette norms that users (virtual world citizens) should respect(Boellstorff, 2008). Some virtual facilities restrict the accessing time, or busy with their own private activities so checking the event schedule of the SIM is very important.

The Learning space
The venue for 2nd workshop was on the bridge of SS-GALAXY Cruise ship, a prebuilt model used for role playing game by Nova Express LLC. This ship is huge, full-scale of nearly 650 meter long; contain more than eight decks and a biggest single built project in Second Life (http://www.ssgalaxy.net/ship-info).
The location of the ship in Second-Life is:
http://slurl.com/secondlife/Galaxy%20AFT/59/43/21. With a virtual world viewer software installed on a pc, clicking on the link will teleport the avatar right to the gangway of the ship.

Figure 21. Aerial view of the ship from an avatar point of view

Figure 22. an avatar at the gang-way of the ship

The bridge of SS-GALAXY features basic navigational equipment such as radars, VHS-like devices and a debriefing table for group discussion. It is layout with panoramic view from the windows and both wings are attached with remote maneuvering applicants. Although, these electronic navigation equipments are just photo overlaid and provide no operational functionality, it helps to adding a flavour of a navigational bridge.

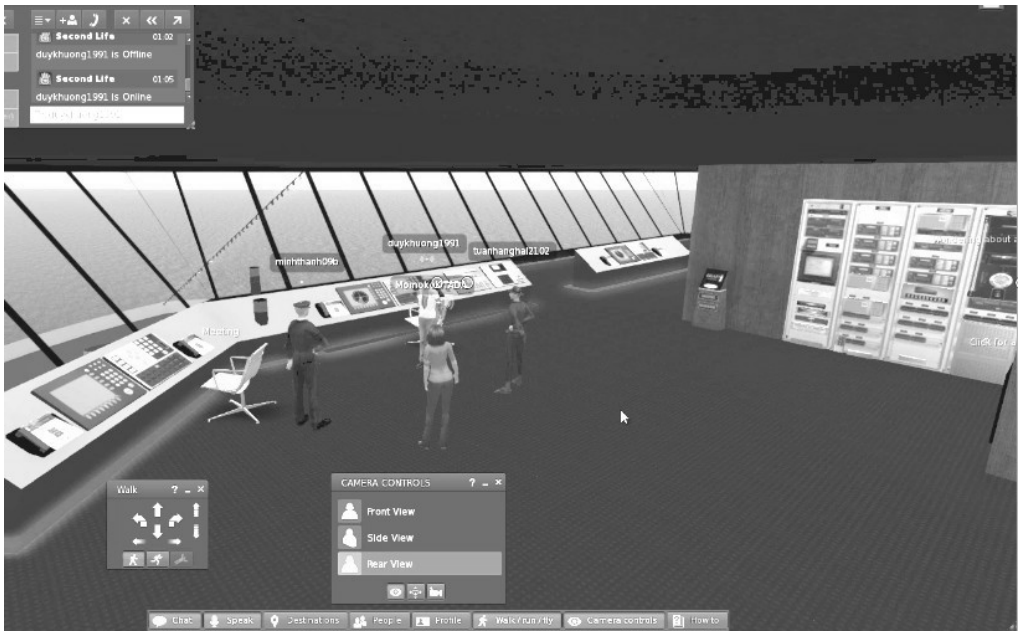

Figure 23. The overview of the bridge of SS-Galaxy. The bridge features basic equipment. However, compared to a ship simulator it just displayed and not interactive.

Figure 24. Debriefing area in the bridge, students and teacher are siting chairs and introduce the workshop configuration to the student.

Figure 25. Students and teacher gathering around the main block of navigational panel and discussing the topic.

Figure 26. Kitada teaching during the second workshop. Bolmsten observing and taking notes for evaluation.

Researcher's roles

The 2nd experiment was designed to target a number of specific dimensions of interest for further inquiry based on the evaluation outcome of the first exploratory experiment. Practical shipboard environment was introduce the topic was "Shipboard familiarization and basic information about navigational equipment".

Among researchers, Kitada was a qualified deck officer. She also had teaching experiences so the role was agreed as below:

- Teacher: Kitada
- Technical assistance: Bolmsten and Pham
- Students: 3 Vietnamese students from Navigation department

The workshop Configuration

The 2nd experiment has 3 main sections:

1. **Ice-breaking/warming-up session**
   - Brief self-introduction
   - Familiarization – all the participant walks around the bridge, engage in informal shipboard related conversation

2. **Bridge operations**
   - Discussion about bridge and basic knowledge implied by question and answer format. The subjects included navigational equipments, rules and regulations, and communication between Master and helmsman.
   - Questions about missing navigational equipments. Because the build of SS-galaxy cruise ship is not intrinsically for MET navigation, the bridge of Galaxy had a number of missing

items, for example, helm-wheel, engine telegraph etc. That leads the researchers to an idea that the lecture can focus on Missing navigational equipments on board a ship and develop further discussion about them.

3. Round-up and reflections

- Summarize the main point of the lecture and to perform the interview with the students inside the virtual world.

Thebellows table is a list of navigational equipment that was used for planning the experiment and expected to discuss in class.

Table 3: Navigational Items expected to be in the main part of the workshop.

Missing items	**Further possible questions (examples)**
Wheel/Helm	Procedure (e.g. starboard 5, mid-ship...)
Magnetic Compass (repeater)	Type (bearing/magnetic) The difference between a magnetic bearing and a compass bearing is the deviation caused to the compass by ferrous metals and local magnetic fields.
Navigational chart and table	ECDIS (Electronic Chart Display & Information System)
Parallel ruler	Whose job is it? (all navigators)
Regulation books	For example? (Conventions such as International Convention on the Safety of Life at Sea (SOLAS), COLREG* (International Regulations for Preventing Collisions at Sea), domestic rules, sailing directions, list of nautical publications (e.g. list of Light & radio signal, nautical almanac, etc.)
Log book	What to record?
Flags	Meanings and signals? (e.g. H (white and red): I have a pilot, G (yellow/blue stripe): I require a pilot, UW: I wish you a pleasant voyage)
Chronometer	What does it for?
Speedometer	Explain the difference between speed over the ground (O.G.) and log speed.
VHF	For cargo ships of 300 gross tonnage and upwards, coverage of at least one VHF coast station in which continuous Digital Selective Calling (DSC) alerting is available
Doppler Speedometer	(Log speed, speed over the ground) Full compliance with IMO MSC.36(63), MSC.96(72), A.694(17) and A.824(19), required for the vessels of 50,000 GT and greater. Provides immediate Information of ship motion and water speed.
Echo sounding	For what purpose? Any information about the working principle

GMDSS (Global Maritime Distress Safety System)	Basic requirement: passenger/cargo ships over 300GT The goal of GMDSS? Inmarsat (The International Mobile Satellite Organization) SOLAS
AIS (Automatic Identification System)	AIS information consists of 4 fields; Static Information, Dynamic Information, Voyage- related Information, and Safety-related messages.
SART (search and rescue radar transponder)	One SART if under 500 GRT, 2 SARTs if over 500 GRT.
Engine order telegraph	What kind of engine orders are there? (full/half ahead, stop engine, half/full astern)
Thruster control system	Who operates this system? (3rd officer)

Table 4: details configuration of the second workshop

	Content	Pedagogical & Technical Intention
1	**Icebreaking session** Gather together at the debriefing table, getting to know each other Getting to know the environment and start to explore the bridge	**[Pedagogical]** • Stimulate the students with sense of the similar and practical environment • Investigate interpersonal dimensions supported by MUVE. • Testing the theoretical and practical knowledge of the students. • Investigate whether the environment really help the students to clearly demonstrate their ideas & intention and whether it helps to bring the relevant to discussion • Investigate the engagement dimensions of the environment. **[Technical]** • Waiting for the technical-ready signal. Since these PCs are located in remote building, is to make sure that the setup of these PCs and recording devices are perfectly fit the expectation of the researcher. • Further investigate the technical related dimensions of the MUVE • To understand the designing elements of the environment for the future development.
2	**Bridge operation** Gather together at the main navigation panel and start the main part of the workshop Asking simple question about the bridge and the basic knowledge about bridge's daily practices. Details can be found more at table.3 Question about missing navigational equipments	
4	**Round up & reflection.** Teacher and the students discuss the learning experience in the virtual bridge and exploring student's perspective about the virtual learning environment. The students may wish to comment and feedback to their experience and share their ideas in the classroom. The lecturer rounds up the class and summaries the main points of the lecture.	

6. Evaluation of Educational Design of MET courses in MUVE

In two MUVE experiments, the researchers designed courses suitable for MET. Some parts of the planned courses met our expectation to achieve educational effects and outputs; and the other parts encountered unexpected challenges which implicated participants ability to proceed with the course work.
This section focuses on the evaluation of educational design of the two experimental MET courses by examining the following datasets

- Recorded video and audio materials from MUVE experiments; and
- breakdown of two MUVE experiments

Further evaluation of learning and teaching experience in MUVE will be presented in the next Chapter 7 in terms of technical, pedagogical and strategic aspects of the virtual institutions.

6.1 MUVE enhanced participants''move' in space

The study includes two different MUVE experiments and each experiment was conducted, utilizing various recording functions, inside and outside the virtual environment. Recorded materials were, for example, videotaping a participant's view of MUVE (inside the MUVE), monitoring the behavior of participants (outside the MUVE), and voices of various participants. All the recorded materials were originally in separate documents and formats although they were capturing a simultaneous event from different angles.
To make all the simultaneous visual and audio data synchronized into one data material was inevitable for analyzing the relationship of actual human behavior and avatar behavior inside the virtual world. Various screen captures from different sites in MUVE were, therefore, edited together with a special software called Camtasia Studio (http://www.techsmith.com/). As explained in the Chapter 4, each video and audio was set out to be a layer and merged in different configurations.
Three research members who played the roles of teachers and technical facilitators (Pham, Bolmsten, and Kitada) sat together in front of one computer and watched the synchronized video of each experiment several times to understand the whole set of event not only holistically but also in small details. The video allowed the researchers to review the experiments and remind how each of the researchers felt and experienced events at a certain point of the event. The researchers then shared their individual knowledge and perspectives and wrote it down in notes. Such shared knowledge was fundamentally a very useful source of data for the evaluation of MUVE in MET.
The evaluation of MUVE through the recorded video and audio materials highlighted both positive and negative aspects of operating MUVE. Positive side was to confirm that MUVE is a possible new learning method for MET as it is used in the various organizations, including top universities and top well-known business companies around the world. The strength of MUVE highlighted by the evaluation of the recorded video and audio materials was an immersed space in which enabled students to reproduce and engage in a professional community. The video also shows that all the students were actively communicating and interacting with other students and teachers and the purpose of the lecture was met in this respect. It shows that MUVE will be suitable for interactive lectures and group activities. Indeed, the most successful parts of the two experiments were the team-building group work (1st experiment) and a small group workshop on the bridge (2nd experiment).
On the other hand, there were also negative aspects, which mainlyentailed on technical issues during the MUVE experiments. The researchers discussed some of the technical problems that occurred

during the experiments and analyzed why and how they happened. For example, one of the student's microphone caused a huge noise which affected the whole participants and prevented them to listen to the teacher. In this case, the technical facilitator had to help the student to resolve the trouble. The detection of such trouble as well as trouble-shooting took several minutes and during this process the virtual lecture was suspended. A technical facilitator and a list of trouble-shooting guidelines were identified as important to solvethis kind of unexpected technical problem. A further discussion on technical issues will be presented in the Chapter 7.

6.2 How well did the planned lectures go? Breakdown of MUVE experiments

The most essential part of evaluating the MUVE experiments was to see how the planned lectures actually went and whether the expectations were met as an educational tool from a pedagogical point of view. The breakdown of the MUVE experiments was conducted to compare the planned lecture with the actual event and to check each step with timing, contents and experience.

The researchers firstly gathered in the meeting room and sat in front of the white board. The researchers then checked the actual timing and the process of the experiments, for example, ice-breaking (1020-1045) with the description of the purpose, rationales and outcomes. Table 5 and table 6 show the breakdown of two MUVE experiments. Five columns provide the information as follows:

- Virtual Environment Teaching experience- what
- Professional Rationales - Intended learning outcomes- why
- Workshop- the steps
- Outcome Professional- Actual learning outcomes
- Outcome Virtual Environment – Teaching outcomes

The Virtual Environment Teaching experience refers to what we did in the MUVE lecture. The Professional Rationales explains why we did it and states intended learning outcomes. The Workshop exhibits what happened with time by step. The Outcome Professional indicates the actual learning outcomes and how students turned out to behave and understand. The Outcome Virtual Environment describes teaching outcomes and how practically the lecture went in the end.

The breakdown of MUVE experiments reflects teacher's views rather than students' views. Teachers and technical facilitators review the actual process of the experiments by contrasting the planned lecture schedule and contents. It is important to compare between the planned and actual experiments and analyse the differences between two, because this can also suggest which parts of the MUVE lecture were more challenging or effective than traditional ways of lecturing in the classroom.

6.2.1. 1st MUVE experiment breakdown

The description of the 1st MUVE experiment is presented earlier in the Chapter 5. In this section, based on the planned structure of the 1st MUVE lecture, the actual MUVE experiment is examined in terms of pedagogy in MET. Table5 shows the breakdown of the 1st MUVE experiment analyzed. It consists of two tables: the first one presents the planned timeline of the MUVE lecture; and the second the actual MUVE lecture recorded with time retrieved from the recorded videos.

Participants: 10 student avatars (6 WMU students; 2 Vietnamese students; and 5 Myanmar students with 2 avatars); 1 teacher avatar; 2 technical facilitator avatars.

Settings: Virtual classroom hall. The locations of the students and the teacher/technical facilitator were in three countries, Sweden, Vietnam and Myanmar.

Familiarization: This was the preparation phase before the actual lecture started. Students and teacher/technical facilitator logged in the Second Life for warming up the avatar in the virtual institution. During this period, they set up their avatars with their choice of clothes and figures and defined the virtual selves before the lecture. It was planned for 30 minutes between 0900-0930 in Swedish time. It went well as planned, however this familiarization had to be cut down as time was running out. There were six WMU students in Sweden, two students in Vietnam, and five students (but two avatars) in Myanmar, thus the individual start and log-in in the Second Life varied significantly. This was the main reason why the 30 minutes were easily consumed.

Welcome by the research coordinator: It was planned between 0930-0935, however it actually happened between 1015-1020. This 45 minutes gap was unnecessary waiting time because some technical setup took much longer than anticipated. Teachers/technical facilitators communicated by personal voice-calls and instant messaging function of the MUVE and tried to understand what was the reason of the issues. The communications were not established well from time to time. Although all the preparations were done as perfect as possible, it was the first experiment and hard to know when everyone was ready. It was not easy to make sure that all the 10 student avatars understood what was happening and to for example assemble in one place. Moreover, it was difficult to get their attention from the chaotic status of everyone all over the places to the aligned status of everyone sitting in the classroom. What was simple in the real life was actually very difficult in the virtual world. This point was raised by the students as well from the focus group conducted after the experiment. Finally, all the avatars and voices were back and the research coordinator, Pham, made a welcome speech to all.

Ice-breaking: The plan was only 10 minutes between 09:35-09:45, which was too short in the virtual classroom. In the traditional real classroom, the ice-breaking session is mostly 5-10 minutes. However, in the virtual classroom, it took longer to do the same because they could not obtain the same kind of communication data (both verbal and non-verbal) as they otherwise were used to. A lack of the range of facial expressions seemed to confuse some students who tended to rely on the information from others' facial expressions. It was also difficult to call a particular avatar without much clue as they did not know to whom they were speaking. The same point became an issue later when the teacher tried to divide the students into groups. On the other hand, being an avatar and concealing their true identity made some students feel open and encouraged them to interact better with others than they usually do. It actually took 25 minutes (10:20-10:45) before the teacher felt all the students made a good ice-breaking time and adjourned the session. By this point, the students engaged in talking to each other and it was quite successful. One pair of the students based in Sweden and Vietnam found themselves to be interested in this activity and it was difficult for the teachers/technical facilitators to stop them.

*Short lecture:*All the students' attentions were back to the teacher. A short lecture on the STCW Convention in terms of leadership and teamwork was given by the teacher. The PowerPoint slides were presented in the front screen of the virtual classroom from the beginning of the MUVE experiment and it looked in the same way as the traditional real classroom where a teacher uses a projector to show his/her PowerPoint slides. All the students sat down and calmly watched the front screen and the teacher. There was no confusion on this part because everyone understood what was

going on from the common experience of being in the classroom. It was planned for 10 minutes (0945-0955) and the estimation was right (1045-1055). The only difference was the delay of the time, which accumulated already an hour by this point.

Making groups: Preparing for the group activity planned after the lecture, the teacher planned to divide the whole class into two groups. The teachers/technical facilitators discussed various options to do this, for example, two technical facilitators stand apart and call the students to each side. They eventually agreed it would be easier that the teacher walks in the classroom and points her finger to each student calling which group they belong to, such as group A and B. When the teacher attempted to walk and point her finger, she realized that it was extremely difficult to ensure that the avatar was listening to her instruction. In the real world, eye contact helps that both teacher and student confirm the message exchanged between them. The virtual world was different. The students raised exactly this point during the ice-breaking session. The teacher discovered that this method of pointing her finger did not work, therefore she had to change her strategy. She asked one of the technical facilitator, Bolmsten, to stand in the back of the classroom and she herself stayed on the front stage. She asked all the students to stand up and move either to Bolmstem's group or remain seated to join Kitada's group. The students immediately followed the instruction and they started to move. The problem was that the teacher let Bolmsten's group walk away and forgot to explain what the group were expected to do the next. It was a different plan that made the teacher confused. The teacher asked all the students to come back to the classroom for the explanation of the group task. This became a good lesson to learn that what it is assumed to be easy in the real world does not always seem to be so simple in the virtual world.

Group work: The group task was given by the PowerPoint slide and the teacher explained it to the students. The instruction was as below:

TEAM-BUILDING
Decide who are the Captain, Chief officer, second officer, Chief Engineer and second engineer. If your team has more people, name them bosun, helmsman, cook etc.
A given scenario is that the team members are seafarers on a tanker ship. They have just received a call from their shore-based manager that their ship has just allocated EURO10,000 to be used strictly for welfare on board.
The crew have 5 minutes to generate individual 'wish lists', along with some appropriate budget figure for each item. (An example could be to buy a computer, DVDs and books, Karaoke set, BBQ party, sports equipment).
The Captain asks his/her crew to share the top priority item on their individual lists with the entire team. Post this information on the front screen of the virtual classroom to share with everyone.
As a team, discuss the individual priority listings and attempt to arrive at consensus on a team list

Both the task explanation and the group work were planned for 20 minutes out of 65 minutes lecture in total. It actually took twice as long as the plan, 40 minutes (1105-1145) including the group discussion itself, typing the results of each group into the front screen, two group presentations and brief wrap-up.

It is obvious that the lecture planning was too tight in terms of the allocation of time for each activity. Bolmsten's group made a good discussion on the topic because the group members included a couple of WMU students who were active speakers on a regular basis and knew each other. Kitada's group also had two WMU students who facilitated the group discussion, but the other students had some technical problem and it was difficult to listen to what they said. There was also quite an interrupting noise from the other group which Kitada's group could hear the conversation of Bolmsten's group. This problem was identified and tested beforehand and the researchers found that two groups need a considerable distance between them in order not to hear each other. However, the problem was arisen again on the day of the lecture and it affected Kitada's group. After all the students were back to the classroom, they started typing in their discussion in the front screen to share with all. This process took some time and everyone was waiting for completing one's typing. In the future, the group activity notes and memos would be best to be directly linked to the shared screen so that typing time can be omitted. The group activity itself was successful and the result of the welfare items reflected cultural differences and the students learned how to cooperate as a team.

Round-up/Refection: The teacher summarized the points of the lecture. Then, the teacher asked some questions about how the students found this new learning tool for MET. Some students found it very interesting to have new technology to stimulate the regular learning activities. They also found it was possible to have this type of lecture, but some improvements are needed. For example, one explained that she was too busy with operating her own avatar and did not have time to take notes. Limited facial expressions were also noted and the others commented they felt free from their own with avatars. The immediate reflection time was smooth and peaceful as everybody calmed down after the intensive period of operating their own avatars in the virtual classroom. A further feedback from the students was obtained through focus group and interview.

In general, the planning of the lecture was far from the reality in the virtual classroom. The total lecture time was 100 minutes (1015-1155), 10 minutes going beyond 90 minutes lecture which the WMU students normally have. The future lecture planning needs to take this point into consideration.

Table 5: Actual MUVEbreakdown of the first workshop –

Planned

09.00 - 09.30	Coming in/Familiarization
09.30 - 09.35	Welcome by the research coordinator
09.35 - 09.45	Ice breaking Walk around and talk
09.45 - 09.55	Lecture STCW + Leadership - teamwork
09.55 - 10.05	Division into groups
10.05 - 10.10	Group task explanation
10.10 - 10.25	Group work
10.25 - 10.35	Round up + reflection

Actual

Virtual Environment Teaching experience- ***what***	**Professional Rationales - Intended learning outcomes** ***- why***	**Workshop** ***- the steps***	**Professional Outcome** ***- Actual learning outcomes***	**Outcome Virtual Environment** ***– Teaching outcomes***
familiarization (technical)		Preceding: - 1 st training session - 2nd life - Avatars moving around - Defining virtual self		Successful - cut down because more time required
Assembling in one place	Getting students from 3 sites into a common virtual classroom	[09:00] getting to the lecture hall		Logistics more difficult than anticipated
Welcome	Welcome to the experiment	[10:15] The research coordinator welcomed		Messy to get the attention important teacher responsibility

Virtual Environment Teaching experience- *what*	**Professional Rationales - Intended learning outcomes *- why***	**Workshop *- the steps***	**Professional Outcome *- Actual learning outcomes***	**Outcome Virtual Environment *– Teaching outcomes***
Familiarization with getting to know each other	Getting to know each other	[10:20 – 10:45] Ice breaking	- Networking - Students started to engage	-Contact between students better than expected - Lacking facial expression - Who is the other? - culture neutral "body"
Trying out formal lecture	- Defining objectives + goals of the workshop - Training with respect to MET	[10:45 - 10.55] Lecture on the Manila amendments		That worked - students paid attention - "common ground"
Distribution in groups like in normal classroom teacher pointing to assign groups	- Prep group work	10.55 Division into groups, chaos, change of method	- Chaos	- Division into groups difficult - difficult getting contact - charge of
	Introduction to group work	11.05 Experimentation of task distributed by teacher		- Technology problems
Group work with facilitators	Cross cultural negotiation of decision Leadership in ad hoc groups	11.05 - 11.20 group work distributing 10 000 Euros welfare	two students did experience the differences in cultural values facilitation need for leadership become visible	- cultural dimensions were experienced - need to facilitate
Collecting of distr activities	Rounding up development of learning outcome	11.20 Typing results for presentation 11.33 Group Presentation 11.45 highlighting some points: STCW	extended discussion (reflection on cultural issues)	unexpected delay due to
Class discussion taking	Reflection on learning situation	11.45 Reflection 3 questions	- Reflection on experience with respect to learning outcomes and reflection on leadership	"Nice feeling", peaceful, format
		11.55 finish		

6.2.2. 2nd MUVE experiment breakdown

Similar to the 1st MUVE experiment, the description of the 2nd MUVE experiment can be found in the Chapter 5 and this section set out to examine the actual MUVE experiment from a pedagogical point of view.Table 6 shows the breakdown of the 2nd MUVE experiment analyzed, containing two tables: the planned timeline of the MUVE lecture and the actual MUVE lecture recorded with time retrieved from the recorded videos.

Participants: 3 Vietnamese student avatars; and 1 teacher avatar.

Settings: Navigational bridge on the cruise vessel. The students and the teacher - technical facilitator were all in Vietnam.

Assembling: This includes everyone's log-in and assembling to the location, in this case, the navigational bridge. It was planned for 30 minutes, however some voice-sound problem happened with one of the students' computers and the technical facilitator had to run and fix the problem. The 2nd experiment was held in Vietnam; however three students and the teacher were sitting in four different private rooms of different campus buildings. It aimed to simulate the situation that students in various locations access to the virtual classroom and do not have any influence from other students. This setting made the technical facilitator busy when a problem was arisen. It turned out to be almost 90 minutes waiting (1330-1458) before the teacher was finally able to start the workshop. While waiting for the last student to become ready to participate, two students and the teacher sat down in the lounge next to the bridge and had an informal conversation. This information conversation included a question from the student to the teacher, 'how old are you?', for example.

Welcome by the teacher: Instead of welcoming by the research coordinator in the 1st experiment, the teacher gave a welcome remark to start the workshop. In the 2nd experiment, the technical facilitators did not participate as avatars in the workshop; only the teacher and three Vietnamese students were in the virtual navigational bridge.

Self-introduction: Compared to the 1st experiment with 13 avatars in the large space, the 2nd experiment accommodated only four avatars in a smaller space of the navigational bridge. This made a cozy atmosphere and all of four avatars could to sit down in the lounge next to the bridge and to a brief self-introduction one by one. In a smaller group, everyone kept one's attention to the person who isspeaking and the teacher found it more manageable in terms of controlling group dynamics.

Familiarization in the space: The teacher suggested that everyone stood up from the lounge chairs and walked around the bridge. This allowed the students to familiarize themselves with the bridge space surrounding them. The three student avatars moved smoothly and their movement and gesture were far better than the teacher avatar. They were all young and around the age of 20, therefore they quickly picked up how to operate their own avatars. Their avatars moved around the bridge and it was an ideal situation for the workshop. The teacher also invited the students to come out to the wing to explore further in the space given. Students found different navigational equipment installed in the wing and got interested in them. The teacher asked a few follow-up questions about the equipment, which was the topic of this workshop. The familiarization was planned for 10 minutes but it actually took only seven minutes (1505-1512). It was because the students were good at using their avatars and the quick

and smooth operation saved three minutes of the session time. There was no stress at all to give a workshop from the teacher's perspective.

Basic navigation Q&A: All the teacher and students gathered in the center of the navigational bridge and the teacher asked the students about basic navigational terms and related knowledge, such as starboard, port, bow, and stern. The students answered the questions actively and it was going well. They were not shy. There was a constant noise issue in the background, which made it difficult to communicate from time to time. The session continued in noise for 22 minutes (15:12-15:35), although the planned time was 10 minutes. At 15:20, one of the students whose microphone was broken produced a huge noise and the others got frustrated. The workshop was suspected between 15:35-15:40.

Nautical equipment Q&A: The remaining two students continued the workshop. Soon the other student joined the group again. The noise problem was troubleshot and all were ready for the workshop. The topic moved to the main focus on this workshop, nautical equipment. Obviously the navigational bridge that we chose from the existed artifacts in the Second Life was mostly likely to be built by someone who did not know nautical equipment and ships. This helped the workshop planners to set up the scenario that students can look for missing nautical equipment and discuss the related maritime knowledge on the ill-designed bridge on the vessel. Students were again active and enjoyed discovering the bridge and nautical equipment. The teacher also asked maneuvering and communication relating to the equipment, and the students could answer correctly. All of them had experience of being on board ships as cadets and described their feeling as if they were in the real navigational bridge as officers. Their motivation was notably high and it proved that the MUVE could provide realistic training close enough to the real ship. During the session, teamwork was naturally built when one of the questions were sought to find an answer in their mother language, Vietnamese. They first got permission from the teacher to speak their language and quickly discussed among them to answer the question. This form of paying respect to the senior and teamwork is exactly the essence of so-called, 'seamanship' skills and such tacit knowledge may be able to be tested through the MUVE. This session was planned for 20 minutes, however it took only 12 minutes (15:40-15:52) due to the students' speedy response and avatar operations.

*Round-up:*The teacher summarized the points of the workshop and asked the students about how they felt. All of them expressed happiness of being on board even the virtual ship. It was a luxurious cruise ship with beautiful navigational bridge on which they had never been. They could also dress themselves as officers in uniform and it made them being proud of themselves. Students even wanted to have the functions of real operation in the nautical equipment so that when they touch the bottom of radar, for example, it reacts. They were also interested in not only navigational bridge but also engine room if available. The planned round-up was 10 minutes and it went for nine minutes.

Table 6: Actual MUVE breakdown of the second workshop

Planned

1330 - 1400	Students are available and start preparation
1400 - 1405	Workshop starts by welcoming statement
1405 - 1415	Brief self-introduction
1415 - 1425	Familiarisation (walk around the bridge, informal conversation)
1425 - 1435	Simple questions about bridge and basic knowledge (starboard, port, bow, stern) etc.
1435 -1455	Questions about missing navigational equipment.
1455 - 1505	Round-up: The lecturer rounds up the class and summarise the main points of the lecture. The students may wish to comment and feedback to their experience and share their ideas in the classroom.

Actual

Virtual Environment Teaching experience - what	**Professional Rationales - Intended learning outcomes - why**	**Workshop - the steps**	**Outcome Professional - Actual learning outcomes**	**Outcome Virtual Environment – Teaching outcomes**
Assemble to the bridge.	Bringing students to a practical environment.	[13:30 – 14:45] Students assembled.	- Students waited for Hieu becoming ready in the lounge area on the bridge by sitting comfortably. - Students and teacher had informal conversation.	- Running between different buildings. - Took 13 min to set up PCs and inside/outside recording devices (e.g. cameras). - Asking each other about how we were sitting.
Welcome	Welcome to the experiment	[14:58] Teacher (Kitada) welcomed.	Kitada introduce herself, students introduce themselves	

Self-introduction	- Getting to know each other	[15:00] Introducing each other.	- Students seemed to happy to talk about themselves. - Students also wanted to know about the teacher, asking some personal questions (e.g. age).	Successful.
Familiarisation	- Warming-up. - Knowing the environment.	[15:05] walking around and explore the bridge	- Students walked around inside the bridge. - Teacher invited students to come out to the wing.	- Students were skilful in terms of moving avatars. - Students seemed to be interested in the facilities and equipment, asking questions.
Assemble to the bridge	- Main workshop began.	[15:10]Teacher asking student about their practical experience	- Students digested teacher's instructions and reflected their experiences.	- Small group enabled to have more personal conversations and follow teaching/learning process.
Simple questions about bridge and basic knowledge	- Theoretical and practical knowledge.	[15:12] Gathering at the center of the bridge [15:12-15:35] Basic navigation knowledge Q&A	- Answering to teacher's questions and reflecting their knowledge.	- OK, Students answer the question actively. - the environment really help the students to clearly demonstrate their ideas & intention and help to bring the relevant to discussion - We continued in noise.
		[15:20] One of the Vietnamese student's Microphone breakdown Technical assistance requested. [15:35-15:40] session suspended for troubleshooting	- others getting frustrated	- Technical interruption - Teacher and students waited.
		[15:40] Session continue without the student who is having technical-problems		- 2 remaining students engaged in the workshop.
		troubleshooting completed, student joining back to the session		

		Student discuss in their native language to get the answers		
Questions about missing nautical equipment.	- Theoretical and practical knowledge. - student's sense of the environment	students walk and finding the missing equipment		
Round-up/Reflection	- Discuss our learning experience. - Identify further improvement of the virtual environment from students' perspectives.	[15:53] Wrapping up the session. [15:54-15:56] However, students asked teacher a personal question about her return date to Japan. [15:56] Teacher asked students to reflect their learning experience. - Comparing their on-board experience, how did they find/feel the virtual ship environment?	- Sharing their experience and impressions.	- Noise problem was still there. - Students were satisfied with being on the fancy bridge of a huge vessel which they had never been before. -Students wanted to try on engine room virtual environment. - Students wants to have a live model which can let them to interact with..
Ending workshop	Formal ending.	[16:02] Teacher ending the workshop.	- Good-bye. - Appreciation from students to teacher. - Encouragement from teacher to students.	after nearly one hour of session, student seem to enjoy, engaged in it till the very last minutes

7. Evaluation of learning and teaching experience in MUVE

The idea of using MUVE in MET was born for the purpose of developing a cutting-edge e-learning platform to promote experiential learning and to facilitate collaborative development between MET institutions. The emphasis on experiential learning, therefore, needs to investigate how learners and teachers experience MUVE and adopt to the new learning method.

The previous chapter, the evaluation of educational design of MET courses, has identified several key issues to consider in terms of the application of the MUVE in MET. For example, the MUVE showed its potential to be used in the various learning activities including linguistic training, inter-cultural community simulation, knowledge based class, and role-play. This potential of MUVE can be explored in accordance with technical base which is recognized as another key issue in MUVE for MET. These arguments are, however, from the perspective of course design. It is important to understand how students and teacher/technical facilitator experience MUVE as a learning tool.

This chapter presents the analyses of focus groups and interview data with the students from the three participating universities (WMU, UT-HCM, and MMA) as well as the teacher's notes. The evaluation of these pieces of empirical data helps the research to explore the actual learning experience of the participants and to discover the technical barrier aspects of conducting a class inside the virtual world. It focuses on the discussion of the usefulness of MUVE through each actor's experience of learning or teaching in MUVE. The observed characteristics of teaching and learning in the virtual environment support the research to understand:

- Key characteristics which are meaningful to the learning experience of the student
- Whether and to what extend the re-creation and modeling power of MUVE affect the engagement level of the students in the classroom.

The findings are expected to help this study to identify "how a virtual class" should be designed to maximize its educational potentials.
In the interview data, to add comprehensiveness, there are two conventions that need to be acknowledged here; any omissions in a quotation are indicated by ... (ellipses); and any words that need to be inserted to aid comprehension are inserted within square brackets.

7.1 Active participation boosted in MUVE

The powerful modeling capability of MUVE drew the attention of students, the teacher, and teaching/technical facilitators as it can offer various educational possibilities to create an authentic learning environment. Such indication was observed from the participants' behavior of clearly taking advantage of the interactive and immersive 3D features of SL. There was a mapping between the selves and their virtual avatars that helped to bring social cues to the virtual classroom. Together with role-play scenarios and simulation capabilities, students would be able to enjoy opportunities to practice work-based skills such as remote team working, communication and collaboration in distributed geographical work-settings. One of the WMU students explained:

> *"it's very exciting especially when you speak to somebody and they respond, like when we spoke to [name omitted]. We thought he's almost here. So the virtual classroom gets them the feeling of real, it*

will become a real thing when you talk to somebody and you feel a person besides… (ellipse) and it really gives a warm feeling that you are really in a classroom and communicating."

Although the participating students and teacher/technical facilitators were located in three different countries (Sweden, Vietnam and Myanmar), MUVE enabled to remove the geographical borders successfully and united all to one, virtually yet consciously. The immersive characteristic of the virtual world provided a link that associate sort of values, personality of one self to their virtual self. This could offer both students and teachers the abilities to project themselves into the learning space, which are key elements for successful learning transactions. Such phenomenon was observed in the focus group as well. Two students described their feelings during the focus group as:

"Student 01 : *What I see was that I did not feel us separated from the avatar at that moment. So actually whatever the avatar is doing is me, who is doing that, sort of synchronized in this idea.*

Student 02: *yeah, synchronized [me] too. But I wanted to add…you mentioned that you felt you were close to Pham? [a technical facilitator].*

Student 01: *yeah*

Student 02: *Yeah, I found the same.*

Student 01: *hmm….*

Student 02: *He was fairly relaxed, very talkative and you really feel that he was as if being in the same room as you are."*

Students seemed to develop personal contacts through the MUVE exercise. In some cases, avatars' actions triggered one's emotions and feelings (e.g. shocked, sad, frustrated) or certain personality dimension can be transferred into their virtual self. One student described her feeling as:

"For me, when I am talking with other people, I am very shy. I knew that I had to or should communicate with other people from different countries. But I was feeling a bit shy to start. …

When I started talking to someone [other avatar], other students [other avatar], and the signal was not so well [the delay, lagging due to the connection speed issue]. After that, the students turned away and I was still trying to say something. I was like Ups! (Laugh) it was a little bit like personal feelings. It's not, you understand that on that side he may not hear anything at all what I was saying. I realized that, but it's still this cultural aspect, you feel like 'Ups! Why are you turning away when I was trying to say something?' So for, but for general, if you really associated with these, at least for me, I am very much associated with the avatar."

Another student also stated that she felt as if she was the part of the avatar in terms of emotions.

"Like I said before, I'm synchronized with my avatar, like I remember when we were separated into two groups [in the 1st workshop], at some point I thought that Johan's group took all the seafarers and I wanted to be in this group. Before they [avatars] left, I actually wanted to go with them. But I was not fast enough to join the group, so I was actually the part of the avatar. 'Oh, I've got left. Okay, let me join this group, because I couldn't keep up with the speed, so..."

Interestingly, the social identification issue, where learners can hide themselves behind their avatar, in some cases, turned out to be a good thing as a way for learners to overcome the fear of failures. That

seems to help learners in the sense that they do not mind making mistakes or being afraid of asking question.

> *"You overcome the situation easily with an avatar than you personally do the things,or mistakes. …(ellipse) I feel comfortable because I know nobody knows me (laugh). Nobody know me, nobody know what is my name, because I put a number. You can do some mistakes and nobody knows who was. I think probably I can ask a question I personally never asked, probably, you know."*

Educators possibly take an advantage of the social aspect and co-presence characteristic of the virtual world with its persistence features to foster collaborative learning, experiential learning, role-play and game-based learning. Despite many objective technical barriers that MUVE can bring, such rich sensory immersive environment can facilitate authentic context activities that can be utilized to teach applied linguistics, to train communicative competence and other simulation scenario in MET. Students from Vietnam commented the usefulness of MUVE to improve their English and communication skills as:

> *"I like this software very much because it gives me many knowledge and we can improve our English skill, as our communicative skill"*
>
> *"Most of the scientific books or engineering books are in English and we have to learn in English…We have to communicate in English which is the media language every part of the country. So if we can discuss with the students from another country, we can use English and we can practice together"*

With the capability of constructing an immersive 3D virtual work place, it seems to have a great potential to assist students with the simulation-based teaching activities. Students expressed their motivation of such training by using MUVE.

> *"I think this is very new, this is my first time using this…. that's just like a game. but i can see many similarity with the real ship, for example, many equipments onboard a ship like RADAR, GMDSS system…the windows on the bridge bring me some imagination"*

MUVE can add more than traditional classroom-based learning methods with books which are rather still picture images while MUVE provides 3D images where they can actually move around. One Vietnamese student stated:

> *"when we are studying in my university, we're just studying by book and by picture on board the ship which showing the equipments that the teacher is teaching us, .but with this one, we can actually walk around and see many things, we feel comfortable with this, we can imagine many situations compare to learning as traditional way*
>
> *"We are marine engineers and we have on board ship after finish from our university…I want to go on a ship.. I don't know how the engine room work exactly or something like that…we can make a virtual world that's exactly look like a ship. We can go on a ship and we can be a captain or something like that*

The realistically and interactive level of learning artifact, learning object created in the virtual world can also encourage the students with their cognitive process. If the instructors further develop this

dimension, MUVE can be used for some bridge simulations without purchasing comprehensive simulation equipments and updating it almost every 5 or 10 years. One of the students recommended the use of MUVE into the simulation of ships for effective marine officer training.

> *"Everything is not so real, I can only see the picture but I can't actually use the equipment. For example; the RADAR, I can see them but I can't actually use them. And there is not enough equipments there [in the simulated ship bridge]…the equipment is not realistically installed there. I think it is more interesting if we can actually interact and use the equipment."*

The virtual world with the capabilities to simulate the real world topography, movement and visual physic can provide the illustration of being there. Together with the association of the virtual self and the real-self, this simulated world enable student to perform, to try things that they would have been afraid of doing in real-life. It was observed that there have been cultural cubes transferred into the virtual classroom. Such transferring of cultural aspects could suggest the possibility to utilize MUVE in teaching intercultural issue in MET.

The social interactions in online virtual environments, such as Second Life, are governed by the same social norms as social interactions in the physical world. If people behave according to the same social rules in both physical and virtual worlds even though the mode of movement and navigation is entirely different (i.e., using keyboard and mouse as opposed to bodies and legs).This would offer a possibility to study social interaction in virtual environments and generalize them to social interaction in the real world as Yee, et at. (2007) suggest. In MET, it may be possible to use MUVE in the research areas of inter-cultural communication, bridge resource management (BRM), organizational management, crisis management, human factors, and so on.

7.2 Inter-cultural dimension of MUVE

Flexibility of choosing another identity with avatars represented an interesting landscape of inter-cultural dimension of MUVE. For example, within the international group of participating students, there was a male student whose culture believes that being so close to a woman in the public is unacceptable behavior. In the virtual classroom, one female student – female avatar who tried to challenge and test his religious and cultural belief and see whether his avatar behaves the same with a female avatar as he does in the real world.

> ***"Student A:*** *"there was another very interesting thing. The person is not here but in some cultures it's not acceptable to greet to touch or even anything. The way how close you come to the person is also too much. So I thought that it will be very interesting for the research and I did something. I came very close to the person that is not supposed to talk with women and things like that. I ask him if I can sit on his lap.*
>
> ***Instructor:*** *Did you? Actually during the session?*
>
> ***Student B:*** *Oh my God!*
>
> ***Student A:*** *he was sitting on the chair. His avatar, his avatar was. And I came close to him and I started to talk to him and he started. when I was already quite close to him, he was feeling uncomfortable.*
>
> ***Instructor:*** *How did you know that?*
>
> ***Student A:*** *We were talking by voice. So we're talking and said, 'Oh, chair.' I don't remember exactly now but I started to just joke around his chair. 'No, no, no, you note that it's an avatar.' 'But I cannot do that.' 'But that is avatar. It doesn't count. Come on.' And he was like, 'no, no, no'.*

And I ask if I can sit on your lap and he said, 'no, no, no!' He was already; he wanted to be, to push me. It would be like other real-life. (Laugh) he pushed me. But he didn't know how to move his [avatar] arms and, then I left him alone. But he was very uncomfortable.

Instructor: *Very interesting observation.*

Student A*: Yeah! (Laugh) so he kept his perceptions in the virtual room."*

Her thrilling experiment of testing how religious and cultural belief would be maintained in the virtual world concluded that some people seem to carry out their beliefs from their real selves to their avatars and react exactly the same, at least in this example.

However, the identity authentication issues can be disconcerting and confusing. Users can hide behind their avatar, as identities are never fixed and they are free toplay with their virtual identities. It causes managing the accountability to become an issue of concern.Some students chose to adopt a new identity with their virtual self by choosing an avatar and a name that could not be connected to their identity in real life. One student, for example, chose to be a robot to experience another identity. Nevertheless, most students tended to choose to keep their real identities in MUVE, and explicitly stated that they did not want to separate their true self from their virtual self.

When applying MUVE in the study of inter-cultural communication, the issue of identity is a key to understand how they project themselves with others. The immediate feedback from the MUVE experiment also showed that students felt easier to communicate with other nationalities in MUVE compared to the real world situations. Some students stated that as they were not so familiar with English or were feeling shy, adopting a new identity with their avatar enabled them act out more freely and engage with the teacher and other international students in educational activities.

7.3 Technical considerations in MUVE

Familiarizing with the virtual world grammar is important to encourage students and to support the concentrations of the students. A student who is not used to 3D games before can expect a steep learning curve to enable them to maneuver and behave smoothly in the virtual world. That unexpectedly brings alien atmosphere to the classroom. Even, the students who have little technical knowledge can easily find their experience in Second-Life as threatening.

> *"... (ellipse) I think [in] this case I take all of my fears thinking about how to manage my avatar than what we are going to learn. That was my fears in there. May be after two, three, four classes, I will change my idea about this"*
>
> *" for me it was very similar to [name omitted]'s experience, because I actually like my avatar. I got it and sit and look at the back away from where the professor was speaking from. And it took me a lot of time, my avatar moves to the front. During that time, I lost the attention of the key of the study. I feel this type of study is an issue, teaching on how to use the avatars. That way, students can be able to concentrate on the objectives of the course"*

By paying too much attention to manipulate their virtual self in the environment, their attention to the lecture was lost.

> *"Yeah, same with me. Very distracting that I need to manage that person [avatar] there. The actions are slow if you want to do something. ...(ellipse) that was [a] slow process and you got anxious a bit, because the things keep on changing around you. You are not able to respond to that properly. For example you like something that someone said and you want to applause or you want to say something,*

but because you're taking your time to make it, you are not able to give a response to the person with your appreciation of what haven't been said, otherwise. So that is something I think difficult to manage yourself, but also have to follow what is happening. You are always late, because you need to adjust" – WMU student

"In general, in normal class, we're not thinking about those things [performing avatar's action]. It's so natural. That is our life. Forget about that. We were not bothered by our gestures but what kind of things here were. ...(ellipse), and not just attention, but they require your thinking how to do that. You cannot think about [many] things at the same time, so if you think about how to manage your avatar, you are not listening to what is happening [with the lecture]." – WMU student

Together with the technical related problems, MUVE can bring frustration to the student and in turn demotivate the learning process. If it is not carefully prepared, the virtual classroom can be a frustrated, alien environment to teach in and therefore bringing negative affect.

"It could be a feeding of frustration, because you want to be as the same level as the other students in a virtual classroom as well as keep up what the professor is instructing. But at the same time, you're not able to do so, because you are trying to manage your resources at the moment. So that was quite frustrating." – WMU student

"on the headphone, I can hear everybody talking but sometime I can't hear clearly, some time I speak out into the microphone but nobody hear me." – UT-HCMC student

"I try to speak with [name omitted] in the virtual classroom; however we couldn't speak much, because of communication problems, Internet problems. I was frustrated to speak to the other lady that I was trying to approach her part she was not responding to me at all" – WMU student

Implied by MUVE's technical characteristic, the teaching and learning activities can be constructed in ways that help to minimize some native limitation of the environment. Working in a group, for example; the noise made by one group could affect the whole class and inside the virtual world, it becomes hard for the teacher to direct instructions. The size of the group is another thing to take into account. In Second-Life, every people is looking for a communication sign to detect who is speaking. If the group is too large, student may find it difficult to participate in a discussion.

"But, the problem is that when the instructor gives the instruction from this state [discussion session] if someone talks here around us, we can't hear very clearly because ofnoise. Yes, that's why I can't concentrate on what the instructor is giving now or what the instructor's tasks. That's the problem."

"Then if you need to work in pairs, two, it would be easy. But working with like six people, five people, big groups are becoming complicated and disorganized. ...(ellipse) for example, talk with two, like a group of two, and discuss something, that would be like very close to the real. ...(ellipse). But bigger in the group, I think it's more frustrating and more like lost that feeling"

At last but not least, technical facilities such as Internet connection speed, PC hardware capability and technical support play an important role in the contribution of experience of the learners.

"As you know, the internet connection so poor in our country. So, that's why I talk to someone and he listen to me, at this time, suddenly the connection is fail, I can't hear very clearly... (ellipse). That become the problem" – MMU student

"I can't control my avatar and I have to change 3 computers, I don't know, but I think I have problem with internet connection, and i can't control my avatar when I move the mouse,… when I move the mouse, my avatar doesn't move" – UT-HCMC student

7.4 Strategies for the successful MUVE application in MET

Despite many possibilities and potentials that MUVE can bring, it is important to highlight that the learning environment and its articulated activities should be carefully constructed in order to provide a meaningful experience to the learner. Otherwise, learning activities inside the virtual world can turn out to be frustrating or discouraging, or even worse can be considered as an unnatural ways of learning. Teaching in the virtual learning environment very much demand instructive structure, facilitative and directive function of the teacher. Not only that, it is expected to have some sort of agreement regarding social norms, etiquette, ways of communication and other rule to regulate the virtual learning space. A number of comments from the interviews and focus groups illustrate this.

"I think it is better to such some rules in the classroom, then change the appearance on it…like, when a student wants to ask the question, he or she should raise their hand… like we actually do in the classroom…and if the lecturer about to speak, all students must mute their microphone…so the voices from interruption the lecturer's voice.. We should set rule to make it more like a classroom than the appearance"

"Lecturer also uses typical costume. Different costume…we don't know who is the lecturer.. and we can't distinguish who is the lecturer and students"

"just one thing…say, a professor is teaching, you can sit or you can move around…whose to start and watch him/her…that can be quiet annoy if somebody is walking or flying or…"

"If he is giving a lecture in 3D world, someone is talking and it makes noise …how to control… There must be some set of rules"

7.4.1. The importance of strategies to deal with technical disruptions:

No matter how good the testing is, technical disruptions can still occur. Our experience shows that it is important to have strategies in place of how to deal with them. During the workshop, the participants from Myanmar started to experience technical difficulties due to an unstable internet connection. This turned out not only to implicate their participation, but was also disruptive for all the other participants. Technical sound statics made it into the general audio stream that all the participants could hear, and made it difficult for the rest of the participants to carry out conversations at certain instances. And to get the sound up and running again, the Myanmar participants had reinitiate testing, which resulted in many comments of the type "Hello, Hello, can you hear us", which further distributed the workshop for everybody else. In our case, we did not have any pre-decided strategies of how to cope with these issues. The students commented in the follow-up interviews that these disruptions had clear negative implication on their experience of the workshop.

7.4.2. Supportive function

To ensure the technical fulfillment for MUVE to work smoothly, the role of the technical facilitator is important. Technicalsupport for the primary teacher and the students turned out to be important for the success of the workshop. Before the workshop it was decided that Kitada was going to be the main teacher, and it was planned for that Bolmsten and Pham would primarily support her with teaching assistance. However, it turned out that in addition to teaching assistance, continuously supporting the students also with technical facilitations was important. During the workshop, students at both the

WMU and UT-HCMC site experienced difficulties with their computer workstations, where they had to restart or the students had to change computer.
In addition, issues with the configuration of 2nd life occurred, where for example the voice communication function terminated for individual students, which resulted in that re-configurations had to be made. In both these cases, the students were not able to cope by themselves. This also caused unnecessary confusion in the execution of the workshop as Bolmsten and Pham had to divert their attention away from the teaching assistant role planned. Recognizing and planning for technical as well teaching facilitation would hence be recommended for successful education experience in MUVE.

7.4.3. The need of training

Another key for success in applying MUVE in teaching is to ensure the student familiarity with the virtual world setting. The value of formal and informal training: Training was a necessary to be able to carry out education in MUVE. In addition to the planned formal training session offered both to teacher and students prior to the workshop, it turned out that in informal training between the students themselves played an important role both for them to enable them to operate their avatars and make their way through the virtual world environment.
This latter informal training came to complement the formal training, but was not planned for by the researchers ex ante.

During the first MUVE experiment the students at the different sites were sitting in the same classroom. On several occasions, it was visible that when a student was facing an issue, they could indicate this to their workstation neighbor who would either help them by comment or briefly move over to their computer to aid. and it was observed when the researchers reviewed the empirical material. In this way, the informal training came to effectively complement the formal training, by mediating the resolving of ongoing issues that arose. In this way, for future education in MUVE it is recognized as beneficial to plan for both formal and informal training.

Extensive training needed, but not called for: To purposefully operate the avatars in MUVE, more extensive organized and self-paced training is needed - more than what was provided during the first workshop. This was something that was both noticeable when evaluating the video recordings from the workshop and explicitly highlighted by the students in the follow-up interviews.

However, even though more extensive training clearly was needed, the students themselves did not necessarily call it for. This might seem like a contradiction, but it was explained by the students during the follow-up interview inthat training is time-consuming. The first workshop explored MUVE in a real setting, where the students were required are required to make prioritizations between preparing for and engaging in different educational activities as a normal part of student life. To this end, the students put the training time needed in relation to the perceived benefit of being in MUVE for the educational activity. And MUVE can be recognized to be more difficult for the students than a common classroom or e-learning environment. Careful consideration and planning has to be carried out when it is valuable pursue education in MUVE to motivate the students to participate in training.

7.4.4. Communication

It is also important to recognize that there was an immersive dimension mapping the true-self and their virtual-self in term of social norms, interpersonal distance, values and belief between the real-world and the virtual world. However, it should be noted that in the virtual environment, there are still

limitations with none verbal communication. The students could perform several body gestures but these limited expressions are unnatural and they are not mapped with student's expression of attentiveness or boredom.

It is a common recognized fact that non-verbal communication is a significant part of the complete spectra of communication when humans interact. The ability for the teacher and the students to project themselves into the virtual learning space is key elements for successful learning transaction.In MUVE, students and teachers can verbally communicate by voice, but also move around in a physical space with their avatars and use gestures, by using different commands on their keyboard.

However, for students and teachers to complement communication by voice with comprehensive gestures as part of non-verbal communication is difficult. Through our empirical data collection approach, where we documented what was happening inside and outside the virtual world, we could observe that often students would gesticulate with their hands at the computer workstations "outside" Second Life at the same time as they were talking with their avatars "inside" 2nd life. This meant the avatar that they were talking to, and the person operating it on the receiving end, could hear the voice, but from an avatar that physically remained passive in the virtual space.

In addition, in the follow-up interviews, students commented that it was an issue that some types of non-verbal communication cannot be transferred at all. This includes for example face expressions. Taken together, these issues implicated that it was perceived as more difficult to communicate with each other in Second - Life compared to in real life or also in other types of video-audio assisted e-learning tools.

The adoption of a virtual self remains an open question. It could be argued that the avatar in Second-Life should not necessarily mimic all aspects of real-life communication in a connected way to that the virtual self is in fact not one's real-self. In this way, one could expect new types of gestures and communication patterns in MUVE that does not exist in the real-world, and that there will be new hybrid ways in which people can "face" each other's.

7.5 Reflections from teacher and technical facilitator

Teaching in the 3D virtual world can be complex and challenging. The investigation of these pieces of data is to strengthen the understanding of the teaching experience in the virtual world. Regardless of the nature of the environment, it is the responsibility of a teacher to design and facilitate a purposeful learning process. The evaluation is expected to reveal the extended functional role of a teacher when conducting teaching in MUVE as well as to contribute to the understanding of pedagogical designing elements of a virtual institution.

> *"I almost have no choice but needed to facilitate the whole process of virtual activities engaged quite few people in different part of the world….(ellipse). I have a huge sense of responsibility and pressure that I'm the key in this particular setting" (extracted from teacher's notes)*

The process of planning, designing and conducting a lecture in MUVE is usually extensive and time-consuming. The whole process is very much vulnerable to technical issues. The teacher is also supposed to provide technical support for the student.

"In the middle of the lecture, there was a period of huge noise across the participants which made us impossible to continue the lecture. I tried to speak during the noise but could not do anything.Either [other technical facilitator] contacted me by instant message that I might be the one making noise. But it seemed that the noise came from [other country] and it was resolved by the technical facilitators.] (extracted from teacher's notes)

However, the importance of such supportive function will decrease as the as student become more experience with the 3D grammar and the interactive software become more intuitive and user-friendly to use.

"My Second Life skills were pretty much the same as before. I did not allow myself to train much more than 30 minutes due to the lecture preparation. But in fact, this was my second time to teach in a virtual environment and my previous experience actually helped me a lot to remember what is expected and how to use an avatar. In this sense, I feel that the more you do, the more you feel comfortable in a virtual environment." (extracted from teacher's notes)

"I instructed them to stand up and walk around the bridge. Their ability to use their own avatars seemed much more advanced than mine, because they moved quickly and controlled their avatars well. This was also observed when I clapped, for example, they also immediately clapped. It suggested that they were comfortable to play with their avatars smoothly, compared to the last time" (extracted from teacher's notes)

When conducting teaching in MUVE, preparation is the key. It was also noted that there should be a room to tackle "what if", unexpected situations as everything might get very frustrated. The teacher resolved the problem in the end by applying a new method that worked for the situation given. This example shows that teachers need to be prepared to any 'accident' and be flexible at all times.

"The problem appeared when I tried to divide the students into two groups. We initially planned to use a method that I walked up to each student and point him/her by saying 'you are A's or B's Group. I did walked to one of the students and found it difficult to, first, make my body face to the student. Then, I spoke to the student but there was no response and I was not sure if he or she understood me. Or my speech could be mistaken for addressing to a wrong student." (extracted from teacher's notes)

Teaching in MUVE requires multitasking skills. There are many things for the teacher to pay attention to, for example, lecturing, taking note, giving direction, providing learning resources. Having powerful computer literacy seems to be beneficial for the teacher as well, allowing him/her to concentrate more on teaching.

"I sat in a separated s room with a Microsoft laptop PC for the Second Life [a name of virtual viewer, which helps the user to log into the virtual world] and my Mac computer for the lecturing slides. The Mac was only for viewing the PowerPoint slides so it can be easily replaced by printed materials. However for me, I felt more comfortable with having my Mac besides me for my 2nd assistant. When I was engaged in the Second Life which is quite a technical platform, I did not want to use my hands to flip real papers manually, because in the Second Life, movements are quite intensive and you need to make fully available to use your hands" (extracted from teacher's notes)

Additionally, experiments from the two workshop propose a foreseeable potential that MET can benefit from MUVE.

With the persistence characteristic, a virtual institution and its educational artifacts can be accessible to any students, any seafarers and any maritime experts to learn, to practice and to collaborate in a common interactive world. The virtual MET institution can facilitate MET community by acting as a hub for knowledge transfer and expertise exchange. For example, it is often the case that linguistic teachers in many MET institutions do not have sufficient maritime technical knowledge when they teach Maritime English. Meanwhile experienced maritime officers may not necessarily have adequate linguistic skills enough to teach Maritime English (Pritchard, B. and Borucinsky, M., 2010; Trenkner, P. and Cole, C. W., 2010). With the virtual institution concept, these experts across interdisciplinary and from dispersed geographic locations can participate in the same interactive classroom to collaborate and to conduct the workshop together. If it is properly designed, that virtual workshop can provide opportunities to promote expertise exchange amongst MET institutions, It is only one of the examples of interdisciplinary teaching; however, for the future research, if linguistic teachers are available and one creates a course on Maritime English, the knowledge exchange between maritime officers and linguistic teachers can be tested in the virtual MET institution.

In a slightly difference setting, MUVE can also be utilized to encourage the knowledge transfer process between MET institutions and maritime experts around the world, including the IAMU community. There are a number of challenges in the area of MET; for example, the authors observe that there is a lack of experienced maritime experts to work in MET institutions; and it is also the common that a full-time maritime faculty member often needs to get their practical knowledge updated within the working reality of limited support and time. In this respect, unless they know both maritime and pedagogy, there could be certain challenges of understanding and embracing the pedagogical and scholarly demand associated with a dynamic balance of theoretical and experiential education (Zingale, 2007).

Such needs can vary from introducing newer educators to the basics of contemporary pedagogy and scholarship or making effort strengthening the maritime resources network. However, it is not practically easy for many MET institutions to invite experts from the field due to their availability, distance travelling, and, probably, at greater expenses.

The inferences above could be observed during the 2nd workshop, where a Japanese Navigational Officer based in Sweden can help a teacher in Vietnam in an international wide level workshop with both students from Vietnam and technical facilitator from Sweden. By that mean, it is supposed that a knowledge transfer process has been happening where geographically dispersed experts complimented their knowledge and conducted an inter-disciplinary teaching. The students can also benefit from the international collaborative setting as it is easier, and more encouraging for them to prepare for work with their peers around the world, as one student commented:

> *" Moreover, we have also study the theory in the classroom, now we have to discuss about theory in the classroom with friends, not only with the friends but also [with] scholar here. So, we can understand more and more about the theory. Now, we have to use English language as millions and so we can also improve our English skill more and more…".*

Inherit from the social network characteristic of MUVE, once successfully established and managed, a virtual institution can facilitate a maritime interested communities by which retired officers, experienced seafarers, fresh MET students and MET faculties can share, contribute and collaborate around educational artifacts that can help to support maritime workforce. As education is not only for young, this methodology can be used for life-long learning over different generations. The outcome of this research project showed a great potential that MUVE can offer, and thus, the further investigation of applying MUVE to the life-long learning is reserved.

7.6 Summary

Compared to a traditional classroom, first of all, the virtual world of MUVE with its powerful re-creation power and simulation capabilities can enable educators to construct an enhanced learning environment. If it is properly designed, MUVE can be used to facilitate blended-learning metaphor. That is where traditional teaching activities are blended into role-play, risk management, crisis management, ship handling simulation, ship familiarization, refreshers' courses and open-ended exploration scenarios.

Secondly, the native characteristics of MUVE (e.g. persistence, network of people, synchronous communication) can play a role as an add-on tool to support traditional distance learning. The virtual classroom can be used as a standalone or in combination with other web-based, internet-based learning programs and web-based distance learning programs to maximize the learning experience. The persistence characteristic enables people in the knowledge community opportunities to participate at any time from everywhere. All that is required is an adequate internet connection. It is acknowledged from other educational disciplines that there are distance learning activities conducted inside the virtual world already. These class are various from knowledge based class, instructional class such as laws to business study subjects and tutorial sessions.

In a MET context, the rapid emergence of new technologies makes the ship's instruments increasingly more advanced and sophisticated. On the other hand, the dynamic and changing nature of the maritime industry (legal issues, new regulation and convention, commercial demand) brings about the need to keep seafarers informed, updated with the reality and certifications. Solanki and Nakazawa (2007) emphasize the need of continuously supporting quality education for the seafarers. Such issues reveal the important role of MET distance education in the future.

The usefulness of the MUVE was expressed in various ways, for example, the immediate feedbacks from the students during the wrap-up session inside the MUVE, the focus group and interviews. The voices represent stimulations and motivation of being in close-to-reality and immersed sense of learning on site. While many constraints can be solved by technology, how to strategically apply this new learning tool into a MET curriculum, especially under the STCW requirements, presents a set of interesting discussions. Virtual worlds should be seen as an inclusive and not an exclusive tool for education.

In line with the educational considerations discussed earlier, from the MET management level, a new learning tool will add a new educational value to serve the safe operation of ships and attract more young people by such technological innovation.Possibilities of the utilizing MUVEin MET have a great potential. In order to make a MET institution competitive in the global maritime labour market, MET managers may wish to consider using such new learning tools to increase their reputation and the awareness of Corporation Social Responsibility (CSR).

8. Hardware planning for MUVE

Specific considerations have to be made to plan for the hardware that is necessary to successfully carry virtual education in MUVE. The online virtual worlds of MUVE work on a client-server architecture, and fundamentally dependent on a capable technical platform; without functioning hardware, there is literally no education. The issue of bandwidth, hardware compatibility and firewall affecting the network traffic may lead to issues of downtime and lag. Such issues can make the interactions and the presentation of the virtual environment become frustrating.The testing that was conducted before the workshop focused on the computer workstations to be used during the workshop and was done with reference to the hardware specifications provided by the vendor for the particular MUVE's platform (Second-Life by Linden Lab). Testing the hardware in the way described in the empirical account can be considered essential.

Out testing did, however, show that one does not necessarily need to adhere to the hardware specifications provided by the vendor. It was, for example, possible to work with computer workstations that did not meet the formal specifications. To this end, the testing also, for example, revealed that a discrete graphic card was preferred even though it was not specified.

There are also human or usage related issues, which include managing the client interface, developing the basic in-world competences such as navigation through terrains, creating objects, handling inventory, manipulating one's avatar and developing a visual 3-D grammar. These issues can act in combination and can have different impact on different users, which make the in-world experience not consistent for all the participants. Such technical issues can have implications in practice when participants are in a public place and using the internet connection which is under the restriction of for example a firewall. In that case, seeking for the IT support is problematic, and inherently it is not an immediate support.

In addition, it was found that although Second life entails students and teachers collaborating remotely in a 3D environment, the requirements on a high-speed internet connection was surprisingly affordable. 2nd life recommends a Cable internet connection, but a 256 Kb/s internet connection turned out to be sufficient. The realization that MUVE can be run on workstations and with an internet connection with more limited specifications is an important one in an IAMU context. On ships and in developing countries these are not obvious commodities. However, in such case, and in any case, testing of the hardware is essential.

Moreover, there is also a lack of an open standard or interoperability amongst virtual world platforms, which could potentially make institutions, limit themselves or lock themselves inside a particular platform. So the operation of their virtual facilities and activities completely depend on the service provider (for example, SL). Hence, there is a risk of wasting investments, time, economic and intellectual resources inside a single non-transferable setting. Standardization remains a major problem for developers who want to integrate other technologies and resources into virtual worlds.
Economic factors and business models are different across virtual world platforms. It is different in a sense that these virtual worlds can be hosted locally or outsourced, its code-base can be open-source or proprietary, and the service providers can either use the subscription plan, owned or a similar model.
For example, let take the two major developed virtual world platforms as Second-Life and OpenSim. Second Life has around a million users logging in each month, and the most active OpenSim-based

grid, called Avination, has just around 9,000. The basic download of OpenSim viewer is free from OpenSimulator.org. The price to host a grid from OpenSim platform providers such as Reaction-Grid cost about $25 a month or less.By comparison, Second Life regions rent at $300 a month – or $147 a month for educational institutions, with an initial setup fee of $1,000 ($700 for educators).

Particularly for SL, the game engine and everything that are in-world are hosted by Linden Labs on their servers, while the user access the virtual world via an open-source program called Second Life Viewer and it is free to download. A basic account is free, which allows a user to own an avatar and join the world, but everything beyond that basic-setting does cost money. For instance, buying land to create teaching/learning space, or purchasing in-world tools (unless you create it on your own; these in-world tool can be power point streaming board, or video streaming), or employing virtual world designing and scripting expertise cost money.

No matter if SL is used for education in MUVE or another online virtual world platform, hardware planning is necessary for a successful outcome. MUVE is dependent on a multifaceted hardware configuration that includes the hosting of the MUVE platform per se, Internet connectivity, and the user's computer workstations. As our experiences show, most computers and Internet network connections today are capable of running MUVE. In addition, by using a cloud-based service such as SL the hard planning is also made easier. This is, however, an additional layer of planning that is necessary when carrying out education in MUVE, compared to normal classroom teaching.

9. Conclusions and recommendations

9.1 Conclusions

This research aims at creating a "Virtual MET classroom" and the main focus was to examine the feasibility of adopting the concept of 'virtual institution' to MET scenarios in terms of pedagogical, technical and practical aspects. In this conclusion chapter, a summary of the research findings is presented and the limitations of the study are addressed. Finally the recommendations for future research in the appreciation of MUVE into MET are presented.

The research considers which subjects or competence areas are suitable for learning through the online virtual institution. The literature preview and the evaluation of the empirical data showed the applicability of MUVE in MET teaching and learning practices. The research group conducted two MUVE experiments: the 1st experiment was similar to the traditional classroom style and tried out a group activity among students from various cultural backgrounds; and the 2nd experiment took place on board the ship, focusing on nautical science targeting cadets. From these experiments, the following subjects and competence areas specified in STCW are potentially viable:

- Maritime English Training,
- Leadership and teamwork,
- Culture awareness,
- Safety related topic,
- Ship familiarization, Ship security familiarization,
- Scenario and simulation based can also be used in MUVE

In addition, native MUVE's characteristics (persistence, immersive, network of people, social oriented environment) also enable the possibilities for MET to support distance learning, and facilitate community of practice collaboration. With the increased realization of an educational use of MUVE across disciplines and the future development of MUVE, there should be many more ways to utilize it to benefit MET; however, such claims need more empirical evidence to be confirm.

The study further examined the social-technical aspects of using MUVE, that is, how the actors (i.e. teachers, students, and other experts) react about adopting the concept of a virtual institution in MET. The immediate feedback from the students inside the Second Life as well as the focus group/interview data from the students were coded and analyzed. Students described an immersed learning experience in MUVE and their true identity and their avatar were often synchronized as a result. The social space in MUVE facilitated inter-cultural communication regardless of English levels and a diverse background of individuals. On the other hand, the limitation of gestures and eye contacts in MUVE was remarked as a drawback by some students.

The research group, as MET experts, investigated recorded video data as key components for the evaluation of MUVE and analyzed the reflections of teachers and technical facilitators. It seemed that teaching in MUVE requires the teacher/technical facilitator to be multi-tasking (i.e. operating system and teaching) and flexible to any technical disruptions. Since the communication is almost real-time, teachers tend to be vulnerable to unexpected situations but it is possible to handle it with preparation and strategies.

Finally the key elements of designing a virtual institution in MET were explored. Though there are obviously many barriers and challenges that can affect the experience of the teacher and the learners, these can be minimizedin the design and implementation stage to provide an engaged learning environment that can foster numerous learning philosophies. The findings also strongly indicate the potential application of MUVE to tackle contemporary STCW competency requirements. By using MUVE, a constructivist-learning environment can be built. For successfully constructing aconstructivist virtual classroom or workshop in MUVE, the following elements are recommended to consider:

- Immersive: presence of the self, presence of others in the virtual world, the more the learner connected with their virtual self and their surrounding environment, the more the learning environment become meaningful.
- Engagement: the learning environment should provide a certain level of engagement that is very much dependent on the learning activities planned and their relevant to the environment. The relationship between the nature of learning activity and the environment should show be pedagogically associated. The available of meaningful interactive objects is important to support the imagination, making reference to the real-world and facilitate cognitive process of the learner.
- Realism: The accuracy and the level of details required by primary object is important to foster the user's sensory experience, which in turn contribute to increase the engagement level of the learner inside the virtual world.
- Technical interface: this can be the user-interface which users use to interact with the virtual environment. Some MUVE platforms provide their own pre-programed user-interface software. Other MUVE providers enable their users the ability to customize the user-interface software to meet their need. In such cases, user-friendly features should be taken into account.
- Appropriateness of the avatar (the users virtual world character) plays a quite important role to support the immersion and engagement dimension of the environment. For example, an animal avatar used in a group discussion activities in a virtual lecture hall seem to distract and irrelevant.
- Instructional design oriented: the setting of the in-world objects and their setting should imply instructional message to the visitors to avoid frustration. For example, showing the walking direction on the ground, providing a wall of map of a building at the entrance.

Having realized all the potential educational values and barriers that MUVE might bring, as well as taking into account the long term strategy development of MET and the healthiness of its network of distributed community of practice, it can be concluded that there are various possibilities of utilizing MUVE in MET and maritime industry for better support their workforce.

Although the use of MUVE is widely recognized, the involvement of MET in this field is still limited. Technology innovation as a whole has changed the way people live, the way people work and the way people learn. Like any other educational discipline, MET should prepare for change by exploring new technology in education.

9.2 Limitation of this research

At the launch of this research project, there was no practical guideline available for implementing or designing the virtual learning environment in MET. Due to the limited number of experiments, how user's experience will be developed over time is still unknown. Consequently, this research does not provide comprehensive tools or principles to assess the usefulness of suggested designing elements.

The technology innovation is growing at fast pace and so does virtual technology. The research findings presented here were based on the current stage of MUVE and its application in education. The research, therefore, needs to be constantly developed. Furthermore, this paper predominantly focused on Second Life platform which is just one of the over 300 other virtual platforms available online or under development at the moment (KZero, 2009). There are many emerging virtual world platforms entering the market such as OpenSim, Active Worlds, Kaneva, etc. Asit was out of the scope of research to analyze the future development of MUVE as well as the development of other educational tools, there are still gaps in need for more research concerning advantages, challenges, problems and limitations.

9.3 Recommendations

The utilization of MUVE in MET is a young research area with a limited understanding of how effective it is for MET practices. Having realized the potentials, challenges and limitations of this research, there are several ways to improve the knowledge in the area of MUVE and its applications in MET.

With the limitations of this research itself, it is critical to suggest that future research should investigate the following:

- Designing and implementing a virtual institution in a particular MUVE platform that enable the MET community to further examine how MUVE can be used in MET, including an endeavor to a life-long learning concept.
- Considering and examining whether it is possible to transfer the learning in virtual world of MUVE to the reality of maritime work and how effectively it can be achieved. Such piloting studies will lay the foundation for discovering, improving, synthesizing and determining the best practice of designing and conducting educational activities in virtual world settings.
- Investigating other virtual world platforms apart from Second Life, which this research was based on.

Analyzing the future development of MUVE so that MET institutions can have sufficient instruments to respond to the educational technology innovation and thus, providing them better consideration in their decisions on the strategic development plan.

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Kip Boahn, who has co-led a real-life English-language school in Germany for the last eight years, has become passionate about teaching in “Second Life.” As “Kip Yellowjacket,” Boahn started teaching ESL to fellow “Second Life” players back in 2006

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Appendix

Appendix 1-What is game and simulation?

The terms “Game”, “Simulation”, Simulation-Game” have been used throughout this research.It is easy to observe that such terms are used interchangeably all over academic papers, or even in the gaming industry. There are many games that are labeled “simulation”. For example, Microsoft ™ Flight Simulator, VSTEP™ Ship Simulator 2008, EA SimCity™ to name but a few. These games cost from several up to around 100 US dollar. On the Electronic Arts website alone, if searching for the genre “simulation”, at least 122 games will be listed (EA game, 2012).

In contrast, in the MET field, the term “simulation” refers to a serious platform that has a strong integration between hardware and software, with strictly requirement in realism and interaction aspects. Such system normally costs hundred thousands or millions of dollars to purchase and implement.

The purpose of this section is not to redefine or to compare between game/simulation-game in general and MET Simulation, but rather to make the reader aware of the domain to avoid misinterpretation. Across profession field of study, there are some terms that their individualized usage or symbols and words that are clearly recognizable only to members of the affinity group of that field, which may lead to mismatch in mental image formation and thereby misinterpretation.

Clark Abt (1968), an early pioneer of simulations and games had defined game as “any contest among adversaries (players) operating under constraints (rules) for an objective (winning, victory or pay-off)”. However, according to Laughlin and Marchuk (2005), it does not distinguish between contests for fun and contests of a more serious nature, so they have constructively modified the definition to add a clause noting that both educational games and recreation games are low-stake contests.

Harold Guetzkow (1963, pp.25), who is widely recognized as one of the founders of social science simulation studies, defines simulation as “an operating representation of a central feature of reality”. By Guetzkow’s definition, operation is a key element of simulation. A three-dimensional image of a human body is not a simulation, but such a model that allows a viewer to manipulate or drive biological functions would be a simulation. A simulation is an operational model that is based on something real (Laughlin, Marchuk, 2005). From that point, widening the interpretation a bit more, it could be argued that a game that represents the operational procedures or processes of a particular activity in real life could be considered as simulation – a simulation game. For instance, TheSIMS3 ™ game from EA™ simulatesdaily life activities where the players has a chance to control an in-game character to sleep, go to work, build a house, making friends and participate in parties. The rule of this game is to maintain the balance between work, leisure, career and social activities to keep lifetime–happiness point so called of their character as highest as possible.

In addition, related to MET, Reeve (1984) comments that a cruel aspect of effective simulation is that it represents task demands rather than reproducing exactly the real situation. In the maritime simulation respect, in the paper of Det Norske Veritas (DNV) – Standard for Certification No.2.14, October 2007 said:

"Marine simulator: A creation of certain condition by means of a model, to simulate situations within maritime operation" which associated strictly requirements such as

"Physical realism: to what degree the simulator looks and feels like real equipment. The realism shall include capabilities, limitation and possible errors of such equipment" or

"Behavioural realism: to what degree the simulator resembles real equipment in order to allow a learner to exhibit the appropriate skill…", and much more.

Obviously, the term simulation itself can be interpreted in various ways depending on the requirements of different expertise or field of studies. Throughout the review of definitions of game and simulation, "each can stand alone but in some cases, there is a sizeable field of games that are simulations, or perhaps some simulations that are games. It is easy to interchange the terms 'game' and 'simulation' when discussing educational uses of computers, because so often the two terms overlap" (Ellington, 1981; Laughlin & Marchuk, 2005). The figure below illustrates the relationship between games and simulations.

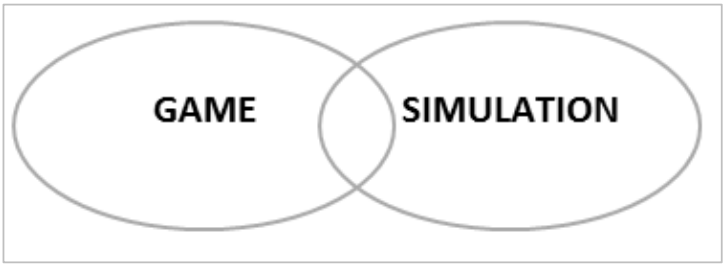


Figure 27. game and simulation overlap (ellington, 1981)

Therefore, in this paper, the term "computer games", "video games", and "game" are used interchangeably to cover the array of educational electronic sound games. Otherwise the specific detail will be given to identify game platform (E.g. Nintendo, consol, mobile, PC, etc.) or the term "traditional game" will be used in case of no electronic game.
The term "simulation" should be interpreted generally in wider scales and contexts. It does not specifically mean the strictly requirement Marine Simulation as in the MET field.

Appendix 2–List of tables and figures

List of tables

List of figures

Attachment

ATTACHMENTS.

Meeting note for IAMU research project

Project setup preparation

Members: Hieu, Johan and Momoko
Date/Time: Monday 06 May 2013, 0900 Swedish time
Venue: Google-hangout

Minutes

1. Discussing general research initiation

- Virtual world(VW) basic training
- rent VW Teaching facilities
- main RS activity: explore & experience VW's potential
- topic to be deployed: Knowledge management (24-28 June)
- Data collection in Vietnam - interview, observation....

2. For Hieu, define the dates for the data collection in Vietnam

from 04/07 - 16/07 we have National University Entrance Examination so all the university are likely to be closed and very busy. Therefore, my suggestion is from July 20 → August 05.

3. Identify the tasks

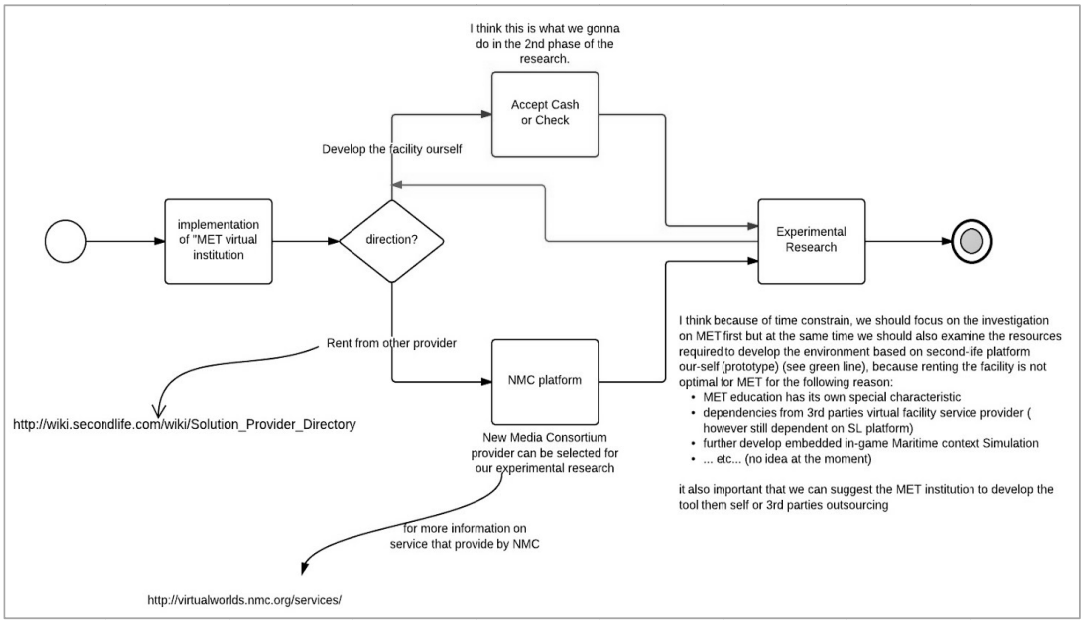
- basic training (hieu) (sometime between 13-17 of May)
- design Knowledge management class activity to be held together with VW stutents (Momoko)
- facilitate the class session (Johan, Hieu)

5. Scheduling the next meeting

Monday 13 May, getting started with VW
Tuesday 14 May, meeting via Skype & VW
Meeting with Prof. Yvone: 27->31May.

6. Other notes

All experiment activities should be recorded both inside and outside virtual world.



Discussing Which MUVE platform to be used for experiment..

Current Land Prices

Prices as of May 5, 2013-- **Great deals on NMC Campus!**

1024 sq m (32 x 32, 235 prims) **US$100/yr**

2048 sq m (64 x 32, 469 prims) **US$200/yr**

4096 sq m (64 x 64, 938 prims) **US$400/yr**

8192 sq m (128 x 64, 1875 prims) **US$800/yr**

Quarter Sim (128 x 128, 3750 prims) **US$1500/yr**

Half Sim (256 x 128, 7500 prims) **US$2800/yr**

Full Sim (256 x 256, 15000 prims) **US$5000/yr**

See current land availability

Discussing the cost of a platform.

Minutes of the meeting for IAMU Research Project

Date: 06 September 2013
Venue: Online, Google-Hangout
Participants: Professor Yvonne (ITU)
Momoko Kitada (WMU)
Johan Bolmsten (WMU)
May Soe Aung (MMU)
Pham Hieu (HCM-UT)

Agendas

1. Research progress overview
    - Hieu will summarize the project progress.
2. Data evaluation discussion
    - Presenting how empirical data is collected
    - feedback from Prof. about methodology
3. Agreement on how our team will keep track and collaborate through next research phases. (OERP functionalities,)
4. AGA 14 presentation (ideas, key point, finding… presenting, structure of PPT)
5. [optional][generating some Articles, journal about our research]
6. [optional][arrange the next meeting]

Minutes

- Pham briefly describe the progress with the team through project phases using OERP software.
- Momoko start to present the group about project progress illustratively using a workflow.
- Proff. Yvonne preview the research objectives and propose carrying out a third workshop to tackle missing links between 1st workshop., 2nd workshop with the research objectives. However, due to the intensive of the time schedule and the data evaluation process have not finished yet, Proff Yvonne suggest to postpone the discussion about whether there is a need to carry out the 3rd workshop till the January of 2014.
- Regarding the data evaluation work, in order for Prof. Yvonne to have such thorough comment about methodology, the research group needs to present here the rationale of conducting the 1st and 2nd workshop. Momoko, Johan, and Pham will prepare a short 2-3 pages paper to present this to Prof. Yvonne before the next meeting.
- Momoko present the draft outline of the Interim report to IAMU.
- Johan present the draft outline of final report.
- The overall impression from prof. Yvonne was “excellent” and promise to keep eyes on it and we will discuss it extensively in the next meeting.
- Momoko & Johan suggest pushing the data evaluation process to add in to the interim report at AGA14.
- The research team decided to use OERP as a primary project management tool. Prof. Yvonne encourages the team to assign task for her.
- The next meeting is defined as next week on Friday, 13 September 2013. At 10AM Swedish time.

Minutes of the meeting for IAMU Research Project

Date: 12 September 2013
Venue: Online,Google Hangout
Participants: Professor Yvonne (ITU)
Momoko Kitada (WMU)
Johan Bolmsten (WMU)
May Soe Aung (MMU)
Pham Hieu (HCM-UT)

Agendas

1. Presenting & feedback on the rationale of conducting 1st & 2nd workshop
    - Design of Workshops: Why did we design in a certain way?
2. Data evaluation discussion
    - any feedbacks regarding research design and methodology
    - How do we effectively proceed? coding? software? how do we present Video data?
    - what will be included in AGA ppt our research]
3. [arrange the next meeting]

Minutes

The next meeting is shifted to 24/092013 and the theme will focus into the AGA14 Preparation...

Minutes of the meeting for IAMU Research Project

Date: 24 September 2013
Venue: Online,Google Hangout
Participants: Professor Yvonne (ITU)
Momoko Kitada (WMU)
Johan Bolmsten (WMU)
May Soe Aung (MMU)
Pham Hieu (HCM-UT)

Agendas

1. Presenting & feedback on the rationale of conducting 1st & 2nd workshop
    - Design of Workshops: Why did we design in a certain way?
2. AGA 14 Preparation Checkup
    - Conference Registration,
    - Participation?
    - What do we have with the paper? Agreement on the outline of the paper? Who does what with the PPT & and the paper?
3. DATA evaluation?
    - any feedbacks regarding **research design** and **methodology**
    - How do we effectively proceed? **Coding?** Software used? How do we present Video data?
        - The inteview transcriptions is available inside the Shared folder (click here)

    what will be included in AGA ppt our research

4. [arrange the next meeting]

Minutes

1. Prof. Yvonne added some comments directly to the file and there should be extensive discussion about this on the next-meeting (Thursday 26/09). Johan and Momoko will travel to Copenhagen for the meeting. Hieu joint the meeting with skype.

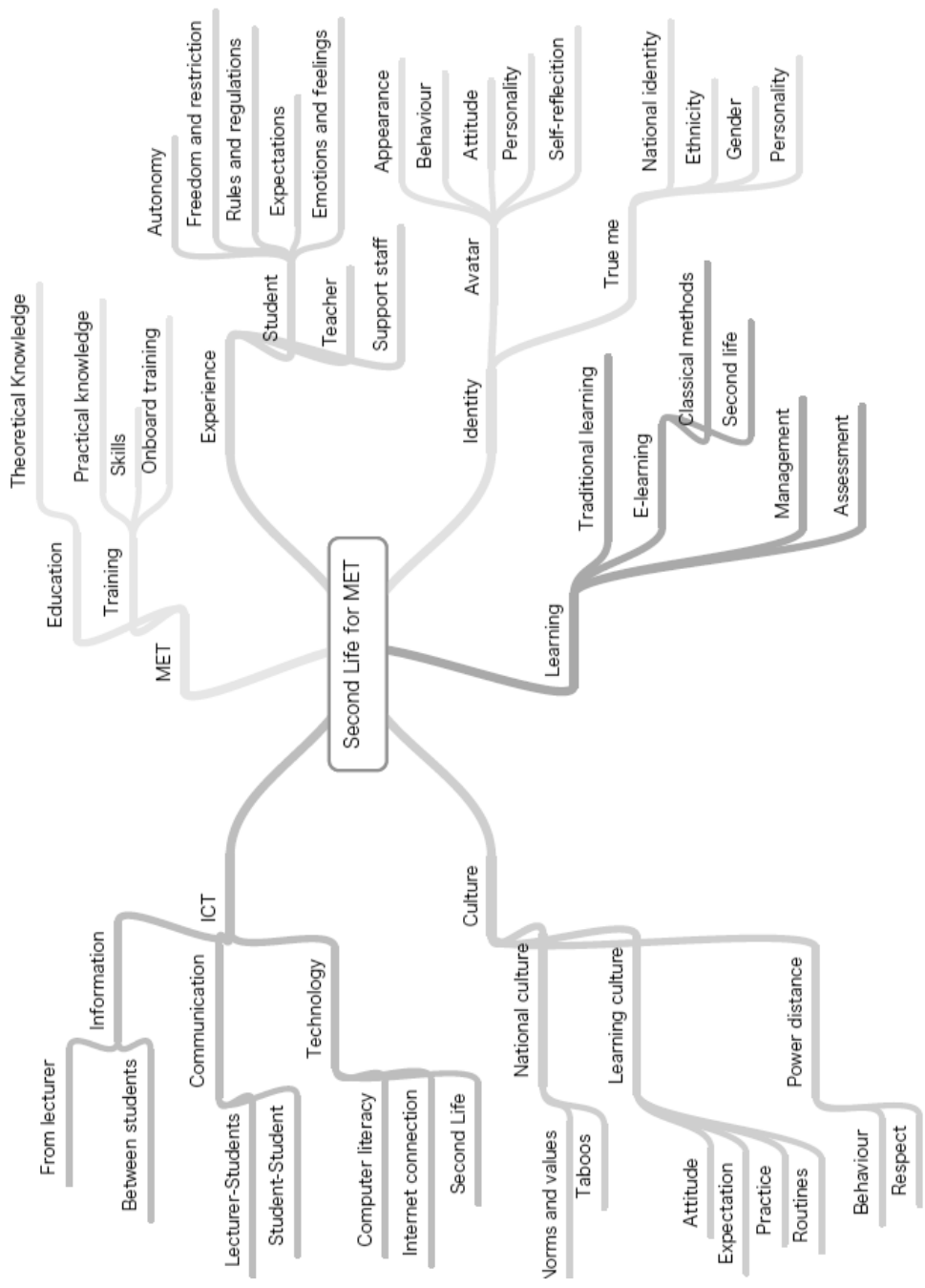
2. Prof. Yvonne is in India during the October.
    - Hieu will combine the two papers of Johan and Momoko and come up with the outline for AGA… the group will discuss about this on the next meeting.
    - Regarding the PPT, we will create some sort of mid-term report paper then → create a PPT file based on that.

3. Advice, feedbacks & on this item will be discuss after the 26 meeting.
4. The next meeting will be on 26th October at 1:00PM (swedish time), prof.

Prof. may available on 30th October, however, during her time in India, Online meeting is also possilbe.

Next meeting Agendas

- comments from Prof regarding the research design & methodology
- Hieu propose the final outline from the two papers of J & M - discussion!
- Related work for data evaluation process.
- should we decided on the deadline for our AGA (week before actual AGA)



Empirical data analysis mind map.

LINKS TO ACCESS THE RECORDED VIDEO DATA

1ST WORKSHOP:
https://docs.google.com/a/wmu.se/file/d/0Bz8gdb6MRCsmOV8tNXVUYzVyWWs/edit

2nd WORKSHOP
http://www.youtube.com/watch?v=I7Vdb9g26yA

Embedded video for AGA14
https://drive.google.com/file/d/0B1eLunxLACg1bTNQYndneHNpR3c/edit?usp=sharing

WELCOME TO THE ONE WORLD CLASSROOM

28 June 2013

Outlines

- Opening session
- Ice-breaking session
- Leadership/Team building workshop
- Round-up

Opening session

- Welcome speech from the project coordinator, Pr. Trong Hieu Pham, Ho Chi Minh City University of Transport, Vietnam.
- Project partners:
  - World Maritime University
  - Myanmar Maritime University

Ice-breaking session

- Meet new friends from other universities.
  - Write down the names of your friends who you communicated during the activities.
  - Try out various functions, such as clapping, smiling, saying 'Hi' and dancing.
  - Fly and meet more friends!

Ice-breaking session

- See the world: teleport to another place.
  - Let's teleport to the ship, 'SS Galaxy'.

    http://maps.secondlife.com/secondlife/Galaxy%20AFT/58/43/21
  - Going back to our classroom.

    http://maps.secondlife.com/secondlife/NMC%20Conference%20Center/210/20/51

Learning Leadership and Team-work

- The STCW Manila Amendment sets out new requirements of leadership and team-work as part of the competences of seafarers.
- However, there has not yet developed an effective learning tool for this new competence.
- The following session will focus on the methodology of learning the subject of leadership and team-work in a virtual institution.

Leadership/Team building workshop

- Divide into 2 groups of mixed participants.
- Decide a facilitator and a secretary who can take notes on the given flip chart.

Leadership/Team building workshop

- A given scenario is that the team members are seafarers working on the same ship.
- They have just received a call from their shore-based manager that their ship has just allocated EURO10,000 to be used strictly for welfare on board.
- The crew have 5 minutes to generate individual 'wish lists', along with some appropriate budget figure for each item. (An example could be to buy a computer, DVDs and books, Karaoke set, BBQ party, sports equipment.)

Leadership/Team building workshop

- The facilitator of the team (Captain) asks his/her crew to share the top priority item on their individual lists with the entire team.
- Post this information on a flip chart (or a paper you have).
- During the discussion, you may use various options of gestures and even guide your team to teleport to another place in order to convince your priority of the item.

Round-up

- A summary report of your discussion in each group.
- Reflections:
  - Was a team-building in the virtual classroom as difficult as in the real-life?
  - Did any stereo-types of different cultures matter when working in the virtual environment?
  - How could your personality be affected by using an avatar? Did you feel you played a different personality in the virtual classroom?

One World Classroom for Future Seafarers

A design of a new virtual E-learning environment for Maritime Education and Training

Interim Report

iamu International Association of Maritime Universities

Supported by 日本財団 THE NIPPON FOUNDATION

Constanta, Romania 25-10-2013 | www.iamu2013.com

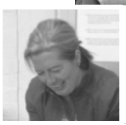
Credits

Lecturer, Pham Trong Hieu (Research Coordinator)
Ho Chi Minh City University of Transport

Lecturer , Dr. Momoko Kitada (PhD)
World Maritime University

Lecturer , Johan Bolmsten (PhD candidate)
World Maritime University

Assit: Lecturer, May Soe Aung
Myanmar Maritime University



Associated Professor, Dr. Yvonne Dittrich
IT University of Copenhagen

A design of a new virtual E-learning environment for Maritime Education and Training

Supported by 日本財団 THE NIPPON FOUNDATION

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Contents

1. **Introduction & Research objectives**
2. **Research approaches & design**
3. **Findings**
4. **What we have done & what to do next**

STCW and E-Learning Education

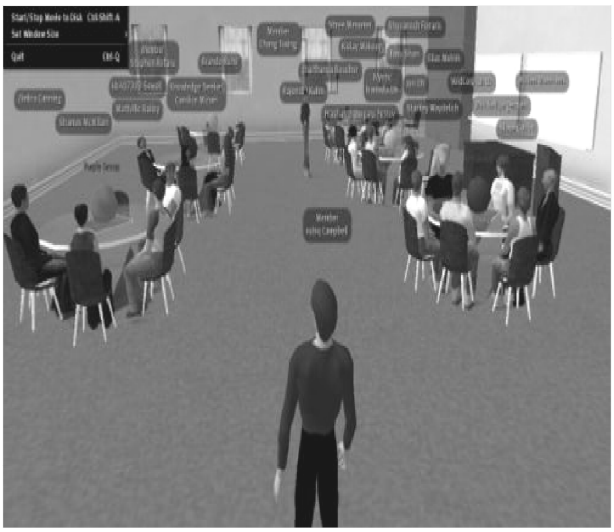
Increasing awareness of the importance of communication and teamwork

- Globalization /multinational crews
- Accidents related to communication and human errors
- STCW 2010 Manila Amendment: Leadership and teamwork skills added

E-Learning

- New methodology to teach leadership and teamwork
- IMO Human Element Goals

Multi-User Virtual Environment



- Teachers and students create a graphica representation of themselves as 'avatars'.
- Avatars similar to real persons
- interact by voice, video communication, and instant text message.
- High technical knowledge not needed.

- Sense of presence
- Rich-interactive collaboration

- Already been introduced by universities and industries (e.g. Harvard, MIT, IBM, Microsoft).

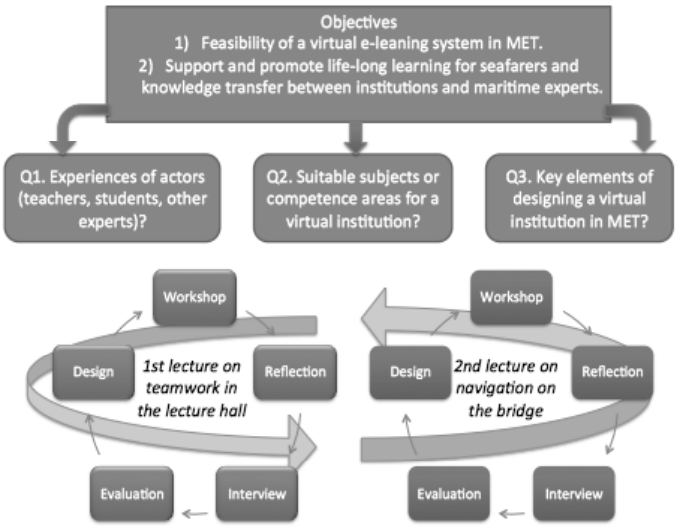
Research approach

Objectives

- To **understand** the possibilities of utilizing a Multi-User Virtual Environment (MUVE) to design a new MET e-learning environment that provide
  - Engaged learning environment
  - improve the process of knowledge transfer between maritime experts and MET institutions

- **Explore** the socio-technical design of a new virtual e-learning environment.

Research approach

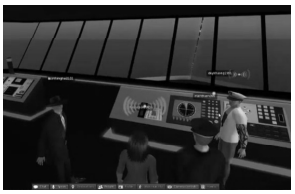


Qualitative flexible research approach

MUVE Workshops

Video from 1st & 2nd workshop

Findings – MET possibilities

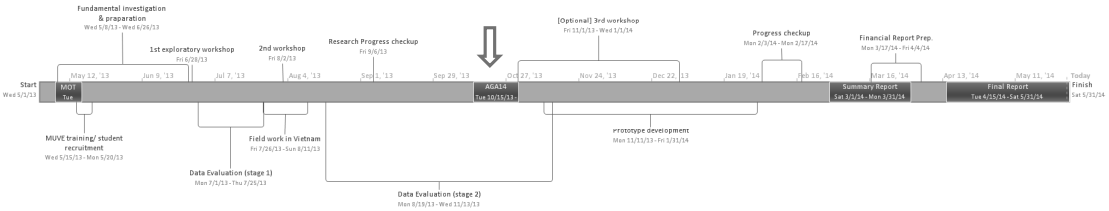


New blendings

Social Collaboration

Environment and artifacts

Progress

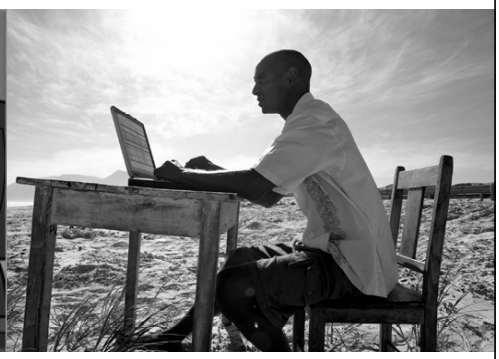


What's next?

- **Going further with empirical data analysis & evaluation**
- **STCW relevant subject matters**
- **Develop and test a MET course unit**

Q & A

Thank you for your attention



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